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Frankincense

Boswellia sacra (syn. *B. carteri*), *B. serrata*

Family: Burseraceae

INTRODUCTION

Frankincense is a resinous, evergreen tree that grows to 15 feet tall with papery, peeling bark.¹ Five-petaled, creamy-white flowers appear in the spring followed by 3 to 5 angled, red-brown seed capsules. While approximately 25 species of *Boswellia* are found in the tropical regions of Africa, Asia, and the Arabian Peninsula, *B. sacra* is native to northern Somalia, Ethiopia, south Yemen, and Oman,² and *B. serrata* (Indian frankincense) is commonly found growing in dry forests from Punjab to West Bengal and in peninsular India.^{3,4} Exudate of Indian frankincense is used in the Ayurvedic, Siddha, and Unani systems of traditional medicine. The oleo-gum-resin is collected from wild trees by making incisions in the bark of the trunks and thick branches. The gum resin exudes from the incision point and solidifies into an irregular mass as a result of exposure to open air.⁵ The oleo-gum-resin is collected all year and used fresh or dried.¹

HISTORY AND CULTURAL SIGNIFICANCE

Boswellia sacra arrived in the Eastern Mediterranean region now composed of Israel, the Palestinian territories, Lebanon, and Jordan via the Incense Trail—the oldest caravan route in the world, which connected the aromatic growing regions with the ancient empires that valued these substances.^{6,7} A 3,000-year-old ball of frankincense was found in the tomb of the Egyptian King Tutankhamun (ca. 1341-1323 BCE).⁷ Two millennia ago, frankincense was as valuable as gold, hence the Bible story of its presentation to the baby Jesus by the 3 wise men.⁶ It may be that the resins of as many as 24 species of *Boswellia* are used in the production of frankincense, but *B. sacra* is the main source in some countries.⁷ The main species for frankincense gum-resin production in Ethio-

pia and in the Sudan is *B. papyrifera*.⁸ Mediterranean and Middle Eastern peoples valued frankincense in religious rituals for its fragrant, white smoke which was thought to appease the gods. It was used as a ceremonial incense in Persia, Babylon, and Assyria, and by both Jews and Romans.⁹ According to ancient records, 2.5 tons of frankincense were burned in a Babylonian temple in 1 year.⁶ Currently, the Catholic Church is thought to be the major consumer of frankincense for use in ceremonies.⁷

Both *B. sacra* and *B. serrata* have been used in cosmetics since the ancient times.¹ A black powder, kohl, was made of charred frankincense and used by the Egyptian women to paint their eyelids.⁹ Kohl was also used in an eye wash for soothing sore eyes.⁷ *Boswellia sacra* has also been used by the Egyptians for rejuvenating the skin via facial masks.⁹ Frankincense has been melted to make hair-removal creams,¹⁰ and used as a paste to perfume the hands,⁹ clothes, hair, and home.⁴ Modern skin care products contain frankincense for the treatment of blemishes, dry and mature complexions, and wrinkles, scars, and wounds.

The early Islamic physician and philosopher Ibn Sina (aka Avicenna, ca. 980-1037 CE) recommended frankincense for dysentery, fevers, and tumors, ulcers, and vomiting.¹⁰ Other Middle Eastern uses include the stimulation of digestion and strengthening of teeth, as a diuretic and purgative, to enhance memory, and for emotional and psychological problems.⁷

In India, different parts of the *B. serrata* tree are used traditionally in Ayurvedic medicine for asthma, blood purification, bronchial conditions, dysentery, rheumatism, skin ailments, and wound treatment.⁴ Therapeutic uses of the oleo-gum-resin of *B. serrata* in the Ayurvedic system of medicine include treatment of fever, excessive vaginal discharge, asthma, conjunctivitis, spermatorrhea, pain in testicles, and disease of the mouth.³ *Boswellia sacra* is used in India for nervous disorders and rheumatism.⁷

Traditional Chinese Medicine (TCM) uses *B. sacra* internally to invigorate blood circulation, control bleeding, relax the muscles, relieve menstrual disorders, and control pain.^{11,12} Called *ru xiang*, it is also used externally for lesions, particularly to reduce swelling, relieve pain, and to promote generation of flesh.¹²

In various African countries, frankincense is used as a tonic, diuretic, and to treat syphilis and bilharzia (schistosomiasis), a disease caused by parasitic worms.⁷

Frankincense is also utilized externally in aromatherapy for asthma, bronchitis, coughs, laryngitis, inflammation, colds, flu, stress-related conditions, anxiety, nervous tension, and painful menstruation.⁹

In North America, for the purpose of pre-marketing authorization and prod-



Frankincense *Boswellia sacra* Photo ©2010 Steven Foster

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uct licensing in Canada, the Natural Health Products Directorate (NHPD) has published 3 Frankincense monographs (for buccal, oral, and topical applications).¹³ The following indications are permitted for the oral use of the dried gum resin: traditionally used as an astringent; traditionally used as a diuretic; traditionally used to relieve nervous problems; traditionally used in TCM to promote circulation of *qi*; traditionally used in TCM to relieve urinary disorders; and traditionally used in TCM to dispel wind-dampness.¹³ Permitted uses for frankincense topical application medicines are: traditionally used in TCM to promote healing of carbuncles; traditionally used in TCM to promote tissue regeneration; traditionally used in TCM to promote healing of injuries; traditionally used in TCM to relieve gum, mouth, and throat complaints; traditionally used in TCM to relieve pain; traditionally applied to treat ringworm; traditionally used in TCM to promote healing of sores; and traditionally used in TCM to reduce swelling.¹⁴

In the United States, quality standards monographs were issued for "*Boswellia Serrata*" oleo-gum-resin and "*Boswellia Serrata* Extract" for use as dietary ingredients in June 2010 and will become official in the 2nd Supplement to the *United States Pharmacopeia* 33rd Revision – *National Formulary* 28th edition (USP 33 NF 28) on December 1, 2010.¹⁵ Olibanum Oil, the volatile oil distilled from gum obtained from *B. carteri* and other *Boswellia* species, is regulated as a food additive permitted for direct addition to food for human consumption.¹⁶ For its use as a flavoring agent in food products, a quality standards monograph has been published in the *Food Chemicals Codex*.¹⁷

For Indian frankincense gum-resin exudate that will be used as an active ingredient of registered herbal medicinal products in the European Community, an official quality standards monograph has been published in the European Pharmacopoeia (PhEur) for test and release of the active substance.¹⁸ It must contain minimum 1.0% 11-keto-beta-boswellic acid and a minimum of 1.0% acetyl-11-keto-beta-boswellic acid (dried drug).

MODERN RESEARCH

While both *B. sacra* and *B. serrata* have been used medicinally, *B. serrata* is the species currently most used in herbal medicine and upon which all the modern clinical research has been done. Its main known pharmacologically-active constituents include α and β boswellic acid and other pentacyclic triterpenic acids shown in laboratory studies to inhibit inflammatory processes.¹⁹ Boswellic acids in proprietary formulations (e.g., 5-Loxin[®]) have demonstrated a high safety profile.²⁰

A 2010 randomized, double-blind, split-face, comparative study was done to assess the efficacy, tolerability, and safety of a base cream containing 0.5% boswellic acids (BAs) (manufacturer unspecified) and the same cream without the BAs with regard to its use in treating photoaging of facial skin.²¹ Fifteen female volunteers applied the creams once daily for 30 days. The treatment was well tolerated and significant improvement occurred in tactile roughness and fine lines in the side of the face treated with the cream with BAs.

In 2008, a double-blind, randomized, placebo-controlled study examined 5-Loxin (30% 3-O-acetyl-11-keto-beta-boswellic acid [AKBA], P.L. Thomas and Co., Morristown, NJ) for treatment of osteoarthritis (OA) of the knee.²² For 90 days, 75 patients received either 100 mg or 25 mg daily of 5-Loxin or placebo. Each patient was evaluated at baseline and at days 7, 30, 60, and 90. At the end of the study, both doses of 5-Loxin showed clinically and statis-

tically significant improvements in pain and physical function scores.

A DBRPC multicenter clinical trial in 2007 studied *Boswellia Serrata* Extract (BSE) (80% boswellic acid prepared by a local pharmacist in Western Germany who is associated with a naturopathic hospital) for the treatment of collagenous colitis.²³ Patients with chronic diarrhea and histologically proven collagenous colitis (n=31) were randomized to receive either 400 mg of BSE orally 3 times per day or placebo for 6 weeks. Proportion of patients in clinical remission at the end of the trial was higher in the BSE group than in the placebo group (63.6 % vs 26.7%), but the authors stated that large trials are necessary to establish the clinical efficacy of BSE.

In a 2007 randomized, prospective, open-label, comparative study, the efficacy, safety, and tolerability of BSE (333mg BSE, WokVel[™], Pharmanza Pvt Ltd., Khambat, Gujarat, India) was compared to valdecoxib (Bextra[®], GD Searle, Peapack, NJ), a selective COX-2 inhibitor.²⁴ For 6 months, 66 patients ages 40-70 years old with OA of the knee received either WokVel 3 times per day or 10 mg valdecoxib (Tab Valdane, Cadila Pharmaceuticals Ltd, Ahmedabad, Gujarat, India) once daily. Following 2 months of therapy the BSE group showed statistically significant improvement in pain, stiffness, and level of difficulty in performing daily activities, with the improvements lasting a month after the therapy ended. The onset of the effect of the BSE was slower than that of valdecoxib but lasted longer.²⁴ [Note: Valdecoxib was subsequently taken off the market in India where the study was performed and voluntarily taken off the market in the U.S. due to adverse cardiac events.]²⁵

Another RDBPC crossover study in 2003 examined the efficacy, safety, and tolerability of BSE in 30 patients with OA of the knee.²⁶ Each group of 15 patients took either WokVel or a placebo 3 times per day. In the group that took the BSE, all patients reported decreased knee pain, increased knee flexion, increased walking distance, improvement in capacity of climbing stairs, and better ability in kneeling, crossed-legged sitting, and squatting. Range of knee movement was improved and frequency of swelling in the knee was decreased.

An additional open, uncontrolled study on 12 healthy men was conducted wherein the volunteers took one oral single dose of WokVel to determine optimal dosing and safety.²⁷ The authors determined that BSE is safe and well tolerated and needs to be given at the interval of 6 hours in the treatment of inflammatory diseases.

In 2002, orphan drug designation was granted by the European Commission to Pharmasan GmbH (Freiburg, Germany) for its *B. serrata* resin extract for the treatment of peritumoral edema derived from brain tumors.²⁸ Orphan designation is not a marketing authorization and still requires demonstration of quality, safety, and efficacy before an orphan product can be granted marketing authorization. The product was withdrawn in 2005 on request of the sponsor.

In addition, clinical trials using boswellic acids have demonstrated activity in patients with bronchial asthma,²⁹ ulcerative colitis,³⁰ Crohn's disease,³¹ and malignant gliomas.³²

FUTURE OUTLOOK

Accurate, current statistics for the frankincense trade are difficult to find, primarily because the figures are usually combined with other gums, resins, and balsams. However, India does report

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its export trade data for frankincense oleo-gum-resin. For the agricultural year of April 2009 through March 2010, India's exports of frankincense were valued at \$0.55 million US dollars, an increase of 81.13% over the previous year's total of \$0.3 million (Apr 2008-Mar 2009).³³ Additionally, the name "frankincense" can refer to any of a number of species and it may not be possible to determine which species' production is being reported. Nevertheless, in the latter part of the 20th century, an estimated 1,000 tons of frankincense were produced per year and current estimates of the amount imported to the United States is anywhere from 5 to 20 tons annually.⁷

In late 2006, there was a rash of popular press articles warning about the overharvesting of frankincense. This was based on an article in the August 2006 issue of the *Journal of Applied Ecology* that addressed only *B. papyrifera*.³⁴ Currently, a sustainability study is being conducted on *B. papyrifera* in Ethiopia.³⁵ Sustainability research on other species is sadly lacking. ■

—Gayle Engels

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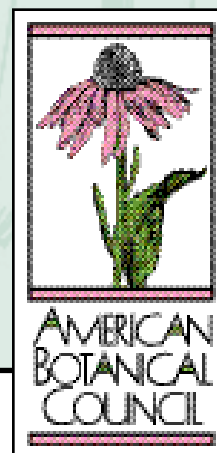
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dear reader

It is not widely known in the herb industry that about 75% of the herbs in world commerce are still collected from wild sources. Although there has been considerable recent progress in development of small- and large-scale cultivation of medicinal and aromatic plants (MAPs), most of the medicinal plants sold in this region—except for the obvious native American plants, e.g. black cohosh, echinacea, saw palmetto—are sourced from overseas. This is due to several factors, including providing a more reliable and steady source of such agricultural products, as well as reducing pressure on wild North American populations. Also, many MAPs are tropical and/or subtropical and simply will not grow in North America.

Another compelling reason for such imports is economic: MAPs tend to be collected and/or grown in countries where the significantly lower pay scale tends to maintain a downward pressure on their prices. In this issue, we present an in-depth article on the growing Fair Trade movement, which has gained significant ground in the past decade as more consumers and companies supplying agricultural products (e.g., coffee, tea, chocolate, and selected MAPs) have become sensitive to the ethical imperative to ensure that collectors, field workers, processing plant workers, and others in developing countries receive fair, reasonable, and economically and socially sustainable financial compensation for their labor.

At a friend's wedding about 25 years ago, I met a man who was in the produce industry. He aggressively scoffed at the idea that organically grown fruits and vegetables would ever become mainstream fare, due to a lack of adequate scale keeping their prices too high for most consumers. The organic food movement is now mainstream—even Wal-Mart sells organically produced foods—and has experienced major annual growth, outpacing increases in conventional foods. Today the scoffer's company sells ample organic produce, and, if I were to re-engage him in our quarter-century-old conversation, he would obviously have to eat his words, though I would prefer that he eat organic produce.

I wonder what fate awaits the Fair Trade movement. Will this be the domain of, say, a vocal 5% of consumers, those who are referred to as socially and environmentally conscious? Or, will Fair Trade, like the organic food movement before it—and perhaps the current “locavore” food movement—become one of the next major trends? We suspect it might, and hence, we've dedicated a significant number of pages to provide a view into its emergence.

Our good friend and ABC Advisory Board member Josef Brinckmann (vice-president of research and development at Traditional Medicinals, a maker of pharmacopeial-grade medicinal teas), has teamed up with Kerry Hughes, an ethnobotanist, author, and Fair Trade consultant, to produce an article explaining the scope of service of various Fair Trade programs and why they believe they are necessary in today's global economy.

This issue's additional in-depth feature deals with a serious health concern of global proportions—the many bacteria that are growing resistant to conventional antibiotics and these medications' increasing inability to prevent and treat such drug-resistant infections. As documented by numerous news reports and groups such as the World Health Organization, the spread of serious infections from bacteria like MRSA (methicillin-resistant *Staphylococcus aureus*) inside and outside of hospitals is creating a public health challenge of mounting concern to many health officials, physicians and nurses, hospital administrators, and policymakers around the world.

One promising prospect, however, might be found in various essential oils. Contributing writer Lindsay Stafford discusses this situation in an extensive article, explaining the potential role that various antimicrobial essential oils can play in killing drug-resistant bacteria and thus preventing and treating the serious diseases that they cause. While citing examples of highly promising *in vitro* and human research, as well as case reports of essential oils being used successfully in healthcare settings, the article also explains what must happen before essential oils could ever become standard items in hospital rooms.

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American Botanical Council

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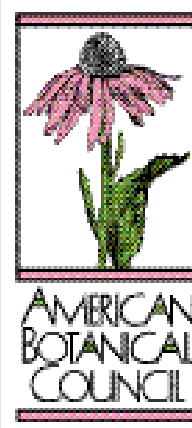
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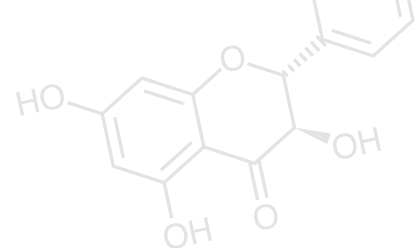
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HERBAlGRAM

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Using Essential Oils Against Drug-Resistant Bacteria: New Treatment Possibilities for a Global Health Priority?

By Lindsay Stafford

As bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) becomes increasingly drug resistant and pharmaceutical companies devote fewer resources to antibiotic development, a growing body of evidence shows that essential oils may be a viable treatment option for some infections. This article, authored by contributing writer Lindsay Stafford, outlines the historical uses of essential oils and promising contemporary human and laboratory research, and a future outlook on essential oils' potential in this area.

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Ethical Trading and Fair Trade Certification: The Growing Market for Botanicals with Ecological and Social Certification

By Josef Brinckmann and Kerry Hughes

There are approximately 3,000 botanical species currently in commerce; the majority of which are wild collected in developing countries. Fair trade experts Josef Brinckmann and Kerry Hughes explore the lack of transparency and inequality in botanical trade, as well as the increasing demand for socially and ecologically responsible market development. The authors identify and elaborate on 6 botanical fair trade certification programs, and discuss benefits of certification for consumers, businesses, and producers.

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Essential Oils & Drug-Resistant Bacteria. See page 32.

Inset photo: Collecting the essential oil after distillation. Photo ©2010 Biolaya

Main photo: *Oregano* *Origanum majorana*.

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ABC Hosts 3 Herb Walks for AHG, CRN, and the Public

The last few days of September and the first few days of October were a busy time in Austin, with herbalists and dietary supplement professionals gathering for both the American Herbalists Guild's 21st National Symposium and the Council for Responsible Nutrition's Day of Science and Annual Conference.



Passionflower *Passiflora incarnata*
Photo ©2010 ABC



Christopher Hobbs giving an herb walk for American Herbalists Guild Symposium attendees. Photo ©2010 ABC

On September 30, 2010, ABC was pleased to host attendees of the American Herbalists Guild's National Symposium at ABC headquarters in East Austin. Guests were treated to an herb walk conducted by noted herbalist, teacher, and author, Christopher Hobbs. This walk marked Hobbs' third ABC herb walk in less than 2 years.

On the afternoon of October 1, 2010, CRN offered an ABC herb walk to its attendees. CRN visitors toured ABC's 30 herbal demonstration gardens on a walk led by ABC Founder and Executive Director Mark Blumenthal and Robin

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Employee Profile: Rebecca Petee



Petee

Every nonprofit is blessed to have employees who see their positions as being more than mere jobs—people who are sincerely dedicated to the mission of the organization. Such is the case with Rebecca Petee, who came to ABC from New Hampshire where she helped manage a natural pharmacy that dispensed many herbal and homeopathic preparations (and no conventional pharmaceutical drugs, even though there are two pharmacists on staff).

One of Rebecca's main roles here at ABC (and I do not think this is stipulated specifically in her job description) is to play "kitchen herbal mama." Indeed, she has made our historic house a home. Hardly a day goes by when there is not an email from

her to ABC staff members inviting them to come to ABC's large kitchen area for some fresh pesto, made that day with basil from the ABC gardens, or for fresh mint and lemongrass tea she has just prepared. Recently, Rebecca has been guiding ABC interns who are interested in creating healthier, herbier food options. Together, they modify existing recipes for cookies and other desserts, and the resulting treats—made with agave instead of table sugar, beans in place of white flour, plus added herbs—have been a sweet success.

Her tutelage does not stop there, of course. Rebecca is constantly showing our pharmacy and dietitian interns how to make herbal preparations such as fresh echinacea tincture—again, from the ABC gardens—or jars of calendula cream. And, she has a traveling bug, which she constructively channels into field trips for the interns to local herb gardens and organic farms, herb shops, compounding pharmacies, and more.

Rebecca's job at ABC also includes responsibility for maintenance of the 2.5-acre ABC herb gardens—no easy task without the aid of a full-time gardener, as we have had in the past. Garden duties entail ensuring that plants are watered (a signifi-



Roy Upton giving an herb walk for visitors during ABC's Open House. Photo ©2010 ABC

cant challenge in Texas summers!), pruned, and cared for, as well as ordering plants in the spring and starting new seedlings from seeds collected from the previous year's plants. Other vital tasks include protecting certain plants from freezing in the winter, and ensuring that the greenhouse, rainwater harvesting system, drip irrigation system, and all garden tools and equipment are in working order.

In addition to directing the ABC pharmacy and dietitian interns, Rebecca oversees ABC's volunteer program, helping to elicit volunteers from the local Austin community and organizing and supervising them when they are here at ABC, particularly in the gardens, where there is no such thing as too much help.

Rebecca also responds to and conducts research for ABC member inquiries. Whether the query is submitted by an individual or a company, Rebecca is always prepared to craft a thoughtful response—utilizing her years of acquired wisdom and ABC's extensive library—or to refer members to another expert source. While it is true that she is providing a service to the herbal community, as Rebecca sees it, these inquiries can also be a valuable teaching tool for ABC's interns.

Building community is central to Rebecca's life outside of work, too. Hospitable to the last drop, she enjoys facilitating convivial atmospheres by cooking for family and friends, and also while sharing her herbal and epicurean skills with younger generations of women. She finds joy in trying ethnic cuisines, and in creating original dishes by combining whatever she may have in the pantry with fresh herbs from outside.

Elsewhere, Rebecca is an avid knitter and reader. She even narrates books to her out-of-state granddaughters, Brisla and Adalyn, over Skype video chats. There is no question that Rebecca brings people together, from reaching out through modern technology to gathering and educating communities the old-fashioned way: around the kitchen table. 📖

—Mark Blumenthal and Ashley Lindstrom



Continued from pg. 12

Marles, PhD, director of the Bureau of Research and Science for the Natural Health Products Directorate, Health Products and Food Branch, Health Canada. Dr. Marles is a long-time member of the ABC Advisory Board.

For those unable to visit ABC during the symposia-designated times or who were just interested in learning more about herbal medicine, ABC held an open house on the morning of October 4, 2010, with an herb walk led by American Herbal Pharmacopoeia Executive Director, Roy Upton. Trained in Ayurvedic, Chinese, and Western herbal medicine traditions, Upton engaged visitors in learning more about the practical utilization of herbs represented in ABC's gardens.

"Our beautiful and varied herb gardens are one of the key educational benefits of visiting ABC," said Blumenthal. "People commented that in many cases they were seeing live herbs about which they had only read in magazines and books, or seen processed in capsules and extracts on store shelves. Experiencing them growing in the ground, touching them, and smelling those with aromatic qualities gave them a new perspective about many popular and esoteric medicinal plants, and reminded them that they all come from the Earth."

—Denise Meikel

Top left photo: Mark Blumenthal leading an herb walk for Council for Responsible Nutrition Symposium attendees.

Bottom left photo: Robin Marles, Christopher Hobbs, Mark Blumenthal, and Roy Upton.

Bottom right photo: *Olive Olea europaea*
Photos ©2010 ABC



The Community Supported Herbal Medicine Movement

When US herbal dietary supplement sales reached an estimated \$5 billion last year—a near 5% increase from the previous year—many industry insiders labeled it a sign that the American people have become dissatisfied with the country's healthcare system and are turning to natural and affordable forms of “self care.”¹ Additional movements are also taking place across the country, which further indicate that people are increasingly taking health matters into their own hands.

Farmers' markets, which continue to pop up in an increasing number of cities and towns, are undeniably part of the massively popular “green” living trend that aims to improve environmental sustainability. But they are also a form of preventative self healthcare, with fresh and healthy food goods that can be the staple of any diet aimed at preventing illness, whether through losing weight, eating vegetarian, or replacing highly processed “junk food” with more whole foods. Doctors in Massachusetts, for example, are now dispensing “prescriptions” for produce bought at farmers' markets to some of their obese child patients, and 36 states fund farmers' market nutrition programs for women and children.²

Likewise, Community Supported Agriculture programs (CSAs) are a newer, yet growing, movement, with more than 1,000 CSAs estimated to exist in the United States and an increasing number dedicated solely to herbal remedies.³ The US Department of Agriculture (USDA) defines a CSA as a “community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community's farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production.”⁴ Members of a CSA, sometimes referred to as shareholders, pre-buy such products as fresh produce, free-range eggs, flowers, or grass-fed beef from the farm, as a way to pledge their financial support to cover the farm's operating costs. Members obtain their farm goods by picking them up at the farm or a designated pick-up location, or sometimes by having them delivered right to their front door.

Herbal-focused CSAs aim to take the CSA experience beyond a connection to the land into the realm of plant-based healing, wellness, and education. They provide fresh herbs and herbal medicines and products to their members, although each differs in its structure, philosophy, cost, and the products and services it supplies to its members. Some are called by other names, such as herb shares, herb exchanges, Community Supported Medicine (CSM), and Community Supported Herbalism (CSH).

Many herbal CSAs are currently concentrated in the Northeastern United States. Third Root Commu-

nity Health Center in Brooklyn, New York, for example, is a worker cooperative of healthcare practitioners that offers yoga classes, nutritional consultations, acupuncture, and other holistic medicine services, as well as a CSH program.⁵

Now in its second season, Third Root's CSH provides members with herbal remedies every week from June to November. Members have the opportunity to answer health-related questions on their registration form, which Third Root's herbalists use to tailor each season's products to address members' needs, said Jacoby Ballard, an herbalist, yoga instructor, and health educator at Third Root (e-mail, August 11, 2010).

The monthly herb packages include information on the specific herbs and usage instructions, and the herbal remedies focus on that month's theme, such as the November “breathe” theme that features a calming tea, oil infusion, and lung-centered tincture. Each month, members request a specific fourth herbal remedy, and pick-ups coincide with monthly health education workshops taught by Third Root Herbal Education Program students.

Unlike many CSAs around the country, Third Root's CSM program is unique in that it functions within an inner-city community and is not based on a single farm. Instead, it depends mainly upon herbs gathered at the nearby Prospect Park and Flatbush Community Garden, and some farms in upstate New York, said Ballard. Additionally, herbs for the CSM are also supplied by Third Root's “Sponsor an Herb” program, in which community members grow herbs in their backyards, fire escapes, and



A basket of herbs and herbal remedies supplied to members of Goldthread Herbal Apothecary's herbal CSA program.
Photo ©2010 Goldthread Herbal Apothecary



An herbal medicine workshop attended by members of Third Root Community Health Center's CSH program in Brooklyn, NY. Photo ©2010 Third Root Community Health Center

windowsills, keeping 40% of the herbs for themselves and donating the additional 60% to Third Root, he added.

Third Root's CSM is based on a sliding pay scale in which members pay according to their income level. Prices start at \$100 for a half share (10 installments) and \$200 for a full share (20 installments) and increase in increments of \$5 to \$10 for higher income brackets. "In the CSH program specifically, the sliding scale means that people who couldn't otherwise afford a full apothecary can build one over a season and that we can have a more diverse member-

ship," said Ballard. "In Brooklyn, that's key, as so many immigrant communities have intact herbal traditions but can't necessarily afford herbal products in stores. Our sliding scale means that we can reach these communities and validate the kind of healthcare they are more familiar with in their home country." More information is available at: www.thirdroot.org/csh.html.

Across the country, the Sonoma County Herb Exchange provides fresh and dried bulk herbs to its Northwestern California community. The Herb Exchange is not a traditional herbal CSA in that it does not have members or provide monthly herb baskets. Instead, it is a large cooperative of about 25 local herb growers who join to sell their herbs to the public at weekly markets and make all pricing and policy decisions. According to Leslie Gardner, director of the Herb Exchange, the program has about 300 to 400 customers a year who can order from a catalog each week or pre-order their yearly supply of herbs, which are dispensed at their "medicinal peak" (e-mail, July 23, 2010). Most of their customers are medicine makers, manufacturers, and herbalists, and several of their growers have obtained organic certification, including the Chinese Medicinal Herb Farm.

"To my knowledge, there isn't anything exactly like us anywhere," said Gardner. "We are locally focused and provide to a lot of local businesses. We are a nonprofit, under the umbrella of the Sonoma County Herb Association, and provide a number of educational classes and events." More information is available at: www.sonoma-herbs.org/herbalexchange.html.

For about 4 years, Goldthread Herbal Apothecary in Florence, Massachusetts has had an herbal CSA in addition to their many other projects.⁶ According to William Siff, founder and director of Goldthread, the goal in creating the herbal CSA was to establish

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within the community an understanding that herbal medicine is a foundational part of being a healthy human being and having a healthy family (e-mail, July 21, 2010).

“The CSA movement is a natural vehicle through which to establish the link between herbal medicine and healthy nutritious food—essentially that they are one in the same,” said Siff. “Re-establishing the knowledge and understanding of how to take a somewhat mysterious subject like herbal medicine and bring it back to the kitchen was one of our [main objectives] for starting the CSA.”

The herbs and herbal products supplied to the 75 CSA members come from Goldthread’s herb farm, which was originally created to supply the apothecary but now also supplies the CSA. The farm also provides a hands-on educational opportunity to Goldthread’s interns, who learn how to cultivate, harvest, and process the herbs, and also how to make the finished herbal medicines that are supplied to the CSA and in-town apothecary.

Popular products include Goldthread’s tea blends, elixir combinations such as elderberry/lime (*Sambucus canadensis*, Caprifoliaceae/*Citrus aurantifolia*, Rutaceae) and astragalus root/holy basil (*Astragalus membranaceus*, Fabaceae/*Ocimum tenuiflorum*, Lamiaceae), and honeys infused with herbs such as lavender (*Lavandula angustifolia*, Lamiaceae) flowers and sage (*Salvia officinalis*, Lamiaceae). Members of Goldthread’s herbal CSA have the opportunity to volunteer on the farm, though it is not a requirement, and they are also invited to participate in the medicine making and essential oil distillation processes. An individual share is \$150; a family share is \$225; and a deluxe share is \$275. (Shares are provided as one large installment at the end of growing season.)

Despite the success of Goldthread’s CSA, running such a farming operation is not easy, and it is one of the many reasons why the numbers of local, organic, or small-scale farms are, though growing, still few. “It is certainly difficult to revive community based agricultural endeavors in terms of financial gain,” said Siff, noting that all profits made from the CSA have been reinvested in the farm. “Small-scale farming by hand is an amazingly labor-intensive process, and even with the tuition from the interns, it is always a challenge to make ends meet.” Despite the obstacles, Goldthread plans to expand into offering culinary herbs and spices to its local cafes and restaurants and to continue exploring new recipes, products, and herbs. More information is available at: www.goldthreadapothecary.com/?p=csa.

“Our feedback has been that there is indeed a growing awareness within our community about the usefulness and necessity of herbal medicine within a grassroots, everyday approach to taking care of ourselves,” said Siff. “People appreciate the freshness and care that goes into our finished products, as well as the education and support that we offer them, so that [herbs] become very accessible and commonplace in the care of their families.”

According to Danica Holoviak, a member of Third Root’s CSA, “It rarely comes into my consciousness to use any pharmaceutical or go to the doctor. I first think, ‘What herb would work for this issue or for this person?’ and, ‘Can I make this tincture or tea myself?’” (e-mail, August 23, 2010). Holoviak often uses her CSA’s first-aid remedies, the sleep-aide tincture, digestive tea, and lavender essential oil. She recently gave the pain and headache tincture to her sister, who has a torn meniscus in her knee. “Why would you want to go to a doctor who has 15 seconds or less to talk with you

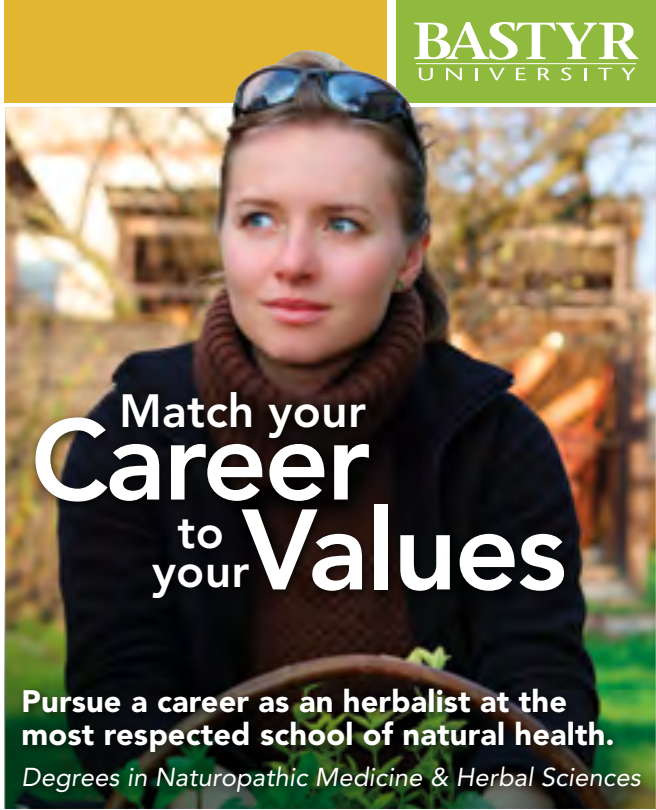
and doesn’t listen anyway and then charges you lots of money?” asked Holoviak, adding that hospitals also charge hefty fees and that prescriptions are similarly expensive, as well as commonly associated with side effects. ■■■

More information on herbal CSAs and their locations around the country is available through the LocalHarvest database (www.local-harvest.org) and in the September issue of HerbalEgram.

—Lindsay Stafford

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Whole Foods Market Raises Standards for Organic Labeling on Personal Care Products Sold in its Stores

In November of 2009, Whole Foods Market presented the US Department of Agriculture's (USDA) National Organic Standards Board (NOSB) with written comments decrying the absence of government regulation of organic personal care products. "The organic personal care marketplace is currently very much a 'Wild West' in which anyone can make an organic claim without substantiation or certification," the statement said (E. Leader-Smith, e-mail, August 16, 2010).

With a very few exceptions, all foods labeled organic must be certified under the USDA's National Organics Program (NOP). Personal care products, such as cosmetics, bath items, and other skincare goods, *can* be certified organic by the USDA, but are not required to be in order to make an organic label claim.¹

That will all change in June of 2011—at least for those organic personal care manufacturers who hope to do business with the Austin, Texas-based natural food retail giant Whole Foods.² The retailer recently announced its plan to privately sheriff the organic personal care industry until federal regulation is in place. With the exception of supplements, items sold in the "Whole Body" section of the store whose labels make organic claims will have to prove the legitimacy of such claims through obtaining either USDA NOP certification or NSF International's American National Standards Institute (ANSI) 305 certification.² NSF International is a Michigan-based non-governmental, nonprofit organization that develops widely recognized national standards in the areas of food, water, indoor air, and the environment.

Because Whole Foods' sales account for such a significant segment of the organic retail industry, the company's decision is likely to reverberate far beyond the walls of its own stores.

"I'm really proud of our company," said Joe Dickson, Whole Foods quality standards coordinator, "that we've drawn the line here and made a decision that's going to effect so much change" (oral communication, August 16, 2010).

According to Dickson, who also sits on the NOSB, Whole Foods already had a strict set of standards in place for what it would allow into its personal care aisles. "We screen every ingredient for safety and naturalness and environmental issues," said Dickson. Still, the organic claims made on some products were anywhere from "marginally confusing to outwardly deceptive," he said. "A customer walking from produce into Whole Body should not have to adjust their expectations or definitions."

According to the USDA's website, a food product masquerading as organic could result in a penalty of up to \$11,000 for its manufacturer.³ Personal care companies have not lived in fear of any such repercussion from the NOP.

The USDA separates organic classification into 4 categories. To qualify as "100% organic," the product should contain only organic materials (with the exception of water and salt). "Organic" products must be composed of 95% organic ingredients—again, save water and salt—and the other 5% must appear on the National List of Approved Substances (which are presently geared toward food, not personal care products, according to Dickson). "Made with organic ingredients" products must be 70% organic; they can list up to three of the organic ingredients on the principal display panel of the product's packaging, but they may not use the USDA Organic Seal. Products made up of less than 70% organic ingredients can label the individual USDA-certified organic ingredients as such in the ingredient panel and are not permitted to use the USDA Organic Seal.³

According to the USDA's website, "[T]he operations which produce the organic agricultural ingredients, the handlers of these agricultural ingredients, and the manufacturer of the final product must all be certified by a USDA-accredited certifying agent."⁴ The site lists more than 50 domestic accredited certifying agents, including Quality Assurance International (QAI), an agency with whom NSF is partnering for certification.⁵

According to Dickson, the new ANSI 305 certification will be comparable to the USDA's "made with organic ingredients" certification, except that it makes "allowances for ingredients and processes that are specific to personal care" that the USDA does not. In fact, Whole Foods held off on its change in proto-



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col until the ANSI 305 standard was completely developed by the NSF Joint Committee on Organic Personal Care—a committee on which Dickson served.

“We wanted to wait for that to be done,” said Dickson, “so that those manufacturers who still wanted to make a label claim that their product contains organic botanical ingredients or organic essential oils had a framework in which to do that.”

It is inevitable that some companies will repackage some or all of their current line in claim-free containers, especially because all products under brand names incorporating the word “organic” or “organics” must be USDA NOP or ANSI 305 certified organic to remain on Whole Foods shelves (E. Leader-Smith, e-mail, August 26, 2010). As a result, Aubrey Organics has a second brand in the works called “Aubrey.”¹

Lily Organics, whose skincare line is featured in select Whole Foods stores, is in the unique position of being a USDA-certified organic grower and handler, in addition to receiving USDA organic certification for one of its products, Organic Kukui Sensitive Facial Oil Treatment, according to Lily Morgan, the company’s founder. Morgan says Whole Foods’ announcement did not influence her company’s decisions regarding organic certification (e-mail, August 20, 2010).

“We have had these same high standards since 1986: made fresh weekly, no synthetic chemicals, ever, and pure plant organic ingredients,” said Morgan, who plans to submit 6 more products for USDA NOP certification in the near future. Morgan does not anticipate seeking NSF’s ANSI 305 certification for any of her products, in part because a mere copy of the ANSI 305 standard guidelines costs \$100. Certification through the NSF and USDA-accredited certifying agency QAI runs an additional \$2,000 to “several thousand” more, depending on the number of products certified, said QAI’s general manager, Jaclyn Bowen (oral communication, August 23, 2010).

Dickson said the USDA is considering Whole Foods’ recommendation for federal regulation of organic personal care products. “They did indicate this year that they are talking pretty productively to the FDA, which shares jurisdiction for personal care products. Our hope is the two agencies will work together to figure out where everyone’s turf is.”

The Organic Trade Association (OTA) lists both the NOP and ANSI 305 standards among its “Best Practices” for the interim, but says it will be “looking more closely at these private standards as it moves forward toward a federal standard” (B. Haumann, e-mail, August 26, 2010).



Per NSF International’s website, if the government should become active in regulating organic personal care claims in the future, “the US Office of Management and Budget (OMB) circular A-119 would encourage them to rely on the consensus national standard, which in this case is NSF/ANSI 305.”⁶

—Ashley Lindstrom

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World News

Office of Dietary Supplements Issues 5-year Plan

The mission of the Office of Dietary Supplements (ODS) of the National Institutes of Health (NIH) is “to strengthen the knowledge and understanding of dietary supplements by evaluating scientific information, stimulating and supporting research, disseminating research results, and educating the public to foster an enhanced quality of life and health for the U.S. population.” Marking its 15th anniversary, the ODS has published its strategic plan for 2010-2014.¹

The ODS was created in 1995 to meet the requirements of the Dietary Supplement Health and Education Act (DSHEA) of 1994. It uses strategic planning to establish and review the goals that drive its activities. The ODS budget for the 2010 fiscal year is \$29,034,000.

The foundation for this strategic plan is threefold: It deals with the congressional mandates set forth by DSHEA, the DSHEA definition of a dietary supplement, and the ODS mission statement. Based on the input from its partners in the dietary supplement industry and US federal government (e.g., the National Center for Complementary and Alternative Medicine [NCCAM] at NIH, and other stakeholders), ODS has established 4 strategic goals for the next 5 years.

Goal 1: Provide intellectual leadership by fostering research to analyze and evaluate the role of dietary supplements in promoting health and reducing the risk of disease.

To address this goal, ODS will continue to support evidence-based reviews of dietary supplements, including evaluations of their safety, efficacy, and effectiveness of use, and their role in reducing disease risk. With the National Institute of Mental Health, the Agency for Healthcare Research and Quality (AHRQ), and the NIH Office of Medical Applications of Research (OMAR), ODS cosponsored an evidence-based review on Alzheimer’s disease and cognitive decline that included the effects of nutrition, and is also cosponsoring a review of probiotic safety through AHRQ in collaboration with NCCAM and the US Food and Drug Administration (FDA).

ODS will also encourage the development and use of research designs for investigating the safety, efficacy, and effectiveness of vitamins, minerals, and other bioactives as dietary supplements.

And, with its federal partners, it will explore the nutritional status of important supplement nutrients of public health concern such as folate and omega-3 fatty acids.

ODS will continue to collaborate with federal groups to estimate the prevalence, frequency, duration, levels, and type of dietary supplements used by Americans, and to determine the relationships of usage patterns to health and disease risks. It will sponsor workshops on topics such as an economic analysis of supplements for chronic disease prevention.

A new ODS Population Studies program will analyze population data from the National Health and Nutrition Examination Survey (NHANES) and other survey programs to select high-priority projects to conduct on its own and with others. It will also support research to evaluate methods of measuring nutritional status by investigating biomarkers as reliable chemical and clinical means of assessing outcomes from supplement use.

Goal 2: Expand the general scientific knowledge base on dietary supplements by funding new research and training.

ODS will continue to co-fund research grants with NIH institutes and centers as part of an interdisciplinary approach to research. Specifically, ODS will cosponsor workshops and conferences to identify research opportunities and will maintain and expand the Botanical Research Centers program to expand the scientific base for botanicals used as dietary supplements—especially emphasizing preclinical research to explore mechanisms of disease risk reduction or prevention. ODS will also collaborate with NIH institutes and centers to support clinical trials designed to evaluate the role of dietary supplements in health promotion, will promote the use of the NIH Human Microbiome Proj-

ect and its association with prebiotic and probiotic research, and will continue to support the NIH epigenetics initiative. Additionally, ODS will expand the group of research scientists qualified to investigate dietary supplements, with an emphasis on investigators in the early stages of their careers.

Goal 3: *Support the development of research tools for the study of dietary supplements.*

ODS will continue its program to develop and validate analytical methods and reference materials for the study of dietary supplements, and will welcome cooperation with organizations such as the National Institute of Standards and Technology (NIST). Currently, reference materials have been developed for saw palmetto (*Serenoa repens*, Arecaceae), bitter orange (*Citrus x aurantium*, Rutaceae), green tea (*Camellia sinensis*, Theaceae), and berries of the genus *Vaccinium* (Ericaceae). Reference materials for black cohosh (*Actaea racemosa*, Ranunculaceae), soy (*Glycine max*, Fabaceae), kudzu (*Pueraria montana*, Fabaceae), and red clover (*Trifolium pratense*, Fabaceae) are being developed. ODS will continue to work with the FDA to identify potential contaminants in dietary supplements and with the US Department of Agriculture to develop validated methods to determine potentially toxic components of botanical dietary supplements.

ODS will encourage the development of state-of-the-art technologies for botanical identification and for the study of complex herbal dietary supplements. It will support the development of databases of dietary supplement labels and ingredients for use in clinical, epidemiological, and other studies. Along with other government agencies, ODS supported the creation of the Dietary Supplement Ingredient Database (DSID) in 2004 and co-funded a pilot study to determine the feasibility of developing a Web-based database of the labels of all dietary supplements sold in the United States. ODS will support the development of an automated database to provide information on 24-hour recall of food and dietary supplement intake.

Goal 4: *Make the most up-to-date scientific knowledge about dietary supplements*

available to the public.

ODS will promote the exchange of information about dietary supplements among other federal agencies through workshops, seminars, and federal working groups. Specifically, it will continue working with the Federal Working Group on Dietary Supplements to coordinate and disseminate information on dietary supplements among federal partners.

ODS will provide reliable, science-based information on dietary supplements and their uses in promoting wellness. It will expand its website and develop new factsheets on dietary supplement ingredients. Besides the current referenced Health Profession factsheets, a Consumer version will be for the informed lay reader, along with an easy-to-read, 2-page QuickFacts version. In addition, ODS will improve access to the databases of dietary supplement ingredients and labels that are accessible through its website. It has already developed a website with dietary supplement analytical methods and reference materials for academic and industrial laboratories (ods.od.nih.gov/FactSheets/AMRM-ProgramWebsite.asp).

ODS will alert public- and private-sector partners of news and research on dietary supplements. ODS staff will give presentations at scientific meetings and conferences and to consumer groups on the latest dietary supplements science and will build on the Dietary Supplement Research Practicum presented for one week annually to faculty and doctoral students in health disciplines to provide an overview and grounding on pertinent concepts, gaps, and controversies. ■

—Shari Henson

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17th US Poet Laureate W.S. Merwin: Passionate Palm Conservationist

He is responsible for planting more than 800 species of palm trees on the Hawaiian island of Maui,¹ but newly appointed US poet laureate, W.S. Merwin, 83, has no illusions of botanical expertise. “I’m a complete amateur,” he said, “but I’ve loved growing things ever since I was a child” (oral communication, September 24, 2010).

For 30 years, the Pulitzer Prize-winning poet has been “putting life back into the world”¹ by planting and nurturing both endemic and non-indigenous palms (Arecaceae) on the 19 acres surrounding his secluded home near the volcano Haleakala.² “One of the reasons I was drawn to settling on Maui was the idea of being able to garden all year round,” said Mr. Merwin, a practicing Buddhist and devout environmentalist, who moved to Hawaii in 1976 and onto his current property in 1980. He recalls the condition of the erstwhile pineapple plantation when he first purchased it: “It was a deserted and ruined land,” he said. “What I wanted to do and what I’ve come to want to do with the land is to save it, of course.”

Mr. Merwin was born William Stanley Merwin on September 30, 1927, in New York City.³ He attended Princeton University, and, at the suggestion of poet and critic Ezra Pound, became a translator of poetry.² *A Mask for Janus*, Mr. Merwin’s first collection of his own poems, received the Yale Younger Poets Prize—just one of many awards and honors to come, including 2 Pulitzer Prizes.³ Today, he has authored more than 30 books, among them *The Folding Cliffs: A Narrative*, a historical novel-in-verse about Hawaii.

In June of 2010, the Library of Congress announced Mr. Merwin’s appointment as the nation’s 17th poet laureate.⁴ He will serve from October of this year until May of 2011, during which

time he will periodically venture away from his cherished palm garden to deliver readings and lectures on the mainland.

Mr. Merwin planted his first palm “back before 1980.” He had taken notice of their seeds and was curious as to how they grew. “I was interested, of course, in growing native species of all kinds, with not such good luck,” he said, “because all tropical species—and above all, Hawaiian ones—are extremely site-specific.”

Together with his wife, Paula, Mr. Merwin eventually planted hundreds of trees with success, many of them endangered species. “I love them, you know. I’ve come to love them more and more... There are individual ones that I really love,” said Mr. Merwin. “There’s one that I look at at breakfast every morning from the lanai; it’s a native *Pritchardia*, and I have always known it by the name of a French botanist *gaudichaudii* [after Charles Gaudichaud-Beaupré].”

It is fitting, then, that Mr. Merwin will be writing a foreword for environmental horticulturist Donald Hodel’s upcoming book on the genus *Pritchardia*, which is scheduled to be published by the University of Hawaii Press next year, according to Hodel (oral communication, October 1, 2010).

Both Hodel and Andrew Henderson, PhD, curator of the New York Botanical Garden’s Institute of Systemic Botany, noted the havoc that development has wreaked on Hawaii’s vegetation,

Place

On the last day of the world
I would want to plant a tree

what for
not for the fruit

the tree that bears the fruit
is not the one that was planted

I want the tree that stands
in the earth for the first time

with the sun already
going down

and the water
touching its roots

in the earth full of the dead
and the clouds passing

one by one
over its leaves

-W.S. Merwin



US poet laureate W.S. Merwin
Photo ©2010 Tom Sewell

including *Pritchardia*. “Many of them are endangered—most of them. As you know, there’s been a lot of destruction of natural habitats,” said Dr. Henderson (oral communication, October 1, 2010).

Mr. Merwin has been credited with saving the near-extinct *Hyophorbe indica* (Arecaceae),⁴ endemic to the Mascarene Islands, after successfully growing several from seed he was sent in the late 1980s. “A very serious palm-nursery friend said to me, ‘You ever get seed from those trees, you can have anything I’ve got,’” said Mr. Merwin, “So for years I sent him seeds, and he honored his agreement, far more than I wanted him to—it’s *embarrassing*.”

Today, palm seeds continue to be a source of wonder for Mr. Merwin. “Sometimes I just pick up a seed and think, ‘Here it is, it’s the size of a joint of one of my fingers, and it knows how to be the right kind of palm,’” he said. “It doesn’t have to ask me about anything. If the conditions are right, that’s what it’s going to do.”

The Merwins’ home and beloved palm forest will be preserved as a conservation site as well as a retreat and research facility for writers and botanists through The Merwin Conservancy, which received tax-exempt nonprofit status last spring (K. Bouris, oral communication, September 30, 2010). Partners include the Maui Coastal Land Trust and Washington-based nonprofit poetry publishing house Copper Canyon Press. The Nature Conservancy will provide high-resolution aerial mapping of the palm forest “to identify the palms and monitor changes over time.”⁵

“What happens a lot is these very special places are destroyed,” said Karen Bouris, director of the Conservancy, who cites the

Walden Woods Project as a model. According to Bouris, there is no chasm between the poet’s written work and his palms: “The work has inspired the garden. The garden has inspired the writing.”

“I think that the human imagination and the environment—it’s not that there’s a connection between them, it’s that they’re inseparable,” said Mr. Merwin. “You don’t have an imagination, really, without some kind of environment... We can’t ever get very far away from it without suffocating.” ■■

—Ashley Lindstrom

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Pycnogenol® and Aloe Cream Effective in Treating Hemorrhoidal Pain in 2 Trials

Reviewed: Belcaro G, Cesarone MR, Errichi B, et al. Pycnogenol® treatment of acute hemorrhoidal episodes. *Phytother Res.* 2010;24:438-444.

Reviewed: Eshghi F, Hosseinimehr SJ, Rahmani N, Khademloo M, Norozi MS, Hojati O. Effects of *Aloe vera* cream on post-hemorrhoidectomy pain and wound healing: results of a randomized, blind, placebo-controlled study. *J Altern Complement Med.* 2010;16(6):647-650.

Although many people suffer from hemorrhoids, most do not report any signs or symptoms to their healthcare provider until bleeding occurs. Most patients can control their hemorrhoidal symptoms with lifestyle changes, topical over-the-counter medications, diet modifications, and careful hygiene. Of those who seek help from their physician, about 10% to 20% require surgical treatment. A hemorrhoidectomy (surgical removal of hemorrhoids) causes significant postoperative pain as a result of numerous variables, including inflammation and wound healing.

Two recent studies assessed botanical-based preparations for treating pain associated with hemorrhoids. The first study evaluated the efficacy and tolerability of a high-dose oral Pycnogenol® supplement on the symptoms and signs of acute hemorrhoidal episodes, either administered alone or combined with a topical preparation containing Pycnogenol. The second study evaluated the effect of an *Aloe Vera* (Liliaceae) topical preparation on reducing postoperative pain and pain upon defecation after open hemorrhoidectomy.

Pycnogenol (Horphag Research, Geneva, Switzerland) is a standardized extract of French maritime pine bark (*Pinus pinaster*, Pinaceae).^{1,2} The extract is standardized to contain 65-75% procyanidins, which consist of condensed catechin and epicatechin. Pycnogenol's anti-inflammatory, antithrombotic, and venotropic (having a beneficial effect on venous pathology) properties may benefit patients with hemorrhoids, both for acute and chronic treatment. (A comprehensive monograph on Pycnogenol research, including pharmacological and clinical studies testing its safety and activity in treating chronic venous insufficiency, thrombosis, diabetes, hypertension, and other conditions, is available on the American Botanical Council website at www.herbalgram.org/site/PageServer?pagename=Pycnogenol.)

Eighty-four patients suffering from an acute episode of external hemorrhoids (lasting 24 to 48 hours before the study) participated in the randomized, controlled, comparative study on Pycnogenol, which took place at the University of Chieti in Italy. The most frequently observed signs and symptoms of a typical hemorrhoidal attack were evaluated during the

2-week study period. Evaluation targets included the duration of the persistence (in hours) of peak pain and pain intensity.

The patients were assigned randomly to one of the following treatment groups:

Group A: 300 mg Pycnogenol (6 tablets, 50 mg each) daily for 4 days, and then 150 mg (3 tablets) daily for 3 days (taken at 8 am, 4 pm, and midnight).

Group B: Comparable placebo (identical tablets without active ingredient).

Group C: Topical 0.5% Pycnogenol cream (in an emulsion prepared by the hospital pharmacy solely for use in this study) in combination with Pycnogenol oral treatment as described for Group A.

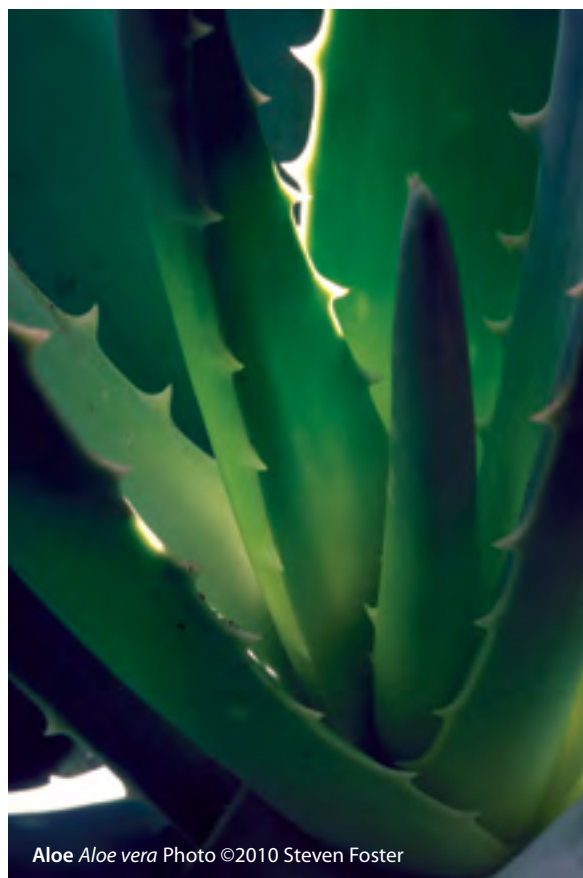
Group D: Oral Pycnogenol as in Group A in combination with topical sham cream (identical to emulsion used in Group C but lacking Pycnogenol).

The patients were treated for 7 days and were followed up with for another 7 days after treatment.

All groups received lifestyle management of their hemorrhoids, including dietary changes (e.g., addition of bulking agents and increased intake of fluids), changes in daily routines, and moderate, continuous exercise.

Symptoms and signs of hemorrhoidal attacks were scored by using an analog scale line (from 1 [absent] to 4 [severe]) at baseline and at 7 and 14 days. Pain was assessed by using the 10-point Karnofsky Scale, which provides a rapid screening of a patient's condition on a given day. Blood pressure, heart rate, and standard blood chemistry and rheology (the study of flow of fluids) parameters were all within normal limits at baseline, including fasting blood sugar, hemoglobin, electrolytes, and liver and kidney function tests but excluding white-cell count.

Patients kept a 2-month diary, showing lost working days, costs of controlling hemorrhoidal symptoms, and the occurrence of any complication or comparable recurrent attacks. Social quality-of-life parameters were evaluated on a scale at days 7 and 14. The authors report that the most important and most frequently observed signs and symptoms were



Aloe Aloe vera Photo ©2010 Steven Foster

acute intravascular thrombus, acute severe perianal pain, purple/black edematous and tense subcutaneous perianal mass, tenderness, ischemia/necrosis of the overlying skin, and bleeding. The scores for signs and symptoms decreased progressively in all groups ($P<0.05$) during the 2-week study period. The decrease was significantly higher in all 3 of the Pycnogenol groups as compared with the placebo group ($P<0.05$).

Of the 3 treatment groups, the scores for signs and symptoms were decreased most significantly in Group C. Results for Groups A and D were statistically comparable. Hemorrhoidal bleeding was completely absent in all 3 treatment groups at days 7 and 14, but it was still observed in the placebo group at day 14.

Regarding quality-of-life, the most important and most frequently observed social impairment problems decreased progressively in all groups during the 2 weeks ($P<0.05$). However, the improvement was significantly better in the 3 treatment groups when compared with the placebo group ($P<0.021$). Patients in Group C reported significantly decreased scores for each quality-of-life item ($P<0.05$), which included impairment in walking, standing, sitting, work performance, and embarrassment or social withdrawal. Again, the results in Groups A and D were comparable. The duration of peak pain was on average 17.8 hours in Group A, compared with 23.6 hours in the placebo group ($P<0.05$). In Group C, the peak pain duration (16 hours) was significantly lower ($P<0.05$) than in Group A. The number of working days missed decreased in the treatment groups: Group A averaged 65% of that for controls, with a minimum of 63% as many lost work days in Group C ($P<0.05$). Treatment costs decreased significantly ($P<0.05$) in the treatment groups compared to controls: Group A costs were 57.8% as much, while Group C had only 33% of control costs.

Within the month following the study period, there was a significant ($P<0.05$) decrease in the occurrence of hemorrhoidal events in the treatment groups (5% incidence for Group A, 3% for Group C, and 6% for Group D), when compared with an 18% incidence in Group B.

The authors conclude that Pycnogenol treatment significantly reduced the intensity and duration of pain and bleeding in acute hemorrhoidal episodes. Also reduced were costs of treatment, the number of complications, and the number of lost working days. This study indicates that "Pycnogenol (both in oral and topical forms) represents an effective way for controlling the common, disabling problem of acute hemorrhoidal attacks. Pycnogenol should be effective for the management of hemorrhoids and the prevention of future acute outbreaks," write the authors. Studies in progress are investigating its chronic use for management of hemorrhoids and prevention of new episodes.

For the aloe trial, 49 patients with symptomatic III and IV degree hemorrhoidal disease and undergoing open hemorrhoidectomy surgery participated in the randomized, double-blind, prospective, placebo-controlled study. The study was conducted at Imam Hospital, Sari, Iran. Patients who were pregnant or had anal fissure, heart disease, or liver disease were excluded. Patients were randomized to receive placebo or aloe cream, specially compounded for the study.

Liquid white paraffin, sterile alcohol, cetyl alcohol, solid white paraffin, and propylene paraben were mixed and heated to boiling, as the oil phase. *Aloe vera* inner leaf (gel) powder 0.5% (Zarband Phytopharmaceutical Company; Iran) mixed with deionized water was added to a mixture of propylene glycol, sodium lauryl

sulfate, and methylparaben, and heated as the aqueous phase. The 2 separate phases were mixed continuously while being cooled. The resulting cream was packaged into an aluminum tube for the study. The placebo cream was made the same way, but the aloe was left out of the mix.

The first application of the cream was immediately after surgery and was part of the postoperative dressing. Cream was reapplied 12 hours later. The patient then applied approximately 3 g of the cream to the surgical site 3 times per day for up to 28 days. Patients could take analgesic drugs as needed, and the analgesic requirement was recorded. Postoperative pain was recorded with a visual analog scale. At 2 and 4 weeks post-operation, an expert surgeon evaluated wound healing.

There were no significant differences between groups at baseline. Pain scores immediately following surgery were not significantly different between groups. The aloe group had significantly less pain than the placebo group at 12, 24, and 48 hours, as well as 2 weeks post-surgery ($P<0.001$). The aloe group also had significantly less pain upon defecation 24 and 48 hours after hemorrhoidectomy ($P<0.001$), but there was no significant difference between groups at 2 and 4 weeks. At 2 weeks post-surgery, the aloe group had significantly better wound healing ($P<0.001$), but there was no significant difference between groups at 4 weeks. Narcotic use was significantly less in the aloe group than in the placebo group 12 hours postsurgery ($P<0.001$), and non-narcotic use was significantly less in the aloe group than in the placebo group 2 weeks post-surgery ($P<0.001$). No adverse side effects or allergic reactions were reported.

The authors conclude that *Aloe vera* cream provided significant pain relief after open hemorrhoidectomy. Also, aloe cream produced significant wound healing 14 days post-surgery. The authors point out that the use of fewer analgesics by the aloe treated patients supports the findings. Aloe may be producing these effects through a variety of mechanisms. Aloe may decrease inflammation, which is the first step to wound healing; it may also be enhancing production of collagen, which provides strength and integrity to the skin and supporting tissues.

The findings of this study are particularly credible since the study was not sponsored by a commercial company and does not promote a specific product. *Aloe vera* 0.5% products are available commercially, which enables the findings from this study to be relatively easily put into clinical practice. (An *HerbalGram* peer reviewer notes that "Inner leaf (gel) juice with 0.5% solids is the standard for what is commonly known as single strength juice. Not all aloe juice products in the US have this level of solids but they are available.") ■

—Shari Henson and Heather S. Oliff, PhD

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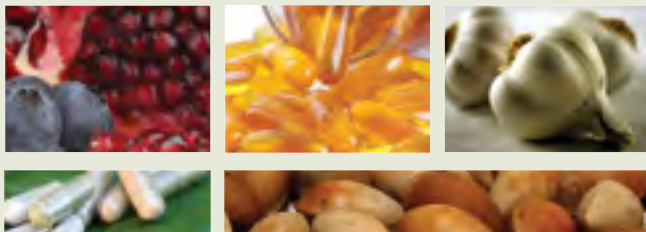
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Hibiscus Extract Helps Reduce Blood Glucose and Triglycerides and Increase HDL-Cholesterol Levels in People with Metabolic Syndrome

Reviewed: Gurrola-Díaz CM, García-López PM, Sánchez-Enríquez S, et al. Effects of *Hibiscus sabdariffa* extract powder and preventive treatment (diet) on the lipid profiles of patients with metabolic syndrome (MeSy). *Phytomed*. Jun 2010;17(7):500-505.

The anthocyanin-rich calyx (sepals on the flower) of Hibiscus (*Hibiscus sabdariffa*, Malvaceae) is used to make herbal teas in Mexico and elsewhere around the world. Hibiscus extracts have shown diuretic, laxative, antibacterial, antioxidant, antihypertensive, hypolipidemic, anti-atherosclerotic, and hypocholesterolemic effects. In this clinical study, researchers at the University of Guadalajara in Guadalajara, Mexico and the Instituto Tecnológico de Tlajomulco Jalisco herbarium in Tlajomulco de Zúñiga, Mexico studied the effect of a powdered hibiscus extract alone and combined with dietary changes on the lipid profile of metabolic syndrome patients, characterized by insu-



Hibiscus *Hibiscus sabdariffa* Photo ©2010 Steven Foster

lin resistance, obesity, hypertension, and dyslipidemia. Metabolic syndrome is considered to be a reversible clinical stage before its evolution to heart disease or Type 2 diabetes.

The authors enrolled 152 male and female subjects, aged 30-71 years, with or without metabolic syndrome diagnosed according to the criteria of the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP)-III. The subjects with metabolic syndrome and the healthy control subjects were subdivided into 3 treatment groups: diet only, hibiscus extract only, and hibiscus extract plus diet. Biochemical evaluations were conducted at baseline and after 31 days of treatment.

For subjects receiving dietary modifications, the diets were individually formulated according to NCEP ATP-III guidelines. Those assigned the hibiscus extract took 1 capsule (100 mg) each day before breakfast. A botanist at the Instituto Tecnológico de Tlajomulco Jalisco herbarium authenticated hibiscus plants of the Tepalcatepec variety, and a voucher specimen was deposited. The researchers prepared the hibiscus extract by macerating fresh hibiscus calyces in 30% ethanol for 7 days and drying the extract into a powder. High performance liquid chromatography (HPLC) analysis showed that the extract contained 192.4 mg/g total anthocyanins, primarily delphinidin- and cyanidin-3-sambubiosides.

At baseline, there were 80 control group subjects and 72 subjects with metabolic syndrome enrolled in the study. There was a large number of withdrawals in both groups due to nonmedical reasons, which left 51 metabolic syndrome subjects and 73 control group subjects in the final data analysis.

The metabolic syndrome subjects who received the hibiscus extract experienced significant decreases compared to baseline in average values for glucose, total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C) ($P < 0.05$ for all), as well as an increase in high-density lipoprotein cholesterol (HDL-C; $P < 0.001$). Triglyceride levels decreased significantly compared to baseline in the control group patients who were treated by diet and those treated with hibiscus extract ($P < 0.01$ for both), as well as metabolic syndrome patients treated with the hibiscus extract plus diet ($P < 0.001$). Treatment with the hibiscus extract improved the triglyceride/HDL-C ratio in the control group and the metabolic syndrome group ($P < 0.01$ and $P < 0.05$, respectively). The control subjects who received dietary treatment and the metabolic syndrome subjects treated with hibiscus extract experienced significant intra-group absolute differences (final – baseline values) for TC ($P = 0.001$ and $P = 0.050$, respectively). The control subjects treated with hibiscus extract and the metabolic syndrome subjects treated with diet, hibiscus extract, and diet plus hibiscus extract showed significant intra-group absolute differences for HDL-C ($P = 0.047$, $P \leq 0.001$, $P \leq 0.001$, and $P \leq 0.01$, respectively).

In addition, significant intra-group differences in the triglyceride/HDL-C ratio occurred in the control subjects who received the hibiscus extract and diet changes ($P = 0.002$ and $P = 0.031$, respectively), as well as the metabolic syndrome subjects who received the hibiscus extract and those who received the hibiscus extract plus diet ($P = 0.026$ and $P < 0.001$, respectively). Significant intra-group differences in triglyceride levels were observed in control subjects treated with diet and hibiscus extract ($P = 0.006$ and $P = 0.002$, respectively) and metabolic syndrome subjects who received hibiscus extract plus diet ($P < 0.001$). The basal triglyceride levels of the metabolic syndrome patients who received hibiscus extract and hibiscus extract plus diet decreased significantly ($P < 0.001$ for both).

There was a significant reduction in the metabolic syndrome patients with high cholesterol levels in the group that received hibiscus extract ($P = 0.033$), as well as a reduction in hypertriglyceridemia in metabolic syndrome subjects treated with diet and those treated with hibiscus extract plus diet ($P = 0.032$ and $P = 0.016$, respectively). In addition, the authors observed a significant reduction in hypertension in the metabolic syndrome patients treated with hibiscus extract plus diet ($P = 0.031$). Out of 16 metabolic syndrome patients with insulin resistance, eight had normal triglyceride/HDL-C ratios after treatment with hibiscus extract plus diet ($P = 0.004$). Levels of urea, creatinine, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) did not change significantly for any group, suggesting a good hepatic and renal safety profile. The authors did not report the presence or absence of adverse events during the study.

The hypolipidemic effect of hibiscus extract has been attributed to the presence of anthocyanins. The authors write that more research is needed to define the chemical profile of hibiscus extract and to determine the active constituent(s). The results of this study are in agreement with prior clinical trials indicating the cardiovascular benefits of hibiscus, including hypotensive and hypocholesterolemic effects. The authors conclude that hibiscus extract is a useful complementary therapy for patients with metabolic syndrome. ■■

—Marissa Oppel-Sutter, MS

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Special Turmeric Curcumin Formulation (Meriva®) Relieves Osteoarthritis Symptoms

Reviewed: Belcaro G, Cesarone M, Dugall M, et al. Product-evaluation registry of Meriva®, a curcumin-phosphatidylcholine complex, for the complementary management of osteoarthritis. *Panminerva Med.* 2010;52(2):1-8.

Turmeric (*Curcuma longa*, Zingiberaceae) rhizomes and tubers contain curcumin. This yellow pigment has been extensively researched to assess its efficacy in the treatment of chronic diseases, and especially inflammation, in over 2,500 preclinical investigations. There are several challenges with curcumin pharmacokinetics, including instability at physiological pH values, poor oral absorption, and quick elimination. However, some researchers believe, and some research demonstrates, that these challenges

can be improved by complexing curcumin with phospholipids, specifically phosphatidylcholine (PC). The resulting non-covalent adducts are named Phytosomes® (a group of patented phytomedicinal formulations made by Indena SpA of Milan, Italy). The authors state that this proprietary, patented combination improves curcumin's utilization in the human body by a combination of higher hydrolytic stability and better intestinal absorption.

Osteoarthritis (OA) could potentially benefit from curcumin's anti-inflammatory properties. Meriva®SR® Curcumin Phytosome formula, a curcumin and PC combination (1:2 ratio), was studied in a 3-month trial of 50 patients with X-ray diagnosed OA in one or both knees to assess the effects on their inflammation symptoms. The 50 patients were selected from the Vascular Screening Project at the University of Chieti in Italy, and sorted out into 2 groups. Patients from group A took only their prescribed medication, while those from group B took their prescribed medication along with 1.0 gram of Meriva capsules per day, corresponding to 200 mg of unformulated curcumin. (Meriva is produced by Indena SpA; this formulation is produced and marketed to healthcare professionals in the United States and North America by Thorne Research Inc., Dover, Idaho.)

The Western Ontario and McMaster Universities Arthritis Index (WOMAC) questionnaire was utilized to rate the patients' OA symptoms. The questionnaire scores were evaluated at inclusion and at the conclusion of the 3-month study. A treadmill walking test at 3 km/h with a 10% inclination was also employed to assess mobility and walking distance before knee joint pain occurred, at inclusion and at 3 months. Edema was evaluated and found to exist in 88% of the 50 patients at inclusion. C-reactive protein (CRP) plasma levels were measured to evaluate the inflammation status of the patients. CRP levels were assessed with the use of laser nephelometry at inclusion, 8 weeks, and 3 months. A healthy level of CRP, a marker for inflammation, is lower than 10 mg/L.

The results showed a significant decrease of the WOMAC median score for pain, stiffness, and physical function in patients from the Meriva group, where this score changed from 83.4 at inclusion to 34.8 by the end of the 3-month trial. In the control group, this score only decreased from 80.6 to 78.8. Walking ability increased from 76 m to 332 m (>400% improvement) in the Meriva group versus a 30.8% improvement in the control group at 3 months. Edema in both groups was reduced. Group A (control) began the study with an edema score of 2.76 (standard deviation [SD] 0.4) and Group B's (Meriva) average score was 2.81 (SD 0.33). At 3 months, Group B had edema reduction with a mean decrease of 65% to 1.2 (SD 0.3). Group A completed the



Turmeric *Curcuma longa*
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trial with a mean decrease of 5.0% and an edema score of 2.13 with $P<0.05$ between the groups.

A sub-population of 23 patients had elevated CRP levels, and was separated into 2 groups, Meriva (mean age 43.3; 8 females) and control (mean age 44.2; 6 females), to assess the effects of Meriva on CRP levels. Meriva patients experienced a significant decrease in CRP from 168 mg/L at inclusion to a final level of 13.1 mg/L at 3 months, with a significant improvement detected after 2 months. The control group began the trial at 175 mg/L, and at the end of the trial had decreased to only 112 mg/L. The Meriva patients had a significantly greater reduction in CRP levels, which were almost normalized, while in the control group the CRP level remained elevated by the end of the 3-month trial ($P<0.05$).

Several other measures were considered as secondary end-points, including emotional wellbeing, decrease in pharmaceutical medication consumption, and digestive disturbances. Emotional wellbeing improved significantly in the Meriva group (from 34.9 to 10.5 [$P<0.05$]), while it remained constant in the control group. The decrease in digestive problems was 38% in Meriva and 15% in the control group. Analgesic medication (non-steroidal anti-inflammatory drugs, NSAIDs) consumption decreased 63% in the Meriva group compared to 12% in the control group ($P<0.05$).

Previous research has indicated that this proprietary curcumin-phosphatidylcholine complex had a superior bioavailability to curcumin alone, with an over 20-fold improvement of plasma curcuminoid concentration.¹ The overall results from this new clinical study suggest that Meriva, when integrated with conventional medication, improves the general quality of life of OA patients, decreasing the painful symptoms associated with the disease, improving joint functionality, and reducing the consumption of NSAIDs.

Whether Meriva affects the levels of other inflammatory cytokines, e.g., TNF-alpha, was not investigated in this trial. Such information would have been constructive, as TNF-alpha blocker medications have been approved for this disease. Furthermore, a potential weakness of this study is the lack of a control group taking a non-formulated curcumin extract alone to compare with Meriva. Such direct comparison could help determine the possible superiority of Meriva over a more conventional curcumin extract. The dosage of curcumin in Meriva used in the study (200 mg) was significantly lower than those of unformulated curcumin preparations found clinically active in the treatment of inflammatory diseases (over 1 g).² ■

—Erin Miner and Mark Blumenthal

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Bacopa Extract Produces Evidence of Memory Improvements in the Elderly

Reviewed: Morgan A, Stevens J. Does *Bacopa monnieri* improve memory performance in older persons? Results of a randomized, placebo-controlled, double-blind trial. *J Altern Complement Med.* 2010;16(7):1-7.

Bacopa (*Bacopa monnieri*, Scrophulariaceae) is an aquatic plant that has been used in Ayurvedic medicine to enhance memory, intellectual function, and longevity. Several randomized, blind, controlled clinical trials demonstrate the benefits of bacopa extract on memory and learning, including one that also improved depression and anxiety measures in the elderly without dementia.¹ A Phase I clinical trial demonstrated the safety and tolerability of BacoMind™ (Natural Remedies Pvt. Ltd., Bangalore, India), a standardized extract of bacopa, in healthy volunteers.² The purpose of this randomized, placebo-controlled, double-blind study was to evaluate the efficacy and safety of BacoMind in older people (the population that experiences memory impairment).

Researchers recruited participants from the general population of Northern Rivers region, New South Wales, Australia via media announcements and staff at Southern Cross University, Lismore, New South Wales, Australia. Volunteers 55 years or older who were without dementia or depression as assessed with validated scales were included. Participants had to be healthy and not using psychoactive medications, herbal medications, recreational drugs, or consuming more than 4 alcoholic drinks per day.

Participants (n = 98; average age 65 years; range 55-86 years) were randomized to receive one 300 mg tablet/day BacoMind or placebo for 12 weeks. BacoMind is an alcoholic extract (herb-to-extract ratio, 20:1) standardized to contain total bacoside saponin content of 40%-50%. BacoMind is standardized to 9 active constituents: bacoside A₃, bacoside I, bacoside II, jujubogenin, bacosaponin C, bacosine, luteolin, apigenin, and b-sitosterol-D-glucoside. The dosage evaluated was based on the manufacturer's recommendation and was taken after a meal. Compliance was assessed by counting tablets at the end of the study.

Efficacy was evaluated with 3 validated neuropsychologic tests and a memory complaint questionnaire. The Rey Auditory Verbal Learning Test is a word-list learning test to assess aspects of memory including immediate recall, delayed recall, and retroactive and proactive interference. Rey-Osterrieth Complex Figure Test assesses visuospatial ability and visual memory. Trail Making Test measures scanning and visuomotor tracking, and involves cognitive processing (including memory) along with psychomotor speed. The Memory Complaint Questionnaire quantifies subjective memory complaints of aging.

At baseline, there were significant differences between treatment groups in the mean scores on the Rey-Osterrieth delayed recall tasks at both 3 minutes (Bacopa 18.2 ± 6.4; placebo 14.6 ± 5.9; P=0.005) and 30 minutes (Bacopa 18.3 ± 5.9; placebo 14.9 ± 6.4; P=0.008, respectively). There were no other baseline differences between groups. There were 17 withdrawals, including 9 in the bacopa group and 2 in the placebo group due to adverse effects, mostly gastrointestinal complaints (stool frequency, nausea, and abdominal cramps).

The Rey Auditory Verbal Learning Test consists of 15 tasks. Of these 15 tasks, BacoMind significantly improved memory function on 6 of the tasks compared with placebo: trial a4 (P=0.000) (the level in the paper; presumably this is a typographical error), trial a5 (P=0.016), trial a6 (postdistraction trial; P=0.000) (ditto), trial a7 (delayed-recall trial; P=0.001) (total learning summary trials a1-a5; P=0.011) and retroactive interference index (P=0.048). (Ed. Note: P values are somewhat suspect in this trial.) For all of the other efficacy tests there were no significant differences from placebo.

The authors conclude that bacopa significantly improves memory acquisition and retention in older Australians as measured by the Rey Auditory Verbal Learning Test. They state that the study demonstrated an improvement in the learning rate and had no effect on the forgetting rate. They caution against concurrent use of bacopa and acetylcholinesterase inhibitor medications, which are commonly prescribed for dementia. This study reported a higher incidence of GI side effects than was reported in the Phase I trial of BacoMind. This difference may be due to the older age of the population included in the current study, which may have a lower tolerability to bacopa, possibly due to its high saponin content.

This study was well designed and executed; however, an improvement on one test does not show decisively that bacopa improves memory acquisition and retention. This study bears repeating since there was a significant difference at baseline (a study limitation). It might also be constructive to evaluate a population with memory loss. ■

—Heather S. Oliff, PhD

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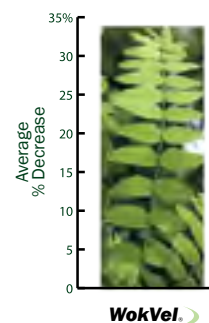
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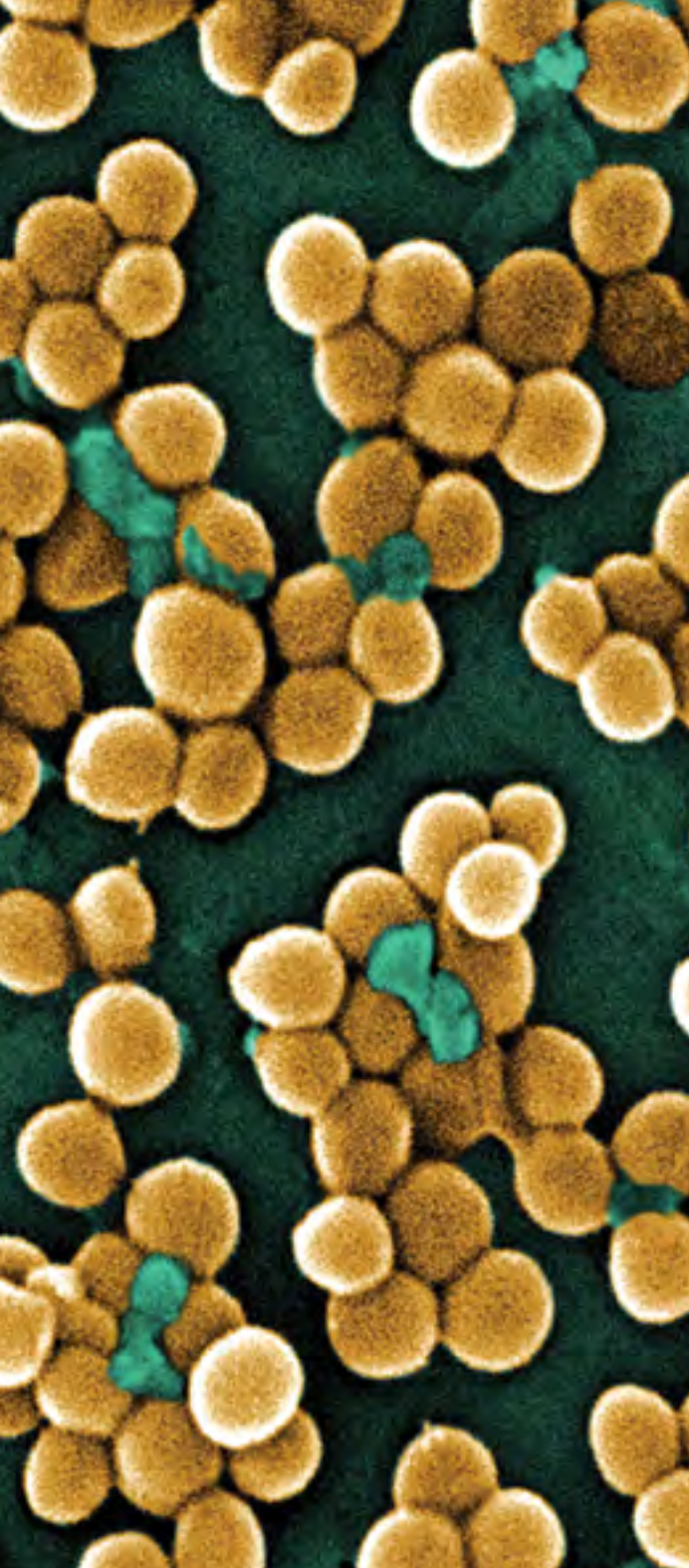


Using Essential Oils against Drug-Resistant Bacteria

*New treatment possibilities
for a global health priority?*

By Lindsay Stafford

Thyme *Thymus vulgaris*
Photo ©2010 Steven Foster



Scanning electron micrograph (SEM) depicting numerous clumps of *Staphylococcus aureus* bacteria, many strains of which are drug resistant, like MRSA; Magnified 9560x.
Image ©2010 Centers for Disease Control and Prevention's Public Health Image Library

Despite the dire threat to human health posed by drug-resistant bacteria, no successful therapies have been created nor implemented on a wide-scale basis. But the situation is not hopeless. Research on and usage of the essential oils from many plants suggest potential new preventions and treatments. Like many alternative and integrative therapies, however, large clinical trials on the efficacy of essential oils in preventing or treating drug-resistant bacterial infections in humans are lacking. Some say a significant and collaborative effort by complementary and conventional medicine scientists, practitioners, and industry is needed if these botanical substances are to receive the attention that could prove crucial to the future of public health.

The average person has trillions of bacteria living upon and within his or her body—more than he or she has cells.^{1,2} Though most of these are nonpathogenic and even helpful, such as beneficial gut flora, some bacteria can cause harm in humans and animals with compromised immunities, ranging from minor skin infections to serious diseases like tuberculosis. *Staphylococcus aureus*, for example, resides on and within the bodies of about 30% of the population and causes almost 500,000 serious illnesses each year.³

When a bacterial infection or illness occurs, doctors must drain any infected superficial abscesses and give the patient antibiotics, which are designed to kill or slow the growth of specific bacteria.⁴ First used on a large-scale basis in healthcare settings in the 1940s, these infection-fighting drugs have drastically decreased infectious disease-related illness and death. But antibiotics' widespread and sometimes inappropriate use has contributed to a situation as alarming as the sicknesses that these drugs were created to eliminate—drug resistance.

Drug-resistant bacteria withstand the intended effects of antibiotics by adapting themselves genetically and then sharing the new gene snippets with other bacteria, thus spreading the resistance ability.³ This allows them to cause more harm to living beings, increasing the risk of death, length of illness, and the opportunity for infection to spread to others. Almost every bacteria strain is stronger and less responsive to drugs than it once was; this rise in antibiotic-resistant bacteria has become one of the world's most urgent health concerns. The US Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) both consider addressing antibiotic resistance as one of their top priorities.^{1,5}

In hospitals, drug resistance is a major problem. "It is a very high priority issue in clinical settings, not only for patients, but for staff who may be exposed," said Linda Halcón, RN, PhD, an associate professor at the University of Minnesota's School for Nursing (oral communication, April 30, 2010). Additionally, drug-resistant bacterial infections outside of hospital settings are on the rise, which many experts say is especially concerning considering that these infections once occurred mainly in the sickest hospital patients.³ A 2009 article in the *New England Journal of Medicine* pointed out that it is now more difficult than ever to eradicate drug-resistant infections, and a global and collaborative effort from academia, industry, and government is direly needed.⁶

WHO lists penicillin-resistant *S. pneumoniae*, vancomycin-resistant *enterococci* (VRE), methicillin-resistant *S. aureus* (MRSA), multi-resistant *Salmonella*, and multi-resistant *Mycobacterium tuberculosis* as the antibiotic-resistant bacteria of greatest concern.⁵ MRSA is especially troubling as it once comprised merely 2% of staph infections but now accounts for at least 63% of the total number of recorded staph infections in the United States.³ MRSA can cause skin infections and

more serious sores, and it can also penetrate deep into the body, invading and infecting bones, joints, surgical wounds, and the heart, blood, and lungs.⁷ In 2005, the most recent year for which fatality records are available, MRSA killed 18,650 people in the United States,⁸ more than the number of people in the United States who die each year from AIDS (*Acquired Immune Deficiency Syndrome*).³ Though vancomycin, an antibiotic that is stronger yet more toxic in humans than methicillin,⁹ is sometimes used as a treatment, some MRSA strains are now becoming resistant to that drug as well.

While these bacterial strains are becoming more and more resistant to even the most powerful antibiotics, pharmaceutical companies have been drastically reducing the amount of time and money they devote to antibiotic research and development.³ It can cost up to \$800 million to bring a new drug, including an antibiotic, to market. While companies typically recover such pre-market costs through drug sales, the opportunity to do this with antibiotics is rather limited. Antibiotics do not have a long period of consumption, as most patients take them for weeks or months rather than years; also, because bacteria develop resistance unpredictably and sometimes rapidly, antibiotics often need to be replaced or discontinued within a relatively short amount of time.

Alan Goldhammer, PhD, the deputy vice president of science and regulatory affairs for the Pharmaceutical Research and Manufacturers of America (PhRMA), said that although some companies have discontinued research in this area, some promising vaccines and new classes of antibiotics are in development to combat resistance (oral communication, May 25, 2010).

According to WHO, “Most alarming of all are diseases where resistance is developing for virtually all currently available drugs, thus raising the spectre of a post-antibiotic era. Even if the pharmaceutical industry were to step up efforts to develop new replacement drugs immediately, current trends suggest that some diseases will have no effective therapies within the next 10 years.”⁵

But many healthcare professionals, including those at WHO, may be unaware of new treatment possibilities lurking below the mainstream radar. Mounting evidence suggests that the essential oils of herbs, flowers, and trees could change the future of public health in this area.

Traditional and Modern Uses

Drug resistance is a relatively new phenomenon, as antibiotics were not widely implemented until around the end of the Second World War.³ The contemporary usage and study of essential oils against drug-resistant bacteria is rather recent, as well. But these volatile plant-produced substances have well-established antimicrobial properties that have been used for centuries and researched for more than 100 years.

“[Essential oils] were fairly widely used in some parts of the world prior to the advent of antibiotics,” said Dr. Halcón. “Then the use of essential oils as antiseptics and antimicrobials faded

from view for a time. So in a way it is a young field and in a way it isn’t.” Dr. Halcón teaches a course on aromatherapy fundamentals for health professionals at the University of Minnesota’s Center for Spirituality and Healing. Though the name aromatherapy commonly suggests the use of aromatic oils for relaxation or beauty, its actual definition encompasses the use of essential oils for therapeutic or medical purposes.¹⁰

Aromatic plants and their natural oils were used in the traditional medicine of ancient civilizations, with the oldest record of medicinal use dating back to 4500 BCE.^{10,11} These early uses did not employ true essential oils but instead used oils obtained by combining plant material with fatty oils, which were heated under the sun and then separated so that the aromatic oil was preserved without the remaining material.¹² Egyptians, Greeks, Persians, and Romans used oils medicinally, sometimes to disinfect battle wounds or to prevent disease. Though the origin of distillation, which enabled the production of true essential oils, can be difficult to trace, many references cite its creation with the invention of the refrigerated coil during the late 10th century CE by Avicenna, the great Persian physician and scholar. During steam distillation, the oldest and most common commercial production technique used today, steam is passed through a chamber of plant material, which then collects and condenses, and a separator is employed to collect the oil.

During the 19th and 20th centuries, scientists analyzed and recorded many of the medicinal properties and uses of essential oils, including cinnamon (*Cinnamomum* spp., Lauraceae), frankincense (*Boswellia* spp., Burseraceae), juniper (*Juniperus* spp., Cupressaceae), rose (*Rosa* spp., Rosaceae), rosemary (*Rosmarinus officinalis*, Lamiaceae), sage (*Salvia officinalis*, Lamiaceae), and lavender (*Lavandula angustifolia*, Lamiaceae). And in the early 19th century, chemists identified and named some of the oils’ constituents, such as geraniol and citronellol.^{10,11}

The rapid growth of synthetic medicine led to essential oils being used mostly in perfumes and cosmetics, though bouts of reemergence occurred. Civilian and military hospitals during World War I, for example, used thyme (*Thymus vulgaris*, Lamiaceae), chamomile (*Matricaria recutita*, Asteraceae), clove (*Syzygium aromaticum*, Myrtaceae), and lemon (*Citrus x limon*, Rutaceae) essential oils and developed ointments for antibacterial and healing purposes. Essential oils were also used as natural disinfectants on patients with battlefield injuries during World War II.¹⁰

Today, numerous physicians, nurses, other healthcare practitioners, and laypersons use essential oils for their antibacterial properties, as well as their antiviral, sedative, stress-reducing, and antiseptic properties. According to Mindy Green, founder and president of the herbal and aromatherapy consulting company Green Scentsations and co-author of a leading book on aromatherapy, physicians in France prescribe essential oils externally and internally, and they sometimes specially formulate essential oil products for specific patients. In some European pharmacies, people can also purchase over-the-counter (OTC) oral capsules

In 2005, the most recent year for which fatality records are available, MRSA killed 18,650 people in the United States, more than the number of people in the United States who die each year from AIDS.



Essential oils in an Egyptian perfume shop.
Photo ©2010 Steven Foster



Juniper *Juniperus communis*
Photo ©2010 Steven Foster

of essential oils to treat headaches, menstrual cramps, stomach problems, and many other ailments, she said (oral communication, April 21, 2010).

The UK Royal College of Nursing accepts all methods of aromatherapy except oral use, and nurses in Australia, New Zealand, Canada, Germany, and Switzerland also use aromatherapy on their patients.¹⁰ Though therapeutic essential oil use in the United States is more limited, some physicians, nurses, and complementary and alternative medicine (CAM) practitioners employ essential oils in their treatments.

Current use in US hospitals primarily concerns palliative care, such as reducing stress and pain and increasing relaxation, but some physicians have begun using essential oils in their operating rooms to prevent infection of the surgical patient as well as cross-infection among staff.¹⁰ Depending on the institution's policy, nurses can also incorporate essential oils into their interventions. Jane Buckle, RN, PhD, a noted aromatherapist and author of several essential oil books, including *Clinical Aromatherapy*, has trained about 2,000 US nurses on the uses of essential oils (oral communication, May 5, 2010). As of 2003, about 70 hospitals and other medical centers in the United States were incorporating some form of essential oils into their treatment practices.¹⁰

According to Green and Dr. Buckle, the general public uses essential oils as antibacterials more frequently than does the healthcare community, especially with the growing interest in natural health. The majority of topical essential oils and essential oil products sold in the United States that do not make medicinal claims are considered cosmetics (as opposed to drugs), a designation accompanied by less stringent regulation, thus allowing for widespread availability and use in self-care.¹³ (To be classified as a dietary supplement, the essential oil would have to be administered orally with the intention of supplementing the diet.)

A Google search for essential oil cleansers returns hundreds of sites, pages, and forums providing advice and/or suggesting products for making essential oil cleaners—many of which call for tea tree (*Melaleuca alternifolia*, Myrtaceae) and lavender oils. Many brands also currently offer antibacterial products containing essential oils. CleanWell™, for example, is a brand of soaps and hand sanitizers containing thyme oil, and according to its website, the product has been shown in laboratory studies to be effective at killing MRSA, *E. coli*, and *Salmonella*.¹⁴ CleanWell products have been used by Equinox Health Clubs, Carnival Cruise Lines, The Great Neck Unified School District in New York, Brigham and Women's Hospital in Boston, and the Lincoln Park Zoo (R. Diamond, e-mail, May 4, 2010).

Research

Human Studies

Though not as extensive as the antimicrobial history, emerging human research and case reports support the specific use of essential oils against drug-resistant bacteria. "I think the fact that there's anything at all in the literature that shows that essential oils have an efficacious effect is enormous," said Dr. Buckle. "And I think it's the tip of the iceberg."

In 2007, for example, a study at Wythenshawe Hospital in Manchester, England found that a vaporizer diffusing a blend of East Indian lemongrass (*Cymbopogon flexuosus*, Gramineae) and sweet-scented geranium (*Pelargonium graveolens*, Geraniaceae) essential oils into the air effectively reduced airborne bacteria, including MRSA, by 89% when operated for 15 hours.¹⁵ For 9 months, the vaporizer was kept in the hospital's burn unit, causing a disappearance of MRSA infections and a dramatic decrease in all other infections.¹⁶ As a control, the essential oil blend was removed from the hospital's vaporizing machines during the last 2 months of investigation. This resulted in a MRSA outbreak.

In the most well-known human study, in 2001 researchers conducted a randomized, controlled trial looking at the effect that a tea tree oil cream and body wash had on 224 patients infected with MRSA.¹⁷ They found that almost as many patients receiving treatment with the tea tree oil products were free of MRSA (41%) as were patients receiving the control, a standard treatment of the antibiotic mupirocin, chlorhexidine gluconate, and silver sulfadiazine (49%). While the standard antibiotic treatment more effectively killed MRSA in the nasal region, the tea tree cream and body wash were better at clearing MRSA from the skin and wounds. Additionally, anecdotal reports have arisen, telling of



An ICU nurse at Texas Health Harris Methodist Hospital in Fort Worth diffusing Mandarin (*Citrus reticulata*) essential oil to treat a patient's nausea. Most essential oil use in US hospitals deals with palliative care. Photo ©2010 Jane Buckle

Many healthcare professionals may be unaware of new treatment possibilities lurking below the mainstream radar. Mounting evidence suggests that the essential oils of herbs, flowers, and trees could change the future of public health in this area.



Lavender *Lavandula angustifolia*
Photo ©2010 Steven Foster



Eucalyptus Eucalyptus globulus
Photo ©2010 Steven Foster

“Conventional antibiotics only interfere with one specific target, often a very specific step in the reproduction of a bacterial membrane. This is only a single step that the antibiotic is attacking, whereas the essential oil is attacking many targets at the same time.”

aerosolized tea tree oil reducing hospital-acquired infections.¹⁸

“[Tea tree oil] has broken down the door,” Dr. Buckle said of the existing research. “And I think a lot of other ones are coming.”

Case reports document similar success. In 2000, for example, researchers in Australia used botanical-containing antiseptic beads to treat a man whose leg wound was infected with MRSA and was not responding to antibiotics.¹⁹ The beads, containing mostly tea tree and eucalyptus (*Eucalyptus globulus*, Myrtaceae) oils, as well as a mixture of lemongrass, clove, thyme, butylated hydroxytoluene, 0.3% triclosan, and 69.7% ethanol (Polytoxinol™, Eucanol Pty Ltd, Wollongong, NSW, Australia) were inserted through a funnel into the MRSA-infected bone. After 3 months, the man’s wound had healed, his symptoms resolved, wound cultures cleared, and a plain x-ray showed resolution of the infected bone.

In a separate study a year later, 8 out of 9 patients with wound infections, including 4 infected with MRSA, experienced reduced inflammation and rapid healing after being given Polytoxinol.²⁰ Some patients had had the infection for more than 2 years. Six of the original 9 patients took only Polytoxinol while 3 took the essential oil medicine in addition to systemic antibiotics.

“It was quite surprising to see how active these oils are,” said Patrick Warnke, MD, PhD, one of the researchers involved

in the Polytoxinol studies (oral communication, August 2, 2010). According to Dr. Warnke, a professor of surgery at Bond University in Australia and an internationally renowned stem-cell researcher and plastic surgeon, it was very difficult to get a respected medical journal to accept an additional article he co-wrote on essential oils against drug-resistant bacteria. But now, he said, it is the journal’s most downloaded article, and people from around the world contact him for advice on using essential oils to combat critical infections in their patients. “This is very important,” he said, noting the duality of essential oils’ antibacterial and anti-inflammatory properties. “It sounds a bit dodgy in many eyes, but we are clinical scientists. I’m coming from the old-school [medical establishment]. There is so much potential that could really have an impact on clinical hospital treatments today.”

Additional case reports further show the activity of essential oils against other types of infections. In October of 2009, an elderly woman in hospice care who had had MRSA in her eyes and nostrils for 3 years was cleared of infection after a month-long treatment with lavender essential oil and saline.²¹ In another, a woman with tuberculosis, many strains of which are resistant to drug therapy, inhaled a blend of Australian eucalyptus oils in a water base with 29% ethanol 3 times per day for 10 days. This resulted in her having no clinical symptoms and testing negative for tuberculosis.²²

Though these human studies and case reports have shown essential oils to be effective against drug-resistant bacterial infections, more rigorously-controlled human clinical research is needed.

"There are tons of laboratory studies on the effectiveness of a variety of essential oils," said Dr. Halcón of the University of Minnesota. "They're very good laboratory studies. But they're not human studies."

Conducting human studies has not been easy, however. The US National Center for Complementary and Alternative Medicine (NCCAM) currently has no research portfolio or grants dealing with the use of essential oils against drug-resistant bacteria (K. Danielson, e-mail, May 13, 2010). According to Dr. Halcón, it is more difficult to obtain funding from NCCAM if the proposed research does not relate to one of its current prioritized research areas.

Dr. Halcón was able to obtain an Investigational New Drug (IND) designation for a tea tree oil product created specifically for use in her pilot study on wound healing and a seed grant from the University of Minnesota's Academic Health Center. But a large trial would require much more funding.

"The FDA was very supportive once I entered this process," she said. "They called me periodically to tell me, 'Don't give up, we believe in this,' and, 'Keep going.' Then in the same breath, they said, 'You know you won't be able to do large clinical trials without help from the pharmaceutical companies.'"

Because raw botanicals have historically been used in traditional medicine and contain numerous phytochemical constituents that can vary from plant to plant, many of these plants, or their extracts, are difficult to standardize and are usually not patentable. Thus, the pharmaceutical industry is not usually interested in funding such botanical research, as it prefers to focus on patentable single-chemical entity products,^{23,24} generally necessary to protect the large financial investment required to meet the high costs of FDA's extensive New Drug Application process.

While conducting her tea tree oil study, Dr. Halcón also experienced difficulty in recruiting participants, as she works in the academic world without a patient pool of her own. "It is necessary to have a team for this kind of research," she said, noting the need for researchers and healthcare providers to join together in testing innovative and promising therapies.

Despite there being very few human studies, the low number of toxicity reports from the many years that essential oils have been used by the public and some healthcare providers indicates that they are generally nontoxic and safe when used appropriately.¹⁰ Dr. Buckle surveyed documented cases of toxicity for her book *Clinical Aromatherapy* and found that few adverse event reports exist regarding essential oils taken orally, an administration route with greater chance of toxicity. Most of the adverse events that have been reported pertain to children who ingested a greater amount than is normally used. Even in those cases, the children fully recovered.

"Enough people are using essential oils throughout the world that if these things were not safe, then we'd know about it," said Dr. Buckle.

Sometimes toxicity does occur, however, ranging from minor to more serious skin reactions, oral poisoning, respiratory depression, and even several deaths.¹⁰ This is an area that warrants more investigation, particularly since the amount of essential oils that can result in adult fatalities has varied widely, with some adults having died after ingesting 4 or 5 ml of eucalyptus essential oil and others having recovered after ingesting 220 ml.

In Vitro Studies

Much more extensive than the body of existing human studies on essential oils against drug-resistant bacteria is the collection of *in vitro* research. Cinnamon, thyme, lemon, lemon balm (*Melissa officinalis*, Lamiaceae), lemongrass, sage, clary sage (*S. sclarea*, Lamiaceae), and eucalyptus oils have been found to be active against several bacterial strains, such as MRSA, *S. aureus*, *E. coli*, *S. epidermidis*, *Candida krusei*, *S. pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*.^{25,26,27} *Zataria multiflora* (Lamiaceae), a medicinal plant in Iran, has been found to have high antibacterial activity against MRSA and methicillin-sensitive *S. aureus* (MSSA). It has also been found to work synergistically with the antibiotic vancomycin.²⁸ Carrot (*Daucus carota*, Apiaceae) seed oil has been found to be active against *S. aureus* and *Helicobacter pylori*, which is developing resistance to drugs and is associated with gastric and duodenal ulcers, as well as gastric carcinoma. Additionally, tea tree oil has been shown as effective against *Mycoplasma pneumoniae*, strains of which are also drug-resistant.²⁹

Older *in vitro* studies have documented the drug-resistant antibacterial efficacy of the essential oils from bay (*Laurus nobilis*, Lauraceae), clove, marjoram (*Origanum majorana*, Lamiaceae), and geranium; and French tarragon (*Artemisia dracunculoides*, Asteraceae) was found effective against several strains including *Enterococcus faecalis*, which can lead to meningitis, food-borne illnesses, urinary tract infections, and life threatening VRE.¹⁰ In 1960, researchers found that lemongrass, oregano (*Origanum vulgare*, Lamiaceae), savory (*Satureja* spp., Lamiaceae), thyme, and cinnamon were the most effective of 133 oils against *S. aureus*, *E. coli*, *E. faecalis*, and *Mycobacterium avium*, which can be resistant to drugs and cause infections associated with HIV, pulmonary disease, and cervical lymphadenitis.

"I would think that we are actually at a pivotal stage where there are enough *in vitro* studies and anecdotal evidence to suggest that we need to move along to more human studies," said Dr. Buckle.

Action Mechanisms

How do essential oils work against such smart and powerful bacteria when even the strongest drugs fail? Though their mechanisms of action are complex and not completely understood, several factors are thought to contribute to their demonstrated efficacy.

As plants grow in the wild, they are susceptible to many dangers, including wild animals, climatic and environmental stressors, and disease. To protect themselves, they produce molecules called secondary metabolites, some of which produce a bitter smell or taste, induce loss of appetite if consumed, or emanate a pleasant aroma in order to attract seed and pollen dispersers.³⁰ Essential oils are secondary metabolites that can affect the activities of bacterial membranes and can also interfere with bacterial membrane or surface proteins, thus changing the bacteria's viability.³¹

"There are many different molecular targets in the bacteria with which the essential oils interact," said Kurt Schnaubelt, PhD, a chemist and scientific director of the educational and research organization Pacific Institute of Aromatherapy (oral communication, April 29, 2010). "The actual mechanisms of how these things occur are actually very well established."

Additionally, essential oil components can interfere with membrane vesicles and, eventually, the primary energy metabolism. Components such as thymol disrupt or partially disintegrate the membrane's outer layer,^{30,32} and some oils can denature

the bacteria's functional proteins, as is the case with tea tree oil's activity against *E. coli*.

"Conventional antibiotics only interfere with one specific target, often a very specific step in the reproduction of a bacterial membrane," said Dr. Schnaubelt. "This is only a single step that the antibiotic is attacking, whereas the essential oil is attacking many targets at the same time."

Though some have asserted that the solvent, usually ethanol, in which oils are diluted could be the source of the active properties, an international group of researchers found that when using only 70% ethanol, essential oils "consistently demonstrated inhibition zones larger than 70% ethanol alone."²⁵ Additionally, their controls of olive and paraffin oils had no effect, showing that the effect of the essential oils was not caused by an effect of an oily medium on microbial membranes.

Essential oils' complex compositions, as well as their evolutionary history, make it unlikely that bacteria will develop resistance to them, Dr. Schnaubelt continued. "I don't think it is justified to say that this is impossible, but it is really, really unlikely. The complex mixtures in plants have been designed by nature to prevent resistance. In addition, essential oil composition continuously changes throughout the season and from year to year. This contributes to the goal of the plant. They have the same interest as we do." Supporting Dr. Schnaubelt's comment, a 2008 study found that bacteria like MRSA and *E. faecalis* have very low frequencies of resistance to higher concentrations of tea tree oil.³³

This ability to avoid resistance might be compromised, however, when the essential oils are used in lower levels of concentration, though this is also debated.¹⁸ In 2007, researchers at the University of Ulster found that bacteria such as MRSA, *E. coli*, and *Salmonella* exposed to low doses of tea tree oil were more resistant to antibiotics.^{32,52} They warned that because the concentration of tea tree oil used in cosmetic products is not always specified, consumers could be using low concentrated products, which might increase the risk that the tea tree oil will fail to kill bacteria and increase the bacteria's resistance to antibiotics.

Several studies have reported that some essential oils work synergistically with antibiotics to increase activity and decrease drug resistance.²⁸ It is thought that some botanicals, like epigallocatechin gallate (EGCG) from green tea (*Camellia sinensis*, Theaceae), overcome resistance by inhibiting the synthesis of bacterial enzymes that target, destroy, or modify antibiotic drugs, thus increasing antibiotic drugs' activity when combined.³¹ Additionally, essential oil constituents like thymol and carvacrol can increase the permeability of bacteria's outer membranes that work to keep out antibiotics. Other plant components, such as carnosic acid from rosemary, can decrease the amount of antibiotics flushed out of bacteria's cells.

Fewer studies have been conducted on essential oils' activity against beneficial bacteria, said Dr. Schnaubelt. "Very little is known about that. However, the experience within the aromatherapy community suggests that they do not. Some of the studies suggest that the good bacteria can use some essential oil components as nutrients."

While some components of essential oils have been found to be most active, such as thymol and eucalyptol, it is thought that the synergistic relationship between all of the molecules might be important as well.

"It really depends on who you're talking to," said aromatherapist Green. She noted that there are several schools of thought on the effectiveness of isolated constituents versus the whole herb or essential oil. Holistic therapists often favor using the whole herb, while other practitioners might lean toward using an isolated component

based on research showing its efficacy.

In the 1970s and 1980s, French physicians Christian Duraffourd, MD, and Jean Claude Lapraz, MD, studied the antimicrobial effects of essential oils and concluded that their activity stems from the synergistic interaction among their molecules, and not one key "active principle."³⁴ Their research found an essential oil to be effective against a given microbe *in vitro* regardless of the presence of commonly recognized active principles.

In addition, essential oils have the ability to encourage a healing response in patients through antioxidant activity, immunomodulation, and/or neuroendocrine and genetic activity. Drs. Duraffourd and Lapraz found the most effective therapy is to treat patients at regular intervals with a combination of mild essential oils, regardless of the relative level of key "active" ingredients, and to tailor the essential oils to the individual patient and his or her terrain—the biologically qualitative and quantitative state of the body and its internal milieu. This process of considering the totality of a patient's sickness is the basis of the endobiogenic method, or clinical "phytoaromatherapy."

According to Dr. Schnaubelt, just because pharmacology has not yet conclusively determined if all molecules have a stronger combined effect does not mean it is not happening.

"Clearly the isolated components do have an effect," said Dr. Schnaubelt. "But we also know, when you use a natural mixture, such as essential oils, you have many different components and you do observe effects. If you adopt an evolutionary perspective, you realize that plants have evolved for all secondary metabolites to have more or less pronounced physiological effects."

Future Outlook

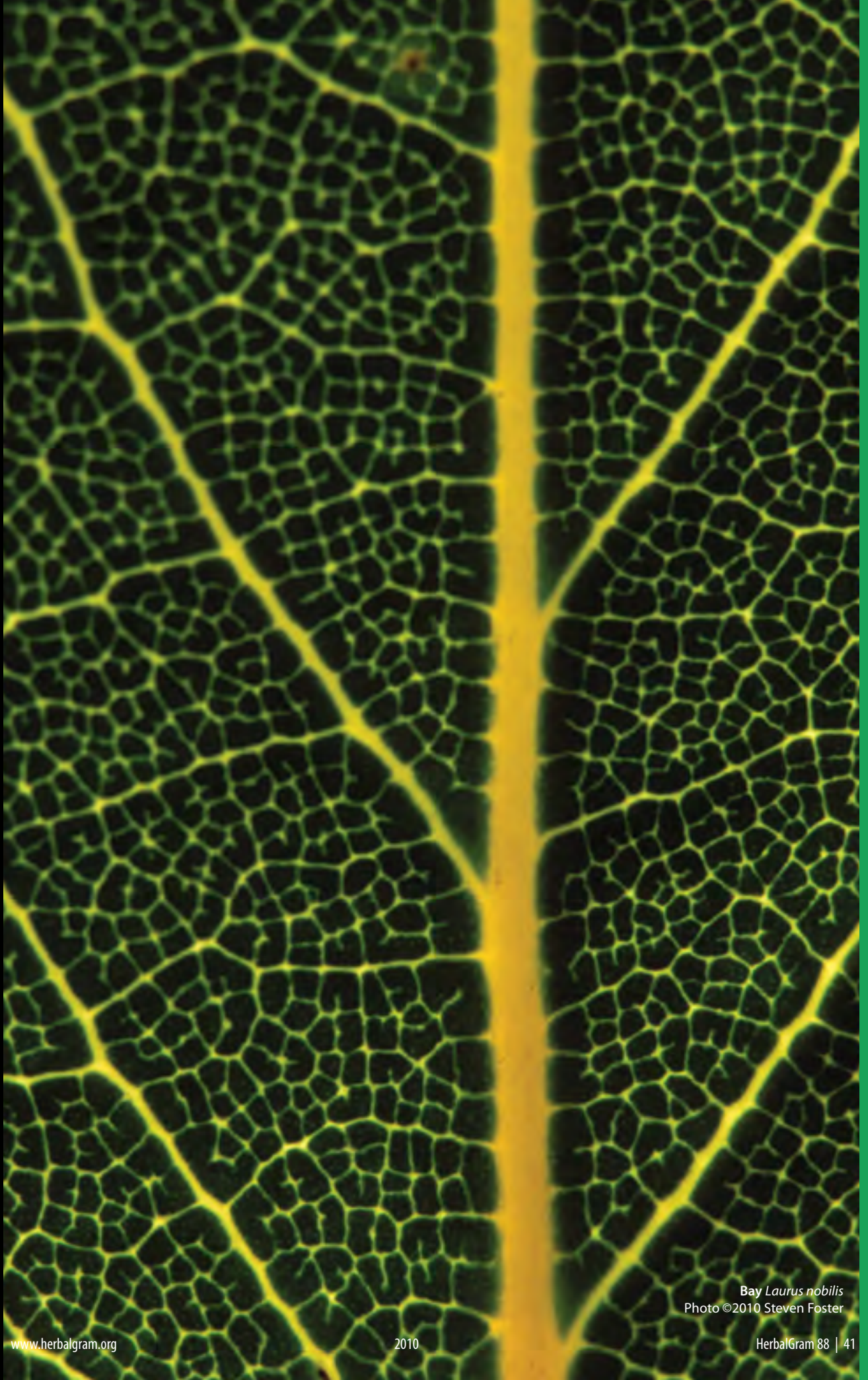
Drug-resistant bacteria present a potentially serious threat to the health, wellbeing, and even survival of people throughout the world. Despite the situation's dire nature and the potential of essential oils as a new therapy, several obstacles could prevent or slow their widespread clinical usage.

Because recent essential oil usage has mainly been within the perfume and food-flavoring industries, therapeutic essential oils are much farther behind herbs when it comes to complementary and integrative therapies, said Green.

"Medical use of essential oils is still very, very new in this country," she said. "I think aromatherapy is still making its way in the role of modern medicine. To most Americans, 'aromatherapy' is a product you buy on the drug store shelf that might be peach flavored bubble bath." While essential oils have aromas with restorative and healing effects, they also have potent and strong properties that work to mitigate conditions like infection, leading many within the aromatherapy community to want a new name for the practice, she added.

Additionally, one bottle of essential oil requires a great deal of plant material, making sustainability a potential concern for widespread usage. Although the amount of essential oil produced from plant material varies based on a number of factors, the yield of essential oils in plants is typically only between 0.005 and 10%.³⁵ Plants like sage and rosemary, which produce a relatively high percentage of essential oil, can require about 500 pounds of plant material to produce a mere 32 oz of essential oil. Dr. Buckle recognizes that this could potentially be a problem. "Wild crafted is probably not a good idea, but there is no reason why we can't grow [essential oil plants]," she said. "On the whole, I don't think the world is running out of them."

Green, on the other hand, thinks the plants from which essential oils are derived *can* be wild crafted in a sustainable way. In the book *Aromatherapy: A Complete Guide to the Healing Art* (Cross-



Bay Laurus nobilis
Photo ©2010 Steven Foster

Essential Oils and Food-Borne Bacteria

In the ongoing worldwide effort to prevent, control, and treat drug resistance, experts have called for a decrease in the massive amount of antibiotics used in agriculture, widely thought to contribute to drug resistance among humans. Essential oils are being used and researched within this area and the results suggest that they could replace some of the antibiotics used in food production.

The most recent estimate from the Union of Concerned Scientists (UCS) in 2001 puts the weight of all antibiotics used in food animal production in the United States at 13 million pounds.¹ The large-scale, industrial, and crowded nature of the meat and dairy industries increases the chance that infection and illness will spread quickly, so it is common for many animals, or even a whole herd or flock, to be given antibiotics when only one animal is sick in order to prevent disease.² Even more common, 80% of antimicrobials given to animals are for reasons unrelated to sickness, such as growth promotion. But these conditions make it particularly likely that bacteria will quickly develop resistance to drugs.

Laboratory and epidemiologic research has shown that drug-resistant bacteria from animals can enter a person's body when that person consumes animal products, handles colonized animals, or comes into contact with someone who has. Additionally, bacteria can be absorbed by produce and transferred to people who eat it, an increasingly common cause of food-borne illness in humans.² The European Union banned the use of antibiotics in animals for growth promotion in 2006, while the US government has yet to implement any regulations on the use of antibiotics in the livestock industry.³

Though some still consider antibiotics to be the industry's only hope for adequate livestock health and weight at slaughter, several techniques could decrease antibiotic dependency, including replacing some antibiotics with certain antimicrobial essential oils.^{4,5}

The essential oils in orange (*Citrus sinensis*, Rutaceae) peel and pulp, for example, were recently found to be effective at killing *Salmonella* in the intestinal tract of sheep,⁶ and an essential oil blend has proven to reduce intestinal bacteria and increase weight gain in thousands of

chickens.⁷ The essential oil constituents capsaicin (from hot peppers [*Capsicum* spp., Solanaceae]), cinnamaldehyde, and carvacrol (from thyme and oregano) have been shown to improve feed conversion weight in chickens; enhance their breast muscle proportion; reduce *E. coli*, *Clostridium perfringens*, and fungi; and increase beneficial *Lactobacillus*.⁸ In 2001, the journal *World Poultry* wrote that essential oil blends "should be regarded as one of the tools available to animal nutritionists in formulating diets for poultry."

Additional research has found that the essential oils of horseradish (*Armoracia rusticana*, Brassicaceae), mustard (*Brassica juncea*, Brassicaceae), oregano, and cassia (Chinese cinnamon [*Cinnamomum aromaticum*, Lauraceae]) would be a good replacement for the antimicrobial growth promoter Mecadox® (Pfizer Animal Health) in nursery pigs, as the oils increased the amount of food the piglets ate and oregano reduced the numbers of intestinal pathogens.⁹ Furthermore, the US Meat Animal Research Center reported in 2002 that essential oils containing a thymol and carvacrol combination were found to reduce or inhibit fecal coliforms, *E. coli*, and nitrogenous and odorous excrements in waste from livestock feedlots.¹⁰ Seven reports on essential oil usage in dairy cows found that thymol, eugenol, vanillin, guaiacol, and limonene, as well as garlic (*Allium sativum*, Alliaceae) and juniper oils, increased feed efficiency, milk yields, digestion, and fat and protein percentages of milk.¹¹

Some studies, however, have found that the essential oils studied did not affect growth performance or milk production as expected, and that they reduced counts of beneficial bacteria.^{12,13} The authors of a recent literature review on essential oil use in livestock nutrition state that most studies have been short-term and the results vary because each study used different essential oils, dosages, and diets.¹³

This research and various regulatory environments have contributed to the growing use of essential oils in livestock and agricultural products. A survey of livestock feed manufacturers in 7 EU countries, for example, found that plant extract and essential oil use increased from 55% to 75% after the EU banned growth-promoting antibiotics.¹⁴

ing Press, 2009), Green and co-author Kathi Keville write, "If essential oils are used in the proper dilutions and with the respect that they deserve, they can be both economical and environmentally sustainable." The authors advise aromatherapists and consumers to use the least amount possible to achieve the desired effect, such as putting only 5 drops, and not 30, into a running bath. "One drop of essential oil *does* represent a lot of plant material, so use it with respect and an understanding of its potency and power," they write.³⁵

Sustainability concerns exist for some trees whose oil is usually harvested by cutting the tree down or taking it from the roots—both practices that kill the plant. Importantly, none of the current threatened species, such as sandalwood (*Santalum album*, Santalaceae), rosewood (*Aniba rosaeodora*, Meliaceae), and agarwood (*Aquilaria malaccensis*, *A. agallocha*, Thymelaeaceae), are knowingly being studied or considered for use against drug-resistant bacteria. Also, several essential oil companies offer sustainably-harvested or cultivated products. The *Himalayan and Nicaragua Oregano Oil Against MRSA* projects, for example, were recently created as SEED Initiatives of the International Union for the

"I think the reason that [pharmaceutical companies] would want to fund research is that some essential oils appear to work synergistically with antibiotics. That is a hugely attractive area for everybody."

Conservation of Nature (IUCN). Both aim to provide rural Indian and Nicaraguan farmers with a sustainable income for collecting and distilling wild oregano, which will be used to make a fair trade antimicrobial product to prevent hospital-acquired infections like MRSA.³⁶

The most glaring barrier to widespread clinical use of essential oils for drug-resistant bacteria is the low number of human studies. But, according to Dr. Halcón, an increase in this research will be possible in the years to come—"especially when there is a track record," she noted. "We need a few more key researchers who will be relentless in submitting research grant proposals and making the scientific case. The popular interest in antiseptic and anti-infective uses for essential oils is very energizing, and I think that there are people in healthcare and in industry who are receptive to being partners."

Dr. Schnaubelt thinks a different obstacle might prevent widespread usage of essential oils for drug-resistant bacteria: lack of interest from the pharmaceutical industries.

Essential oils' potential for use in the food system expands into other areas. Candles containing essential oils from orange, thyme, and eucalyptus have been found to be effective at killing several surface bacterial strains. Researchers conclude that plug-in devices combining essential oils and ions generated by an electrical discharge might offer the same benefits for large scale food production.¹⁵ Additionally, some essential oils and their components are currently being used in food packaging to kill pathogens on meat, fish, and vegetables, and to decrease food spoilage, which allows the use of fewer preservatives like salt and potentially carcinogenic synthetic antioxidants.^{16,17,18,19}

—Lindsay Stafford

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Collecting the essential oil after distillation.
Photo ©2010 Biolaya

"I think in the culture that we live in, if it's not coming from a corporation, it's not considered valid," said Dr. Schnaubelt. Though he thinks more human research on essential oils should be conducted, Dr. Schnaubelt said that this might not make much of a difference because the pharmaceutical industry will not be interested in un-patentable products. Instead, Dr. Schnaubelt said, essential oils will have a future in being a "viable underground therapy. It's being done as we speak."

Though Dr. Buckle recognizes the likely un-patentable nature of essential oils, she thinks that money could be made from the synergistic relationship between essential oils and antibiotics. "[Essential oils] could be hugely valuable in terms of the medicine of the future," she said. "I think the reason that [pharmaceutical companies] would want to fund research is that some essential oils appear to work synergistically with antibiotics. That is a hugely attractive area for everybody."

But much remains to be done if essential oils for drug-resistant bacteria are to receive the attention that some say they deserve. While the majority of existing research articles characterize the use of essential oils against drug-resistant bacteria as an area of "great potential and hope" and "a promising alternative,"²⁵ many infectious disease and antibiotic-related organizations, as well as the pharmaceutical industry, have little awareness of the possible treatment.

The Infectious Disease Society of America (IDSA), for example, is currently sponsoring a campaign to discover or develop 10 new antibiotics or antimicrobials by the year 2020. But when asked about the potential of essential oils in this area, IDSA spokesperson John Heys said, "This isn't something IDSA necessarily has a policy or opinion on as an organization . . . This isn't something I've heard discussed in the context of addressing antibiotic resistance" (e-mail, May 17, 2010).

Likewise, the National Foundation for Allergy and Infec-

tious Disease did not have anybody who could discuss the area of essential oils and drug-resistant bacteria. Additional organizations, including the Alliance for the Prudent Use of Antibiotics, National Foundation for Infectious Disease, and Extending the Cure, a drug resistance project of the nonprofit Resources for the Future, did not respond to interview questions by press time, but a search of each group's website did not return any results on essential oils for drug-resistant bacteria.

Most organizations and healthcare facilities focus on preventing the spread of drug-resistant bacteria and related infections through different efforts. The CDC Campaign to Prevent Antibacterial Resistance in Healthcare Settings, for example, advises practitioners to prevent infection through immunizations and responsible use of patient catheters, to treat the infection instead of colonization, to use vancomycin only when absolutely necessary, and to keep hands clean.³⁷

According to Dr. Goldhammer of PhRMA, the pharmaceutical industry is researching how resistance evolves and how to target single, specific particles of bacteria, and it is also continuing to focus on developing new classes of structurally different antibiotics in attempt to decrease the speed at which bacteria develop resistance. Dr. Goldhammer acknowledged that bacteria might eventually develop resistance to these new antibiotics, as has been the case with linezolid (Zyvox®), a novel and expensive antibiotic that carried much hope until MRSA began developing resistance to it within a year of FDA approval.³ But while bacteria are developing resistance to new antibiotics, they will also lose resistance toward some of the older, previously used antibiotics, he said. Dr. Goldhammer was not aware of the possible synergistic effects among antibiotics and essential oils.

Despite these efforts, the drug-resistance problem continues to grow, and many organizations and institutions are not aware of the potential that essential oils might offer if incorporated

into their current activities. A recent hand-washing study, for example, found that a soap containing 5% tea tree oil and an emulsifier was as active and sometimes more active against *E. coli* when compared to another skin wash containing 5% tea tree oil as well as 10% alcohol. Both tea tree combination soaps were more effective than a soft soap hand wash.³⁹

Dr. Warnke, the stem cell researcher and plastic surgeon who studied tea tree- and eucalyptus-containing Polytoxinol, thinks aromatherapists' and herbal scientists "should not stop trying" to convince the "old-school" physicians and researchers to study essential oils' activity against drug-resistant bacteria.

A worker for Biolaya's Himalayan Oregano Oil Against MRSA project collecting wild oregano to be used in antibacterial products. Photo ©2010 Biolaya

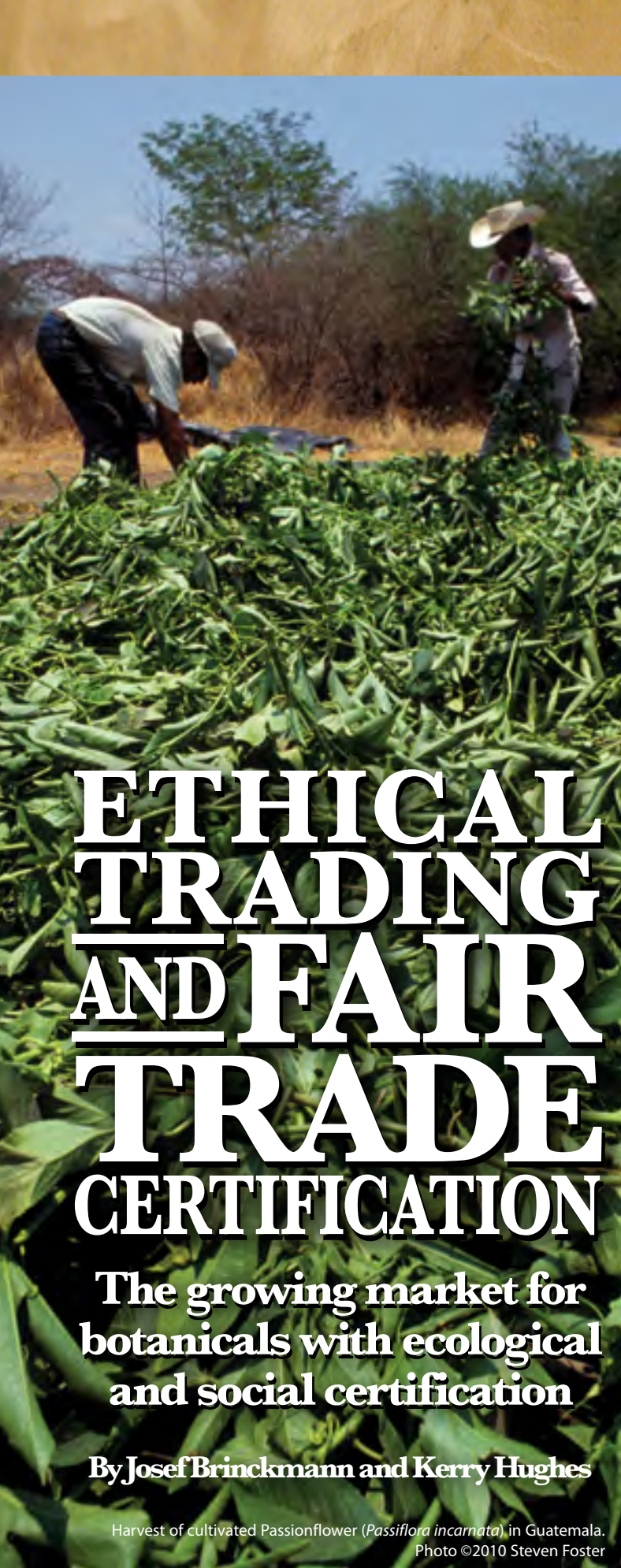


"It is very important to put this research on a level where everybody believes it is right," he said. "This urgently needs to be brought into a pathway where everybody can utilize it for the wellbeing of their patients."

Perhaps all it will take is more time and effort. "If you find that something works for you, and you tell somebody else, that's the way it spreads," said Dr. Buckle. "We need to get our act together, because this is where it begins." ■■■

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Introduction

An estimated 3,000 botanical species that are used as medicinal and/or aromatic agents are traded globally, of which the majority of species are wild collected. These plants are destined for a wide range of commercial uses as components of foods, aromas and flavors, colorants and dyes, dietary supplements, and natural health products, medicines, and textiles.¹ *The American Herbal Products Association's Herbs of Commerce 2nd Edition* (2000) lists 2,048 separate species in trade.² Surely, in the decade since this book was published, the total number of such commercially traded botanicals has risen.

The international trade of herbs and spices, their extractives, exudates, gums, resins, and oils has been well-established for many hundreds—in some cases, thousands—of years. It appears obvious that people in the “Global North”^{*} have always placed high importance on market access to exotic or tropical botanical substances imported from afar. Indeed, monarchial empires have battled and even waged wars for access and control of the production and trade of certain medicinal and aromatic plants occurring in biodiverse regions of the world. Over time, seeds and cuttings of plants of economic importance were transported to other colonies, dominions, or overseas territories of the monarchies to establish plantations and competition. The herb and spice trade was not so transparent nor was it equitable for the colonized producing regions. That was then.

A deeper look at sourcing practices today, however, may reveal that the lack of transparency and unequal trading relationships still inherent in worldwide trading systems is the cause of a growing demand for eco-social certification. Today, there remains significant demand from Europe and North America to satisfy the inventory requirements for daily consumption of botanical drinks (such as coffees [*Coffea* spp., Rubiaceae], black and green teas [*Camellia sinensis*, Theaceae], and herbal and fruit teas), as well as exotic and tropical herbs and spices used in food, cosmetic, and medicinal products, most of which are imported from the warmer climates of Africa, Latin America, and southern and southeastern Asian countries. Due to this growing demand and increased concern about unequal and, in many cases, unsustainable trading relationships, new tools and opportunities to make trade more fair and sustainable are being created. Beyond the increased interest in eco-social trading practices, domestic consumption of medicinal plants within certain regions, such as China, the Himalayan countries, southern Africa, and southeast Asia remains very high, but with few means to monitor and measure this trade. However, the demand for botanicals with eco-social certifications in these regions is very low.

Historically, this herb and spice trade has been, and still is for the most part, extremely secretive and highly competitive. At the producer group level there remain some good reasons for secrecy. For example, when one's main source of household income is dependent on access to a particular secluded wild-collection area or on cultivation practices that are a form of inherited traditional knowledge, it can be difficult for a family or tribal group to believe that it would not be detrimental to their livelihood to divulge the precise location and practices of their herb produc-

^{*} “Global North” means the socio-political and economic region which is more developed than the “Global South.” Wealthier “developed countries” are collectively referred to as the “Global North” while poorer “developing countries” and “least-developed countries” are collectively referred to as the “Global South.” The term is not strictly geographical: Most but not all “Global South” countries are in the Southern Hemisphere and most but not all “Global North” countries are in the Northern Hemisphere.

ETHICAL TRADING AND FAIR TRADE CERTIFICATION

**The growing market for
botanicals with ecological
and social certification**

By Josef Brinckmann and Kerry Hughes

Harvest of cultivated Passionflower (*Passiflora incarnata*) in Guatemala.
Photo ©2010 Steven Foster

tion and harvesting operation. With transparency, competitors may soon arrive and encroach on their source of income, possibly even depleting or eradicating the resource itself.

With botanicals—which normally change hands several times in their annual journey from communities in their country of origin to consumer health product markets—the relatively new initiatives for implementing conservation and sustainable resource management plans, chain of custody tracking (from the forest to the final product), transparency and traceability systems, and fair trade can appear daunting to all stakeholders in the supply chain.

A reasonable question for an herb harvester to ask is whether there are really enough conscious consumers to justify the costs and complexities of implementing sustainable fair trade management systems, undergoing audits, and becoming a certified operator. And will these conscious consumers in the rich North be willing to pay appropriate and fair prices for products composed of botanicals that are independently verified to have been produced according to rigorous ecological and social sustainability standards and criteria? This same question remains even if the certification is paid for by a “mandator” or other company in the supply chain that is willing to shoulder some or all of the costs. Certification and development programs are increasingly aiming to create ways in which to ensure sustainability and fairer trade relations while also producing a product that is affordable to the domestic market, regardless of whether the producer operates in the “Global North” or “Global South.”

The process of establishing a sustainable and/or fair trade management system is time-consuming, difficult to navigate, and may compromise elements of secrecy. So, does the benefit outweigh the inputs and risks? This is pioneer territory. Who

knows for sure? This article highlights some of the emerging eco-social certifications and aims to identify who does care. Consumers care differently about different aspects of “sustainable” sourcing of botanicals. For some, sustainable agriculture and sustainable wild harvesting, as evidenced by organic certification, are enough. But for others, non-exploitation of harvesters and social sustainability, as evidenced by fair trade certification, are the most important aspects. However, the linking of ecological and social sustainability in a single standard and certification is a growing trend.

The Standards

Implementation of ecological and social sustainability standards at a botanical farm or wild-collection site is no trivial matter. This requires significant commitment of labor and resources necessary to eventually achieve sufficient levels of compliance for a successful audit leading to certification. Table 1 lists selected ecological and social sustainability standards presently being implemented in the botanical supply chain along with Internet addresses where these may be downloaded.

The addition of social and fairtrade modules to ecological sustainability standards finds its genesis in the organic agriculture movements of the 20th century. The Demeter Biodynamic® Farm Standard was introduced in Europe in 1928. Ecological, economic, and social responsibility are integral to biodynamic production systems.[†] By the early 1970s, farms cultivating medicinal and aromatic plants according to principles of sustainable agriculture were being established in North America. Organic inspection and certification bodies also emerged, such as California Certified Organic Farmers (CCOF) that was formed in 1973.

Table 1. Selected Ecological and Social Sustainability Standards Presently Being Implemented in the Botanical Trade in Alphabetical Order

Organization/Standard	Internet URL*
ECOCERT Fair Trade Standard	www.ecocert.com/IMG/pdf/EFT_Standard.pdf
FLO Fairtrade Standards for Herbs & Spices	www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/July09_EN_Herbs_and_Spices_standard_SPO.pdf
FLO Fairtrade Standards for Tea	www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/JUL09_Tea_SPO_EN.pdf
FWF FairWild Standard and Performance Indicators	www.fairwild.org/publication-downloads/fairwild-standards-social-modules/FairWild-Standard-V2.pdf www.fairwild.org/publication-downloads/fairwild-standards-social-modules/FairWild-Standard-Indicators-V2.pdf
IBD EcoSocial Standard	www.ecosocialnet.com/institucional/8_1_3_ibd_diretriz_ibd_ecosocial_english_8thedition_2009.pdf
Fair for Life Social & FairTrade Program certified by IMO	www.fairforlife.net/logicio/client/fairforlife/file/IMO_SFT_Programme_Version3_Feb08.pdf
Soil Association Ethical Trade Programme	www.soilassociation.org/LinkClick.aspx?fileticket=6I3YOL4O9QQ%3d&tabid=353
Rainforest Alliance	www.rainforest-alliance.org/agriculture/documents/sust_ag_standard.pdf
UNCTAD BioTrade Principles & Criteria	www.unctad.org/en/docs/ditcted20074_en.pdf

* Note: Standards may be revised in which case the sources shown as Internet URLs may change.

† The Demeter Association Inc. defines biodynamic farming as “a holistic and regenerative farming system that is focused on soil health, the integration of plants and animals, and biodiversity. It seeks to create a farm system that is minimally dependant on imported materials, and instead meets its needs from the living dynamics of the farm itself. It is the biodiversity of the farm, organized so that the waste of one part of the farm becomes the energy for another, that results in an increase in the farm’s capacity for self-renewal and ultimately makes the farm sustainable.” <http://demeter-usa.org/about-biodynamic-agriculture>



Weeding Passionflower (*Passiflora incarnata*) crop in Guatemala. Photo ©2010 Steven Foster

Box 1. Principles Underlying FLO Standards*

Companies Trading FLO Fairtrade Products Must:

- Pay a price to producers that aims to cover the costs of sustainable production: The Fairtrade Minimum Price.
- Pay an additional sum that producers can invest in development: The Fairtrade Premium.
- Pay partially in advance, when producers ask for it.
- Sign contracts that allow for long-term planning and sustainable production practices.

Besides the common principles described above, there are specific principles that apply to small producer organizations and hired labor situations:

1. Principles Specific to Small Producer Organizations

- *Members must be Small Producers.* The majority of the members of the organization must be smallholders (small-scale farmers) who don't depend on hired workers all the time, but run their farm mainly by using their own and their family's labor.
- *Democracy.* Profits should be equally distributed among the producers. All members have a voice and vote in the decision-making process of the organization.

2. Principles Specific to Hired Labor

- *Management of the Fairtrade Premium.* The so-called Joint Body, which includes workers and management, is responsible for the management of the Fairtrade Premium in accordance with Fairtrade Standards.
- *Forced labor & child labor.* Forced labor and child labor is prohibited.
- *Freedom of association & collective bargaining.* Workers have the right to join an independent union to collectively negotiate their working conditions.
- *Working conditions.* Working conditions are equitable for all workers. Salaries must be equal or higher than the regional average or than the minimum wage. Health and safety measures must be established in order to avoid work-related injuries.

*Fairtrade Labelling Organizations International (FLO). Generic Fairtrade Trade Standards. Current Version 15.08.2009. Bonn, Germany: FLO 2009. Available at: www.fairtrade.net/generic_trade_standards.html



The international organic movements paved the way for greater awareness of sustainable production systems. But the implementation of sustainable agricultural systems does not necessarily ensure economical and social sustainability for herb harvesters and processors. Nor do these systems ensure sustainable wild collection of the vast majority of medicinal and aromatic plant species which are not farmed. To illustrate that point, there are certified organic herb and spice farms situated in totalitarian dictatorship countries (e.g., Burma, aka Myanmar) where no enforceable labor standards or human rights protections exist. Sustainable resource management systems interconnect elements of ecological, economical, and social sustainability. Therefore, it is difficult to evaluate ecological sustainability without also considering the economical and social needs of the producer communities. Conversely, it is difficult to assess social sustainability of producer groups that are dependent on wild collection for their income, unless ecological and economical sustainability efforts are incorporated into the assessment. Experience is showing that economical and social sustainability are prerequisite to ecological sustainability.³

In an effort to inform prospective buyers, the December 2009 edition of the *Market News Service for Medicinal Plants & Extracts*, a quarterly bulletin of the International Trade Centre (ITC), featured up-to-date information on the commercial availability of botanical ingredients in the global marketplace with value-adding certifications or verifications that demonstrate evidence of sustainable resource management and production (ecological, economical,

and social sustainability practices throughout the supply chain). Additionally, contact details for the certified operators and/or distributors of the listed botanicals were provided.⁴

The following is a brief overview of some of the standards for measuring sustainability (economic, ecological, and social) that are becoming visible in the North American market.

FLO Fairtrade Standards for Herbs and Spices and Tea

Fairtrade Labelling Organizations International (FLO) is an organization based in Bonn, Germany that coordinates Fairtrade labeling at an international level by 1) setting international Fairtrade standards; 2) organizing support for producers around the world; 3) developing a global Fairtrade strategy; and 4) promoting trade justice internationally. According to FLO, “Fairtrade is an alternative approach to conventional trade and is based on a partnership between producers and consumers. Fairtrade offers producers a better deal and improved terms of trade. This allows them the opportunity to improve their lives and plan for their future. Fairtrade offers consumers a powerful way to reduce poverty through their every-day shopping. When a product carries the FAIRTRADE mark it means the producers and traders have met Fairtrade standards. The standards are designed to address the imbalance of power in trading relationships, unstable markets and the injustices of conventional trade.” Box 1 provides a summary of the principles underlying the FLO Standards.

The FLO standards for botanicals are species- and region-specific, and are limited to only certain types of producer groups in developing countries (e.g., small producers’ organizations). Botanicals that are farmed or wild collected in European countries, or in Canada and the United States, among other developed countries, fall outside the scope of the FLO standards.

Presently, the “*Fairtrade Standard for Tea for Hired Labour*”⁵ covers 6 botanicals (chamomile flower [*Matricaria recutita*, Asteraceae], hibiscus flower [*Hibiscus sabdariffa*, Malvaceae], peppermint leaf [*Mentha × piperita*, Lamiaceae], rooibos herb [*Aspalathus linearis*, Fabaceae], spearmint leaf [*Mentha spicata*, Lamiaceae], and tea leaf). The “*Fairtrade Standards for Herbs and Spices for Small Producers’ Organisations*”⁶ covers many more botanical species, produced by smallholders in 70 developing countries in the “Global South.” Annex 1 of the standard provides a non-exhaustive, indicative list of 127 different botanicals (but more than 150 different species) fitting the FLO “Herbs and Spices” definition.[‡] For example, FLO’s Annex 1 includes medicinal plants such as asafetida oleo-gum-resin (*Ferula assafoetida*, Apiaceae), calamus rhizome (*Acorus calamus*, Acoraceae), dandelion herb and root (*Taraxacum officinale*, Asteraceae), eucalyptus leaf (*Eucalyptus globulus*, Myrtaceae), ginkgo leaf (*Ginkgo biloba*, Ginkgoaceae), licorice root (*Glycyrrhiza glabra*, Fabaceae), mugwort herb (*Artemisia vulgaris*, Asteraceae), psyllium husk (*Plantago ovata*, Plantaginaceae), and valerian root (*Valeriana officinalis*, Valerianaceae), among many other potentially certifiable species. This general list also allows for rapid inclusion of species newly introduced to the market such as guayusa (*Ilex guayusa*, Aquifoliaceae) from South America.

FLO publishes a periodically updated “Fairtrade Minimum Price and Fairtrade Premium Table,”⁷ which specifies the product, type, quality, form, characteristics, country/region, certification scope, price level, unit, quantity, currency, Fairtrade Minimum Price, Fairtrade Premium, and date of validity, where applicable. FLO provides the following price and premium definitions:

‡ The list of botanicals of Annex 1 of the FLO Standard can be found on pages 6 through 8 of the document at www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/July09_EN_Herbs_and_Spices_standard_SPO.pdf

Fairtrade Minimum Price (where it exists) is the lowest possible price that may be paid by buyers to producers for a product to become certified against the Fairtrade standards.

Fairtrade Premium is an amount paid to producers in addition to the payment for their products. The Fairtrade Premium is intended for investment in the producers' business and community (for small farmers' organizations or contract production projects) or for the socio-economic development of the workers and their communities (for hired-labor situations).

Retro-certification occurs when a buyer buys tea (or another commodity) from a producer under ordinary conditions (non-Fairtrade) and at a later stage, converts it into a Fairtrade-certified product. Buyers current with their Flow of Goods reports may retro-certify provided that retro-certification transactions fall within the agreed upon limits, the transaction is properly documented, and Fairtrade premiums and any Fairtrade price adjustments are made in full on due date. Prior to commencing retro-certification, buyers must inform the certification body of the intent to do so. Abuse or misuse of retro-certification will likely result in buyers' losing permission to retro-certify.

FWF FairWild Standard

Fair Wild Foundation (FWF) is an organization based in Weinfelden, Switzerland, with its Secretariat based at the World Wide Fund for Nature-Germany in Frankfurt, with a mission to provide a worldwide framework for implementing a sustainable, fair, and value-added management and trading system for wild-collected, natural ingredients and products thereof. FWF does this by 1) encouraging sustainable and fair business practices, with a concentration on influencing consumer choice; 2) informing, advising, and assisting those involved in the wild plant trade; 3) providing advice on the application of the FairWild Standard and supply-chain certification; and 4) by providing advice on the application of standards for sustainable and fair management of trade in conservation, trade policy, and other regulations. Box 2 provides a summary of the principles underlying the FairWild Standard (FWS).

There are now 827
FLO-certified producer
organizations in 60 countries;
an 11% increase over 2008.

Unlike the FLO Fairtrade standards, the FairWild Standard places no restrictions on geographical scope or on the type of producer group. So long as the botanical ingredient is wild harvested, any type of operation in any country or region of the world can implement the standard and apply for certification if desired. The FairWild Standard is designed to be applicable to the wide array of geographic, ecological, cultural, economic, and trade conditions in which wild collection of plant resources (as well as fungi and lichens) occur. It primarily addresses the collection of wild plant materials for commercial purposes, rather than for subsistence or local, small-scale use.

So far, there are FairWild certified operators mainly in European countries (e.g., Bosnia, Herzegovina, Croatia, and Poland) and Asian countries (e.g., Kazakhstan) offering a good range of typical European species of medicinal plants under sustainable wild collection. A number of other operations are in process of implementation but not yet certified, including wild-collection operations situated in China, Georgia, Hungary, and Uzbekistan. Table 2 lists the botanicals presently commercially available with FairWild certification.

FWF provides the

following price and premium definitions:⁸

The FairWild Price that is paid by the buyer to the wild-collection enterprise is based on cost calculations but it is always above the normal market prices for conventional wild crops. In general, the FairWild price is at least 5% to 10% higher than prices paid for same product collected conventionally in the region.

The FairWild Premium Fund amount is negotiated between seller and buyer on a case-by-case basis appropriate for the specific situation and scale. It is usually paid out by the final buyer (e.g., the finished-product manufacturer) to the wild-collection enterprise (even when there are other companies in between). If it is paid by an intermediate buyer (e.g., a wholesale distribution company) or by other value-adding companies in the supply chain (e.g., an extraction house), this amount will usually be charged upstream to the final buyer.

The FairWild Standard Version 2.0 (2010) now combines Version 1.0 (2006) of the original FairWild Standard, which deals with social aspects (the Social Module), and Version 1.0 (2007) of the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP), which deals with ecological aspects (the Ecological Module).

Fair for Life Social & FairTrade Program Certified by IMO

In 2006, The Swiss Bio-Foundation, in conjunction with IMO (Institute for Marketecology), introduced "Fair for Life," a brand-neutral, third-party certification program for Social Accountability and FairTrade to complement existing fair trade certification systems. The IMO Social & FairTrade Certification Program combines strict social and fair trade standards with adaptability to local conditions and a wide variety of products and botanicals. The

Box 2: Principles underlying the FairWild Standard*

Eleven key elements of sustainable wild plant collection:

1. Maintaining wild plant resources
2. Preventing negative environmental impacts
3. Complying with laws, regulations, and agreements
4. Respecting customary rights and benefit-sharing
5. Promoting fair contractual relationships between operators and collectors
6. Limiting participation of children in wild-collection activities
7. Ensuring benefits for collectors and their communities
8. Ensuring fair working conditions for all workers of wild-collection operations
9. Applying responsible management practices
10. Applying responsible business practices
11. Promoting buyer commitment

*FairWild Foundation. *FairWild Standard Version 2.0*. 2010. Weinfelden, Switzerland: FairWild Foundation. 2010.

Table 2. List of Commercially Available Botanicals with FairWild Certification *

Common Name & Plant Part	Pharmacopeial Name	Botanical Name and Family
Bilberry leaf	Myrtilli folium	<i>Vaccinium myrtillus</i> , Ericaceae
Bilberry fruit	Myrtilli fructus	
Birch leaf	Betulae folium	<i>Betula pubescens</i> , Betulaceae
Blackberry leaf	Rubi fruticosi folium	<i>Rubus fruticosus</i> , Rosaceae
Comfrey root	Symphyti radix	<i>Symphytum officinale</i> , Boraginaceae
Cowslip flower	Primulae flos cum calyce	<i>Primula veris</i> , Primulaceae
Dandelion herb and root	Taraxaci officinalis herba cum radice	<i>Taraxacum officinale</i> , Asteraceae
Dog rose hip	Rosae pseudo-fructus	<i>Rosa canina</i> , Rosaceae
English ivy leaf	Hederae folium	<i>Hedera helix</i> , Araliaceae
English plantain leaf	Plantaginis lanceolatae folium	<i>Plantago lanceolata</i> , Plantaginaceae
European elder flower	Sambuci flos	<i>Sambucus nigra</i> , Caprifoliaceae
European elder fruit	Sambuci fructus	
European mistletoe leaf	Visci herba	<i>Viscum album</i> , Viscaceae
Frangula bark	Frangulae cortex	<i>Frangula alnus</i> , Rhamnaceae
Hawthorn fruit	Crataegi fructus	<i>Crataegus monogyna</i> <i>Crataegus oxyacantha</i> , Rosaceae
Heather flower	Callunae vulgaris flos	<i>Calluna vulgaris</i> , Ericaceae
Horsetail herb	Equiseti herba	<i>Equisetum arvense</i> , Equisetaceae
Lady's mantle herb	Alchemillae herba	<i>Alchemilla xanthoclora</i> , Rosaceae
Licorice root	Liquiritiae radix	<i>Glycyrrhiza glabra</i> , Fabaceae
Linden (Lime tree) flower	Tiliae flos	<i>Tilia cordata</i> , Tiliaceae
Meadowsweet herb	Filipendulae ulmariae herba	<i>Filipendula ulmaria</i> , Rosaceae
Motherwort herb	Leonuri cardiaca herba	<i>Leonurus cardiaca</i> , Lamiaceae
Ramsons leaf	Allii ursine herba	<i>Allium ursinum</i> , Liliaceae
Raspberry leaf	Rubi idaei folium	<i>Rubus idaeus</i> , Rosaceae
Sage leaf	Salviae officinalis folium	<i>Salvia officinalis</i> , Lamiaceae
St. John's wort herb	Hyperici herba	<i>Hypericum perforatum</i> , Clusiaceae
Stinging nettle leaf	Urticae folium	<i>Urtica dioica</i> , Urticaceae
Stinging nettle root	Urticae radix	
Strawberry leaf	Fragariae folium	<i>Fragaria vesca</i> , Rosaceae
Sweet violet flower	Viola odoratae flos	<i>Viola odorata</i> , Violaceae
Yarrow flower	Millefolii herba	<i>Achillea millefolium</i> , Asteraceae
Yellow chaste weed flower	Helichrysi flos	<i>Helichrysum arenarium</i> , Asteraceae

*Brinckmann JA. Fair trade medicinal plants and extracts. *Market News Service for Medicinal Plants and Extracts*. December 2009, Number 33.

program is based on several sets of key baseline standards such as the ILO conventions, FLO Fairtrade standards, SA8000, and IFOAM Social Criteria. It offers operators incentives for continuous improvement of social and trade conditions beyond minimum requirements and allows for meaningful certification of multi-ingredient products by using content rules that are modeled after those for organic products and by reviewing all critical steps in the value chain.

Currently, there are approximately 90 operators certified worldwide, and the standard has grown in acceptance quickly, especially in the North American Market, although it is an international standard with producers residing only in the “Global South”

thus far. When the Fair for Life standard was drafted, it was with domestic production in mind, and IMO soon intends to begin pilot certifications for production in domestic projects, especially in North America and potentially other “Global North” countries as long as the operator has a genuine fair trade system and marginalized emphasis.

The following are some of the Key Features of Fair for Life FairTrade Certification:

Wide range of certifiable materials and products, including many niche market but nonetheless important raw materials, multi-ingredient products, and wild-crafted herbs and medicinal plants. There are separate criteria for sustainable wild harvesting

Box 3. Principles Underlying the SAN Standards Employed by the Rainforest Alliance*

The 10 SAN Principles:

1. Social and Environmental Management System
2. Ecosystem Conservation
3. Wildlife Protection
4. Water Conservation
5. Fair Treatment and Good Working Conditions for Workers
6. Occupational Health and Safety
7. Community Relations
8. Integrated Crop Management
9. Soil Management and Conservation
10. Integrated Waste Management

*Sustainable Agriculture Network. Sustainable Agriculture Standard April 2009. San José, Costa Rica: Rainforest Alliance. 2009. Available at: www.rainforest-alliance.org/agriculture/documents/sust_ag_standard.pdf

Wild harvest of bilberry (*Vaccinium myrtillus*) in Montenegro.
Photo ©2010 Steven Foster

of plants. Non-food products, including handicrafts, textiles, and toys can also be certified.

Any type of smallholder producer organization is certifiable. This includes smallholder cooperatives and small farmers under contract by traders (“contract production”), plantations, and processors. Program requirements apply to all critical steps in the value chain to ensure adequate and fair handling at all stages.

Physical audit of the ultimate buyer of FairTrade materials and products, usually a company in the developed world, for verification of their FairTrade practices.

Buyer and supplier cooperate closely and negotiate a fair price for all sales – not just a few FairTrade consignments. Farmers always receive a fair and sustainable price for their products that covers, at a minimum, cost of production and a reasonable premium for value-added organic production. Additionally, a FairTrade premium is paid either directly to the farmers as additional premium or into a premium fund for community projects. There is also no retro-payment of FairTrade premiums allowed in the Fair for Life system. For every order a FairTrade buyer makes with a FairTrade producer, there is an upfront payment of not only the FairTrade price, but also the FairTrade premium.

Transparent system of FairTrade premium payment and use. The importer agrees on a FairTrade premium with the FairTrade supplier. It may be paid directly to the farmers and/or used by a fund for community for local development projects, such as sanitary installations in the village, healthcare or education projects, and livestock programs to ensure nutritional and ecological balance. IMO audits payment and use of the premium to ensure that this extra premium money is fully paid to the farmers (as premium in addition to fair price) or used for intended social community projects. The buyer may be involved in the decision on how the FairTrade premium is spent. FairTrade premium use and certifications are published on the www.fairforlife.net website.

Rigorous chain of custody requirements throughout the whole system ensure traceability, transparency, and greater control.

No license fee is leveraged on participants in the supply chain. Certified entities incur only the actual costs of inspection and certification. For efficiency, FairTrade inspections may be combined with audits for organic or other ecological standards (organic textiles, FSC, GlobalGAP, bird-friendly, etc.). The IMO “fair for life – Social & FairTrade Certified by IMO” and “for life – Social Responsibility Certified by IMO” seal may be used on certified products.

Certification provides maximum transparency for buyers and consumers through annual audits by qualified inspectors. Each operation will be measured against a list of published criteria. The performance rating of all certified operations are published on the IMO website, together with an assessment of their social impact in their host communities.

Good environmental performance is assessed in detail, and additional good agricultural practices (GAP) criteria must be met if an operation is not certified according to organic or GAP standards.

Requirements for physical audit of brandholder companies to help keep the focus of the supply chain on producers, transparency, and brandholders' own commitment to social responsibility within the company and a FairTrade sourcing policy.

Rainforest Alliance Certification Standard

Under the auspices of the Sustainable Agriculture Network (SAN), the Rainforest Alliance works with farmers to ensure compliance with the SAN standards for protecting wildlife, wild lands, workers' rights, and local communities. Farms that meet these standards are eligible to trade goods with the Rainforest Alliance Certified seal. Rainforest Alliance Certified botanical ingredients that have become commercially available include açai fruit (*Euterpe oleracea*, Arecaceae), cupuaçu fruit (*Theobroma grandiflorum*, Sterculiaceae), tea leaf, and vanilla fruit (*Vanilla planifolia*, Orchidaceae). Box 3 provides a summary of the principles underlying the SAN Standards.

Other Fair Trade Organizations/Labels

Beyond ecological and social standards that are emerging on the botanical market, there are other initiatives, membership/trade organizations, and labels that are worth mentioning, such as the Fair Trade Federation (FTF). The FTF is a trade association made up of companies with commitments to fair trade. Although FTF is largely made up of handicraft companies, it is also open to companies that sell other products, such as botanicals. To become a member there is a lengthy application and interview process to assess each applicant's commitment to fair trade. The FTF is worth mentioning herein, as members are allowed to use their logo on the products they sell, and it has become recognized as a fair trade label by some consumers. Other such associations or membership organizations have also emerged with the increase in awareness of eco-social issues, such as the World Fair Trade Organization (WFTO, formerly IFAT) and B-Lab or "B-Corp Certified."

UNCTAD BioTrade Principles and Criteria

The BioTrade Initiative of the United Nations Conference on Trade and Development (UNCTAD) was launched in 1996 to promote sustainable biotrade in support of the objectives of the Convention on Biological Diversity (CBD). In the meantime, the Initiative has developed a unique portfolio of regional and countrywide programs. Since 2003, the BioTrade Initiative has also hosted the BioTrade Facilitation Programme (BTFP), which focuses on enhancing sustainable bio-resources management, product development, and value-adding processing and marketing. In 2007, UNCTAD published the "BioTrade Principles and Criteria"⁹ and Draft 3 of the "BioTrade Verification Framework for Native Natural Ingredients."¹⁰ Box 4 provides a summary of the principles underlying the BioTrade Initiative.

Currently, there are BioTrade

Saw palmetto berry harvest in Florida.
Photo ©2010 Steven Foster



country programs operating in more than 15 countries in Africa, Asia, and Latin America, including Bolivia, Brazil, Colombia, Ecuador, Peru, Botswana, Malawi, Mozambique, Namibia, South Africa, Swaziland, Uganda, Zambia, and Zimbabwe (www.biotrade.org). New BioTrade country programs are under development in Costa Rica, Indonesia, Paraguay, and Vietnam. In addition to the country programs, other BTFP partners include PhytoTrade Africa – the Southern African Natural Products Trade Association (www.phytotradeafrica.com), Bolsa Amazonia Programme (www.bolsaamazonia.com), Dutch Centre for the Promotion of Imports from developing countries (CBI, www.cbi.nl), and the Swiss Import Promotion Programme (SIPPO, www.sippo.ch). Priority product groups include edible plant products (e.g., fruits and nuts), food ingredients (e.g., coloring and flavoring materials), cosmetic and pharmaceutical ingredients (e.g., medicinal plants, essential fatty and aromatic oils), fibers, latex, resins, gums, and gum byproducts. According to Lorena Jaramillo Castro, economic affairs officer of the BioTrade Initiative,¹¹ "Within the BioTrade Network, methodologies, tools, guidelines, and standards are developed to enhance the implementation of the seven BioTrade Principles. The Verification Framework for Native Natural Ingredients, guidelines to implement management plans for wild-collected species and to strengthen value chains of

Box 4. Principles Underlying the BioTrade Initiative

The 7 BioTrade Principles

- Principle 1.** Conservation of biodiversity
- Principle 2.** Sustainable use of biodiversity
- Principle 3.** Fair and equitable sharing of benefits derived from the use of biodiversity
- Principle 4.** Socio-economic sustainability (productive, financial, and market management)
- Principle 5.** Compliance with national and international regulations
- Principle 6.** Respect for the rights of actors involved in BioTrade activities
- Principle 7.** Clarity about land tenure, use and access to natural resources and knowledge

Box 5. Fairtrade Certified Products Global Retail Sales 2008-2009*

Country	2008 (in €)	2009 (in €)	Growth Rate
AUS/NEZ	18,567,280	28,733,986	55%*
Austria	65,200,000	72,000,000	10%
Belgium	45,780,141	56,431,496	23%
Canada	123,797,132	201,978,074	64%*
Czech Republic	-	566,540	-
Denmark	51,220,106	64,436,600	6%
Estonia	-	295,045	-
Finland	54,445,545	86,886,284	60%*
FLO** / Rest of World	130,722	18,099,255	-
France	285,670,000	287,742,792	1%
Germany	212,796,451	267,473,584	26%
Ireland	94,420,586	118,574,416	26%
Italy	41,384,166	43,382,860	5%
Japan	9,867,132	11,283,451	2%*
Latvia	-	153,500	-
Lithuania	-	315,360	-
Luxembourg	4,349,301	5,327,122	25%
Netherlands	60,913,968	85,818,400	41%
Norway	30,961,160	34,689,522	19%*
South Africa	-	458,075	-
Spain	5,483,106	8,030,724	46%
Sweden	72,830,302	82,662,331	26%*
Switzerland	166,760,526	180,160,263	7%
UK	880,620,304	897,315,061	14%*
USA	757,753,362	851,403,590	7%*
GRAND TOTAL	2,994,366,443	3,394,187,360	13%

Source: Fairtrade Labelling Organizations (FLO) Annual Report 2009-10.[19] Reproduced with permission of FLO International.

*Out of Home sales revenue estimated at 19% of Global Fair Trade Retail Sales Value. OOH sales may be understated in some countries due to differences in methodology of calculation.

BioTrade products, are a few examples.” The most recent BioTrade guidance document, available at the homepage of the BioTrade Initiative website, is titled “Guidelines for the Development and Implementation of Management Plans for Wild-collected Plant Species used by Organizations Working with Natural Ingredients.”¹²

Who Cares?

Market indicators show that a steadily increasing number of stakeholders in the botanical supply chain are indeed deeply concerned. This is evidenced by the fact that several new sustainability standards have emerged over the past decade, often developed and test-implemented with the active participation and/or financial and technical support of governmental organizations (GOs), international governmental organizations (IGOs), and/or non-governmental organizations (NGOs), along with various stakeholders, including the variety of producers involved in a supply chain. Correspondingly, the number of independent inspection and certification agencies for ecological, social, and fair trade botanicals and natural products is increasing, presumably in order to meet the market demand for more certified organic and fair trade products.

Box 6. Selected Economical and Social Sustainability Certification Marks Visible in the Botanicals Trade



Table 3. Estimated UK Retail Sales by Value, 1998-2009 (£ million)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coffee	13.7	15.0	15.5	18.6	23.1	34.3	49.3	65.8	93.0	117.0	137.3	157.0
Tea	2.0	4.5	5.1	5.9	7.2	9.5	12.9	16.6	25.1	30.0	64.8	68.1
Cocoa products*	1.0	2.3	3.6	6.0	7.0	10.9	16.5	21.9	29.7	25.5	26.8	44.2
Honey products*	n/a	n/a	0.9	3.2	4.9	6.1	3.4	3.5	3.4	2.7	5.2	4.6
Bananas	n/a	n/a	7.8	14.6	17.3	24.3	30.6	47.7	65.6	150.0	184.6	209.2
Flowers	n/a	n/a	n/a	n/a	n/a	n/a	4.3	5.7	14.0	24.0	33.4	30.0
Wine	n/a	n/a	n/a	n/a	n/a	n/a	1.5	3.3	5.3	8.2	10.0	16.4
Cotton	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2	4.5	34.8	77.9	50.1
Other	n/a	n/a	n/a	2.2	3.5	7.2	22.3	30.3	45.7	100.8	172.6	219.4
TOTAL	16.7	21.8	32.9	50.5	63.0	92.3	140.8	195.0	286.3	493.0**	712.6	799.0

* The figures for these products represent the cocoa part of all products containing cocoa and the honey part of all products containing honey.

** Following review, some of the 2007 figures have been amended but the total remains the same.

Source: Fairtrade Foundation (UK): www.fairtrade.org.uk



Wild harvest of bilberry (*Vaccinium myrtillus*) in Montenegro. Photo ©2010 Steven Foster

The Consumers

The *TransFair USA Almanac 2009* report shows that US imports of Fair Trade Certified (FTC) “herbs” from Egypt (e.g., chamomile flower, hibiscus flower, and mint leaf) grew by 73% over 2008 and imports of FTC “spices” (e.g., cardamom seed [*Elettaria cardamomum*, Zingiberaceae], cinnamon bark [*Cinnamomum verum*, Lauraceae], clove flower bud [*Syzygium aromaticum*, Myrtaceae], ginger rhizome [*Zingiber officinale*, Zingiberaceae], mace aril [*Myristica fragrans*, Myristicaceae], pepper fruit [*Piper nigrum*, Piperaceae], turmeric rhizome [*Curcuma longa*, Zingiberaceae], and vanilla fruit) grew by 240%.¹³ Consumers are the driving force behind fair trade demand and some companies find that the powerful producer stories behind their botanical ingredients are also excellent marketing messages. According to Rob Cameron, CEO of FLO, “As 2009 began in the midst of the worst recession in 70 years, we worried that Fairtrade producers could lose sales. Instead, consumers across the globe bucked the trend and proved their deep commitment to giving producers a fair deal. Fairtrade sales grew in all countries.”¹⁴

According to the *Fairtrade Labelling Organizations International Annual Report 2009-2010*, there are now 827 FLO-certified producer organizations in 60 countries; an 11% increase over 2008; and consumers spent an estimated €3.4 billion[§] on Fairtrade products in 2009—a 15% increase over 2008. An estimated 27,000 Fair Trade Certified products are now sold in over 70 countries. Box 5, excerpted from the FLO Annual Report, compares the 2008 and 2009 total value (in euros, €) of Fairtrade Certified sales in developed countries. The top 5 sellers of Fairtrade Certified goods

in 2009, in terms of estimated value, were the United Kingdom, the United States, France, Germany, and Canada. The FLO report also shows that the highest percentage growth category was “Herbs and Spices” with a 266% growth rate, in terms of volume (in metric tons), over 2008.¹⁵ This audited data encompasses only those Fairtrade products that are certified, documented, and transacted through the FLO System. As of yet, there are no known comprehensive data that combine all fair trade sales inclusive of all products traded under all certification schemes. On the regional and class-of-trade level, different inclusion criteria may be used in a way that could capture a larger percentage of fair trade retail sales inclusive of products certified under different programs. For example, SPINScan Natural is a comprehensive source of information on all UPC-coded retail products selling through the Natural Products Supermarket Channel in the United States. SPINS collects scanner-based sales data with coding parameters for 16 label-based attributes including fair trade. Thus it would be possible to purchase specialized US-specific reports on fair trade retail sales in the natural products channel. Annual sales data for Fair Trade Certified products are also made available through the annual reports of country-specific bodies. For example, Table 3 shows the estimated UK retail sales of Fairtrade products by value 1998-2009 (£ million).^{||}

Business

Although most businesses wait to see an increasing trend in demand for such products that are ethical or fair trade certified, some find there are commercial benefits and reasons to reach and maintain the certification beyond altruism and philanthropy, such

§ 1.00 EUR (€) = about 1.28 USD (\$) as of Aug 15, 2010. || 1.00 GBP (£) = about 1.56 USD (\$) as of Aug 15, 2010.

as reducing the risks that would otherwise come from a supply chain with less management, and creating a more secure supply stream. Currently, there are several initiatives worldwide that are changing the food-safety landscape, and now that there have also been several problems reported from products manufactured outside the United States, notably in China, there is increasing consumer demand as well for such initiatives or assurances to take place. Businesses are realizing that they may not have much control or understanding of their supply chains and are coming to realize that production abroad may come with considerable risk to food safety and therefore a more secure supply chain is invaluable. The implementation of any of the above-mentioned ethical

and fair trade standards increases the amount of management in the supply chain, thereby naturally also increasing some aspects of control and safety of foods and herbal medicines.

Governmental and Non-Governmental Organizations

Governmental and non-governmental organizations are also calling for more transparency and traceability at the very least in supply chains in order to help manage this risk. For example, in 2009 a food traceability bill (S.425) was introduced into the US Senate intended to establish a national traceability system for all food under the US Food and Drug Administration's (FDA) jurisdiction. It is just one of several major food safety bills that have been proposed recently in the US Congress. The FDA also called a public meeting near the end of 2009 in order to provide an opportunity for the agency to collaborate more closely with the Food Safety and Inspection Service (FSIS), as well as with members of the food industry. The FDA and FSIS noted that "changes in consumer preferences, changes in industry practices and the rising volume of imports continue to pose significant challenges" to food scrutiny.¹⁶ One natural advantage to a good chain of custody-focused certification, such as organic and most fair trade standards, is a high level of traceability, forward and backward, through the supply chain.

Producers

The benefits to producers are the one clear advantage in social and fair trade certification systems. As trade relations become more equitable and transparent, they progress toward becoming partnerships. While fair prices are key goals of such certifications, the producer should also receive clear and transparent premiums and benefits from their participation in such programs. Whether the cost of their certification, and time and management of such a system is worth the benefits should be noticeable in the first several years of certification as producers would not opt to continue such a system if the benefits were not apparent. Moreover, since the premium is ensured at the farmer or wild-harvester level, it could be more of a lasting incentive to small producers who may not normally benefit from premiums of other labels that are focused on the final product. Lastly, the standards described in this article were developed through an active multi-stakeholder process that included the voices of the producers in the development and test implementation of the standards. Feedback from all stakeholders based on practical application informs subsequent improvements and revisions to the standards.

Future Prospects for the Fairtrade Botanicals Market

Fair trade is more than just a consumer trend. It is a partial solution to the many converging problems with the current trading system and globalized economy and environment. A movement that began taking shape in the 1940s when Mennonites started selling goods from poor regions through their church network,¹⁷ fair trade has since blossomed into a transparent global trading system. While up to this point a major focus of the various social and fair trade standards has been on food ingredients and products, the standard-setting bodies are beginning to prioritize standards for herbs and spices.

Many people compare the fair trade certification arena today with the early organic food movement: There are many approaches, certifying bodies, standard setters, and labels. Although this may be confusing for consumers, it is also a time of high integrity, meaningful discussion, and application of standards, often performed by the very pioneering companies that make up this emerging niche demographic. As the fair trade movement

List of Acronyms and Abbreviations

ABS	Access and Benefit Sharing
BTFP	BioTrade Facilitation Programme
CBD	Convention on Biodiversity
CITES	Convention on International Trade in Endangered Species of Wild Flora & Fauna
CSR	Corporate Social Responsibility
EFT	Ecocert Fair Trade
FLO	Fairtrade Labelling Organizations International
FSC:	Forest Stewardship Council
FTC:	Fair Trade Certified
FWC	FairWild Certified
FWF	FairWild Foundation
GACP	Good Agricultural and Collection Practice
GO	Governmental Organization
IBD	Instituto Biodinâmico for Rural Development
IGO	International Governmental Organization
ILO	International Labour Organization
IMO	Institute for Marketecology
ISO	International Organization for Standardization
ISSC-MAP	International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants
ITC	International Trade Centre (Joint Agency of the World Trade Organization and the United Nations)
IUCN	International Union for Conservation of Nature
MAP	Medicinal and Aromatic Plants
MNS	Market News Service (bulletin of ITC / UNCTAD)
NGO	Non-governmental organization
NOP	National Organic Program
NTFP	Non Timber Forest Products
TFUSA	TransFair USA
TRAFFIC	The wildlife trade monitoring network
UEBT	Union for Ethical BioTrade
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization
WWF	World Wildlife Fund for Nature

progresses, hopefully this “integrity race” will not devolve into a set of watered-down standards, so it can continue to improve living conditions for workers, promote environmental standards, and earn consumer confidence. As few things motivate producers like the prospect of fair and reliable trade partners, this fast-growing market niche has the potential to inspire more and more harvesters and suppliers of botanical ingredients to realize the social and environmental benefits of the eco-social movement. ■■

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Demeter-certified Biodynamic Turmeric (*Curcuma longa*) production at Luna Nueva Farm, Costa Rica.
Photo ©2010 Steven Foster



Chinese Herbal Medicine Clears US FDA Phase II Trials

A patented Chinese herbal medicine has successfully completed Phase II clinical trials in the United States and will soon begin Phase III investigations, raising the possibility that it could become the first Traditional Chinese Medicine (TCM) product to obtain drug approval from the US Food and Drug Administration (FDA).¹

The product, Compound Danshen Dripping Pill (also referred to as Cardiotonic Pill), is produced by Tianjin Tasly Pharmaceutical Co. Ltd. in Tianjin, China. It contains the extract of the root of Chinese salvia (*Salvia miltiorrhiza*, Lamiaceae; known as *danshen* in Chinese), the extract of the root of notoginseng (*Panax notoginseng*, Araliaceae; known as *sanchi* or *tien-chi* ginseng), and synthetic borneol, an active ingredient that replaces the more expensive natural borneol found in cardamom (*Elettaria cardamomum* var. *cardamomum*, Zingiberaceae), ginger (*Zingiber officinale*, Zingiberaceae), and other spices.^{1,2,3} According to Tasly's website, the pill is sold as a prescription drug in China, Vietnam, Pakistan, South Korea, India, and the United Arab Emirates and reportedly is taken by about 10 million people every year to treat angina and coronary heart diseases.³ Last year, its international sales brought in a reported \$148 million.

Danshen has been used in TCM for many years to improve patients' circulation and to treat cardiovascular diseases.³ The oldest documented record of *danshen* as a medical agent is found in *Shen Nun Ben Cao* (*The Divine Husbandman's Classic of the Materia Medica*), dated at about 200 CE.⁴ Consumers in the United States are currently able to buy and use *danshen* and notoginseng either as whole, raw herbs or in herbal dietary supplements. An FDA drug approval would give Tasly protection of market exclusivity for the pill's ingredient combination, specifically in dripping pill form and for the cardio-indication as a prescription drug, because it specifically intends to treat and prevent disease.⁵ (The product cannot qualify for over-the-counter drug regulation because the condition it intends to treat is not a self-diagnosable, self-treatable, and self-limiting condition.)

"This product, known earlier as Fufang Danshen Pian (tablet of salvia with other ingredients), has been used in China for many years, and there have been efforts to get it approved for use outside China for decades," said Subhuti Dharmananda, PhD, director of the Institute for Traditional Medicine and Preventative Health Care in Portland, Oregon (e-mail, September 16, 2010).

"The biggest problem," he said, "is that it is for very serious cardiovascular disorders—mainly angina pectoris—and so it is difficult to integrate it into modern medicine. There were some previous concerns about borneol being potentially toxic, but I think that has been alleviated in recent years. Also, the problem of inconsistency of the botanical constituents is a big issue. In particular, notoginseng grows in southwestern China, an area with difficult climatic conditions that can lead to considerable variability of the chemistry in the root."

In order to conduct human clinical trials, a product must be designated by the FDA as an investigational new drug (IND), which

requires varying levels of evidence that the product is safe for testing in humans and that the clinical protocol is suitably designed.⁵ (Compound Danshen Dripping Pill was the first TCM product to obtain IND designation in the United States in 1997.²) Then, Phase I consists of testing the drug within small groups to determine safety, dosage range, and side effects, and in Phase II researchers study the drug on a larger group of people to determine safety and efficacy. In its third phase of clinical trials, Compound Danshen Dripping Pill will be studied on large groups of people to confirm efficacy, monitor side effects, compare it to commonly used treatments, and collect safety information.⁶

If Phase III investigations are completed, Tasly can decide to submit a new drug application (NDA) to the FDA, which then considers if the drug used for its intended purposes is safe and effective, if the benefits outweigh any known adverse side effects, if the drug's proposed labeling is appropriate, and if the drug can be manufactured in a way that preserves its identity, strength, quality, and purity.⁷

An FDA drug approval for Compound Danshen Dripping Pill, which could take 10 years from the beginning of Phase III trials, might be significant, as it entails official recognition of the safety and efficacy of an herbal preparation in the conventional healthcare system, said William Morris, PhD, DAOM, LAc, president of the Academy of Oriental Medicine at Austin, TX (e-mail, September 23, 2010). "But it could also mean that there is a trend toward 'pharmaceutical herbs,'" Dr. Morris added.

Of the near 3,000 medicines currently in development stages in the United States, only 25 new drugs were approved in 2009, evidence of the extreme difficulty in bringing a new drug to market in the United States.⁸ It now costs a reported \$800 million to \$1.3 billion to conduct the research and development needed to bring a new drug to the market, and generally takes 10 to 15 years for most new drugs to go from the laboratory to market.^{8,9}

"If the drug successfully gains approval in the US through the NDA process, it will be the first time a multi-sourced botanical 'new' drug—one derived from more than one plant [or] plant part—is approved by FDA, and the first botanical to achieve a cardiovascular indication," said Freddie Ann Hoffman, MD, a former FDA official and founder of HeteroGeneity, LLC, a Washington, DC-based consulting firm that advises companies seeking to market botanically-based drugs (e-mail, August 17, 2010). Dr. Hoffman noted that there are approximately 450 IND and pre-IND applications for botanicals that have been submitted to FDA.

Many botanical product developers experience great difficulty in completing the FDA clinical trial process due to the complex chemical nature of the products' multiple plant components. To address

"While entering into Phase III usually means that there is sufficient interest on the part of the sponsor to proceed—based on prior studies—the success of the trial lies strictly with the data itself, which determines whether FDA can approve the drug for marketing."

this situation, in June of 2004, the FDA released *Guidance for Industry for Botanical Drugs*.¹⁰ This document advises potential botanical drug sponsors by describing both the application process and recommending how chemically complex products might satisfy the requirements of FDA's rigorous drug review and approval process. Though presenting somewhat different regulatory policies for botanical INDs than those applied to other drugs, including a somewhat easier process for Phase I and II trials, the document states that botanicals are still treated like any other new drug in order to gain full drug approval.⁵

According to the FDA Center for Drug Evaluation and Research (CDER) Botanical Review Team, the most difficult issue for new botanical drugs is how to ensure "therapeutic consistency" of all marketing batches, which is typically easier for synthetic, purified small molecule drugs (C. Rice [FDA], e-mail, August 17, 2010). The Botanical Review Team noted that it thinks a comprehensive approach can address this situation. "Besides conventional [chemistry, manufacturing, and controls] measures, the sponsor may use clinically relevant bioassay, clinical dose-response data, and testing multiple batches in Phase III clinical trials to demonstrate the consistency of a botanical drug product."

Scientists working with single-herb botanicals and TCM products, which usually are mixtures of herbs, also face challenges in showing evidence that each component of their complex mixtures contributes to the product's claimed effects. This requirement may be impossible for botanical researchers to meet before FDA revises the related regulation, said the FDA Botanical Review Team.

Additionally, few conventional health professionals in the United States practice TCM, said Dr. Hoffman. "Therefore the product and its uses must be 'translated' into US medical practice. This goes for claims, dosage forms, and schedules (consumers want once- or at most twice-a-day dosing). Although the indication may be derived from traditional use, the pivotal clinical study (or studies) must address what will go in the drug's Package Insert—the prescribing information for the health practitioner. The US approach to medicine is not individualized in the same way that TCM is practiced."

Though difficult, it is not impossible for botanicals to successfully complete FDA's drug approval process. In 2006, FDA gave drug approval to Veregen® Ointment (Medigene AG, Martinsried/Munich, Germany), which contains a proprietary blend of phytochemicals produced from a partially purified water extract of green tea leaves (*Camellia sinensis*, Theaceae).¹⁰ Veregen was the first botanical approved as a drug under the 1962 federal law known as the Kefauver-Harris Amendments, which requires drugs to be proven both safe and effective prior to being marketed in the United States.

No botanicals have achieved drug designation since Veregen (C. Rice, e-mail, August 17, 2010), and it is possible that Compound Danshen will also fail to obtain FDA drug approval.

"While entering into Phase III usually means that there is sufficient interest on the part of the sponsor to proceed—based on prior studies—the success of the trial lies strictly with the data itself, which determines whether FDA can approve the drug for marketing," said Dr. Hoffman. "Even drugs produced by large, global pharma companies, which have gone through rigorous preclinical testing, can 'miss the mark' in Phase III." Some examples include Medivation's drug Dimebon for Alzheimer's disease,¹¹ Merck's HIV drug vicriviroc,¹² and Inspire Pharmaceuticals' Prolactria for the treatment of dry eye disease.¹³

—Lindsay Stafford

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Society for Economic Botany Holds 51st Annual Meeting

The 51st annual meeting of the Society for Economic Botany (SEB) was held in Xalapa, Mexico from June 6-10, 2010. Its theme, “Agrobiodiversity: Lessons for Conservation and Local Development,” paid tribute to the 2010 International Year of Biodiversity (IYB). In addition to commemorating IYB through a variety of the presentations and sessions, the event included a special symposium sponsored by Biodiversity International, titled “Plant Domestication as an Ongoing Process: Implications and Applications for Conservation and Resilience.” The meeting was accompanied by the 2nd annual meeting of the Open Science Network in Ethnobiology.

Thanks to the local organizing committee and the event’s institutional sponsors, the Centro de Investigaciones Tropicales (CITRO) at the Universidad Veracruzana and the Instituto de Ecología, A.C. (INECOL), the meeting was a great success, both in the meeting rooms and with regards to the accompanying events. Such accompanying events included field trips and local attractions, allowing participants to sample the local flora and cuisine, as well as ancient and contemporary culture. The meeting’s location (this was the 6th meeting outside the United States in 16 years) and an international crowd of speakers and participants reflect SEB’s successful attempt in broadening its scope and membership.

The 4-day event was host to over 100 oral and 30 poster presentations, which were attended by more than 300 participants from 16 countries, some from as far afield as Kenya, Poland, and Estonia. The meeting was partially bilingual, with some presentations given in English and/or Spanish. Alas, the wealth of presentations made parallel sessions inevitable and offered a tough choice to participants.

The meeting provided a great opportunity and platform for young and experienced scientists to present and discuss their work. While it is almost impossible to name highlights amongst the presentations, the young scientist award winners deserve mention: the Edmund Fulling Oral Presentation Award went to Ashley DuVal (Yale University, USA) for “Selection, Management, and Diffusion of Açaí Branco by Smallholder Farmers



in the Amazon Estuary,” and the Julia Morton Poster Award was given to Xitlali Aguirre-Dugua (Universidad Nacional Autónoma de México) for “The Gourd Tree *Crescentia cujete*: Phylogeography and Ethnobotany of a Useful Fruit in Mexico.” The Mary W. Klinger 2010 Book Award was given to Eduardo S. Brondizio, author of *The Amazonian Caboclo and the Acai Palm: Forest Farmers in the Global Market* (New York Botanical Garden Press, 2008). These monetary awards are given annually by the society to promote young scientists.

Another highlight—both in terms of speed and scope—was

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the honorary lecture of this year's recipients of SEB's Distinguished Economic Botanist award, Edelmira Linares, PhD, and Robert Bye, PhD. Alternating elegantly, Drs. Linares and Bye uncovered a lifetime of tireless professional curiosity, research, and achievements in studying traditionally used medicinal plants documented by the rich ethnobotany of Mexico.

SEB also held board and business meetings as part of the conference, details of which are due to be published in the next edition of the organization's newsletter. SEB's 2011 annual meeting will be held jointly with the Botanical Society of America from July 9-13 in St. Louis, Missouri. Its theme is "Healing the Planet," and it will feature a symposium on medicinal plants in honor of the late Harvard ethnobotany professor and SEB Distinguished Economic Botanist Richard Evans Schultes.

More about SEB is available at its website, www.econbot.org. 

—Thomas Brendler, Plantaphile Ltd., and Trish Flaster,
Botanical Liaison, LLC

The opening reception was held in the Museo de Antropología de Xalapa (Museum of Anthropology). The museum houses the largest collection of artifacts from Mexican Gulf Coast cultures such as the Olmec, the Huastec, and the Totonac with more than 2,500 pieces. The most notable pieces in the museum are the giant Olmec heads and the smaller Totonac ones, which are called "*caritas sonrientes*" (little smiling faces) in Spanish. Photo ©2010 Society for Economic Botany

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An Oak Spring Herbaria: Herbs and Herbals from the Fourteenth to the Nineteenth Centuries: A Selection of the Rare Books, Manuscripts and Works of Art in the Collection of Rachel Lambert Mellon by Lucia Tongiorgi Tomasi and Tony Willis.

Upperville, VA: Oak Spring Garden Library; 2009. Hardcover; 394 pages. ISBN 978-0-965408-1-2. \$89.00. Available in ABC's online catalog #B785.

Every book has a story of how it came to be. Recipient of ABC's 2009 James A. Duke Excellence in Botanical Literature Award, *An Oak Spring Herbaria* is the fourth in a series of authoritative catalogs published by the Oak Spring Garden Library. Other titles in the series include *An Oak Spring Sylva*, *An Oak Spring Pomona*, and *An Oak Spring Flora*. These interpretive, scholarly, illustrated catalogs describe selected works in the extraordinary private collection of Rachel Lambert Mellon—the Oak Spring Garden Library.

The Library is nestled on a quiet knoll on the 4,000-acre Mellon estate, Oak Springs Farm, in the foothills between the Blue Ridge Mountains and Bull Run Mountains in northern Virginia. It is a reflection of the mind and passion of Rachel Lambert Mellon, who has been collecting antiquarian books, manuscripts, artwork, and artifacts since childhood, and continues to do so in her 101st year. Over 10,000 volumes relating to gardening, landscape design, horticulture, botany, natural history, and botanical exploration are among the collections in the Library, designed by Edward Larrabee Barnes in 1980; a gift to Rachel Mellon from her late husband, Paul Mellon. As a child, Mrs. Mellon—the granddaughter of Listerine® inventor, Jordan W. Lambert—was encouraged to collect antiquarian books after expressing a fascination with fine illustrated children's books.

Perhaps the reader will begin to picture a darkened, paneled library of rich hardwoods, with detailed molding and locked shelves, holding the investment artifacts of an individual of extraordinary fortune. Au contraire! The Oak Spring Library is light and airy, surprising the senses like the walls of a whitewashed stable. Nature is not stored

on a shelf but invited to participate in the experience. Limestone paths leading to the library seem to be laid for the purpose of allowing weeds and wildflowers to grow as they please between cracks rather than to keep humans separate from the earth below. One is left with the impression of being in a living room, not a museum.

The Library is not the static collection of an investor; rather a living collection borne of passion for things botanical—and the passionate love of the bibliophile and collector—from which springs a lifelong pursuit of learning. The books did not simply arrive in a box, only to be shelved for storage. Mrs. Mellon consumed their contents, garnering an expertise in landscape philosophy, design, and the breadth of human experience with plants, leading to lasting achievements such as her design of the Jacqueline Kennedy Garden and the Rose Garden at the White House.

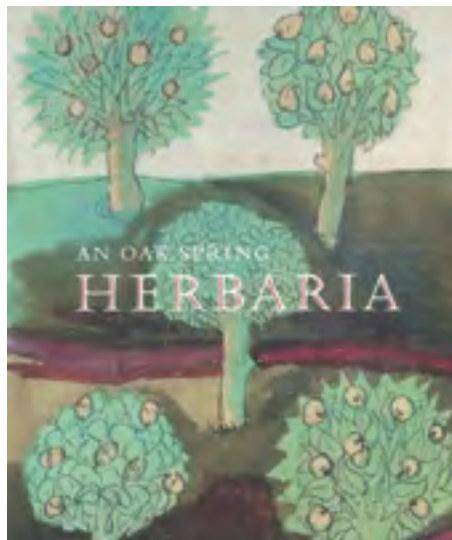
Only the book collector knows the elation of the arrival of an expected package followed by the delighted excitement of carefully unwrapping the new acquisition. Once the package content reveals itself, like a treasure hidden beneath the ocean's surface, the spine and boards are visually inspected more for their beauty than their condition, and enjoyed for their tactile warmth. Inevitably, the collector turns to the title page, his or her hands slipping across the paper to enjoy the pleasure of the 3-dimensional feel of raised type imprinted on crafted paper. Thoughts wander to an author creating a manuscript with quill pen, rhythmically dipped into an inkwell, the muted sound of sand crackling when tossed across the page to hasten the ink's hold to the fibers. The sounds and smells of the print shop, the papermaker, the bindery, drift from the page like a

ghostly aroma. The tactile experience of the moment brings thoughts of the item's provenance, readers who have come and gone, and what the words on the printed page contributed to human experience, appreciation of nature, or simple enjoyment of beauty alone.

Such was the experience of this writer the day *An Oak Spring Herbaria* arrived in the mailbox. Page by page, an hour quickly passed, spent consuming a visual impression of what treasures would emerge from a careful read. Few books of contemporary birth provide the tangible experience of the antiquarian book. This is a book designed and crafted with thoughts and appreciation for the works described within. The heavy endpapers with a simple tree silhouette repeated in a diamond pattern immediately reveal careful attention to detail—not really an important point beyond providing the all-telling first impression. The book blends the best that technology offers, making the book itself an object of beauty. The illustrations are captured with digital high-resolution photographic clarity and reproduced in duotone and process color by Finlay Printing in Bloomfield, Connecticut. Acme Bookbindery in Charlestown, Massachusetts, fused the sewn signatures between hard boards, clothed in fine Japanese silver-gray cloth. Mark Argetsinger, designer and scholar of fine printing, designed and composed the book in Digital Monotype Bembo. He also served as the editor and authored the chapter on American Herbals. No e-book will ever replace a physical book as a true piece of art.

The senior author, Lucia Tongiorgi Tomasi, Vice-Rector and professor of art history at the University of Pisa, labored over *An Oak Spring Herbaria* for 5 years, writing the original manuscript in Italian, which was simultaneously translated to English by Lisa Chen. The co-author, Tony Willis, is the long-time librarian at the Oak Spring Garden Library, handpicked at a young age by Mrs. Mellon and groomed to fulfill his promise.

The book is an authoritative survey of herbals, their authors, and history, as represented in selections from the collection of the Oak Spring Library, dating to the 14th century. Sixty-three selected works





Drawings of Chinese Plants, circa 1770-1774. 'Gardenia,' possibly a Common Gardenia (*Gardenia jasminoides*), Vol. II, folio 3.
Illustration ©2010 Collection of Rachel Lambert Mellon, Oak Spring Garden Library

are detailed in thematic chapters, covering “Late Medieval Herbals,” “The Great Age of Renaissance Botany,” “Herbals from Distant Lands,” “Herbals of Botanical Gardens and Private Gardens of Europe,” “Curious and Strange Herbals,” “Dried Specimens and Nature Printing,” and “American Herbals.” One hundred-seventy illustrations, including 98 in full color and 72 duotones grace the pages.

As chapters, the 63 selected works covered in the book begin with a physical description of the item(s), along with format, measurements and other technical details. Plates or illustrative matter are enumerated in a separate heading, as is “provenance,” with information on previous owners, bookplates, and inscriptions among other details. References are listed citing works in the bibliography which follows the introduction. In most cases, the chapter heading is the name of the author of the work described. In this context, *An Oak Spring Herbaria* is in most instances as much about the author’s or artist’s biography as it is about the book or artwork. As a result, *An Oak Spring Herbaria* is as much about people as it is about books or illustrations.

Many unique illustrations, such as selected examples of 3 detailed botanical paintings of a Chinese artist, Mauk-Sow-U, commissioned by a young British botanist, John Bradby Blake (1745-1743), are reproduced for the first time. One beautiful illustration of *Gardenia jasminoides* (Rubiaceae) displays the remarkable sensitivity, artistry, and penchant for detail of Mauk-Sow-U’s work, under Blake’s guidance. Each morphological detail is reproduced as if a photograph, with individual plant parts sectioned laterally and horizontally to depict plant structures in brilliant watercolor and gouache, with subtle details enhanced by lucent varnish. The artist came to Blake’s residence daily to paint. Blake kept exacting notes on the creation of each illustration, rendered from live plants. “The gardenia was drawn June 1st 1771. I had two plants brought to me about two days journey from a very hilly situation, they are drawn in every respect of full size,” he wrote. The author of this review was particularly delighted by the illustration, as he has a single-flowered gardenia, grown as a container plant for 15 years which was propagated from seed of wild plants collected by a colleague in the very same region of China in the mid-1990s. The 1771 Blake commission mirrors the live plant in exacting detail, down to the subtle

rendition of the color of the bark.

Blake, apparently intent on producing a Chinese herbal for a European audience, embarked for China in 1766 at the age of 20 as the representative of the owner of an East India Company ship. He died in 1773 in China at only 29, but left behind 11 volumes of manuscript material on the natural history of China, including 4 folio volumes of paintings, all of which are in the Oak Spring Library Collection.

The Blake folio volumes are among a dozen unique manuscript and folio collections detailed among the 63 chapters. Other items include a remarkable manuscript herbal, *Webster’s Distribution of English Medicinal Plants*, containing a collection of 226 watercolor/gouache drawings of medicinal plants by an English physician, Joshua Webster (1711-1803). Notes on the botany and medicinal uses of each plant are penned on the left margin of each plate. Notable for its superb botanical illustrations, such as the Stinging Nettle (*Urtica dioica*, Urticaceae), Fennel (*Foeniculum vulgare*, Apiaceae) and Asparagus (*Asparagus officinalis*, Liliaceae), the manuscript’s leaves are produced as full-page, full-color illustrations in *An Oak Spring Herbaria*. The Oak Spring copy of the rare *Buch der Natur*, a 14th-century manuscript by Konrad von Medgenberg (1309-1374), one of 56 known manuscript copies of the work, is among only 2 extant copies that were lavishly illustrated with over 300 drawings. The curious simplistic tree watercolor on *An Oak Spring Herbaria*’s dust jacket is a folia from *Buch der Natur*. These are just a few of the one-of-a-kind treasures conserved in the Oak Spring Library and illuminated in *An Oak Spring Herbaria*.

Other unique artifacts illustrated and described in the book include 3 engraved, original woodblocks actually used in the printing of Pietro Andrea Mattioli’s 1565 Latin edition of *Commentarii in sex libros Pedanii Dioscoridis Anazarbei de medical material*. Eight medicinal-plant oil paintings, rare and unique examples of decorative art that hung in pharmacies in the first half of the 17th century, are also among the treasures reproduced in the book.

An Oak Spring Herbaria, therefore, is much more than a simple review of the history, content, and illustrations of the great medieval and renaissance works by masters such as Otto Brunfels, Leonhart Fuchs, Rembert Dodoens, and John Gerard, among others. *An Oak Spring Herbaria* extends and surpasses the nuance and clar-

ity of detail of classic herbal histories such as Agnus Arber’s *Herbals* (published in 1912, revised 1938) or Frank J. Anderson’s *An Illustrated History of the Herbals* (Columbia University Press, 1977). Alone, the ‘Introduction’ to *An Oak Spring Herbaria* provides one of the most succinct and readable historical overviews of the evolution of the herbal genre, reflecting Tongiorgi Tomasi’s intimate familiarity of classical works, like most of us are familiar with the view from a living-room window. Argetsinger’s excellent chapter, “American Herbals,” details the scientific evolution of herbal medicine classics such as Jacob Bigelow’s *American Medical Botany* and C.S. Rafinesque’s *Medical Flora*, along with the rise of the egalitarian popular American herbal, such as Samuel Henry’s uneven and unreliable *A New and Complete American Medical Family Herbal* and Peter Peyto Good’s *The Family Flora and Materia Medica Botanica*.

Most books mirror the voice of the author. *An Oak Spring Herbaria*, however, feels more like the collective effort of a choreographed Broadway production. Tongiorgi Tomasi’s deep expertise in the classical illuminated manuscript and printed artwork is woven together with Willis’s day-in, day-out intricate knowledge of a collection he has handled for 3 decades. Argetsinger’s behind-the-scenes attention and direction to detail, coupled with expertise in the beautifully printed book and innate sense of design infuse each page. This is a labor of love.

Underlying the entire project, one senses the passion of the collector, Mrs. Mellon, and her extraordinary intimacy with the intrinsic value of art and words that can only come from decades of experience, fused with a deep understanding of the breadth of knowledge presented in botanical literature. Here, a lifetime of pleasure, passion, and dedication translates into the legacy of perpetuating knowledge in the evolution of human experience. For all its intricacy of production, *An Oak Spring Herbaria* ultimately reflects Mrs. Mellon’s gift of a worldview that recognizes the simple beauty of a weed allowed to grow in a place where others would simply have removed it.

—Steven Foster
President, Steven Foster Group, Inc.
Eureka Springs, AR



Joshua Webster, *Webster's Distribution of English Medicinal Plants*, c. 1780.
 Stinging Nettle (*Urtica dioica*), with two mosqui-
 toes (*Culicidae*), folio 70.
 Illustration ©2010 Collec-
 tion of Rachel Lambert
 Mellon, Oak Spring
 Garden Library

Singing to the Plants: A Guide to Mestizo Shamanism in the Upper Amazon by Stephan V. Beyer. Albuquerque, NM: University of New Mexico Press, 2009. Hardcover, 530 pages. ISBN 9780826347299. \$45.00.

As plant-based shamanism peaks in the Western consciousness, a number of books have recently been published documenting different facets of this archaic revival. Few are more carefully researched or as delightfully presented as Stephan V. Beyer's magnum opus, *Singing to the Plants*, which as the subtitle suggests, is *the* invaluable guide to mestizo shamanism in the Upper Amazon.

Beyer is an ex-jungle survivalist, a trained lawyer, and, most curiously, a rigorous academic with degrees in both religion and psychology, who is steeped in the experiential world of Peruvian shamanism. Beyer spent many years learning the arts of indigenous *curanderos* (or as the West would call them, shamans), and received coronación in Peru by banco ayahuasquero (an experienced ayahuasca shaman of many decades) Don Roberto Acho Jurama.

Beyer's book documents the rich traditions of the mestizo Spanish-speaking descendants of the Hispanic colonizers and the indigenous jungle peoples, and their colorful mix of folk Catholicism and traditional plant-based medicines. Chief among these medicines is the "vine of the soul," ayahuasca, a hallucinogenic brew made from the *Banisteriopsis caapi* (Malpighia-

ceae) vine (containing mono-amine oxidase inhibitors) and a mixture of plants such as chacruna (*Psychotria viridis*, Rubiaceae) which contains the potent psychedelic dimethyltryptamine, or DMT.

Beyer sketches the history and current indigenous usage of ayahuasca, as well as documenting its unprecedented boom in the West as a spiritual tool, and he does so in a meticulous and rewarding way, weaving academic discourse with his own personal recollections of training with his *maestro* and other curanderos. The result is a fresh and evocative journey into the magical-realist world of indigenous plant medicines, where literally hundreds of plants are utilized by curanderos for physical and spiritual healing, love, magic, and malicious sorcery.

Beyer has a detailed chapter on the phenomenology of the ayahuasca experience, describing the internal visions that have made it so famous and sought after in the West, and discussing the lucidity, time dilation, synaesthesia, and modes of mental activity that create the internal sensations. Beyer holds no facet of the ayahuasca experience as sacrosanct, and applies modern psychological understanding to the how and why of the visionary experience: gap filling, active imagination, and other templates are applied against the indigenous world of spirits, entities, and magical realism.

In addition to ayahuasca, Beyer lists almost 150 medicinal, psychoactive, and "power" plants used in the Upper Amazon, from the potent tobacco *Nicotiana rustica* (Solanaceae; aka *mapacho*), to *toé* (*Brugmansia suaveolens*, Solanaceae), *ajo sacha* (*Mansoa alliacea*, Bignoniaceae), *camalonga* (*Thevetia peruviana*, Apocynaceae), and many others. There is an invaluable appendix detailing the popular and scientific names, and references to each plant.

As his title suggests, it is not just the physical properties for which indigenous curanderos use these plants; the shamans *sing* to the plants, or the "spirits" in them, and are in turn sung back to. These songs, or *icaros*, are said to map the vibrational essence of the plants and are part of the essential tools of the trade of Amazonian shamanism. "The plant comes and talks to you, it teaches you to sing," curandero Don Solón Tello Lozano is quoted as saying.

Singing to the Plants is an invaluable collection of indigenous wisdom sifted with

reasoned Western critique. Beyer describes an ayahuasca ceremony and counterpoints this with detailed analysis of the role of the shaman as a performer, healer, and sometimes charlatan, providing an essential discussion of this idolized figure. He goes on to successfully map the shamanic landscape and the competition and dangers of shamanism (mainly from other shamans engaged in a jungle-infused, eat-or-be-eaten competition for magical prowess and reputation, also called *brujeria*). From poisoned blow darts to magical *virote* (a short, blunt arrow), Beyer goes where few books on shamanism have dared to tread, to the dark side of ego-based work in the reputed spirit realms the hallucinogenic plants take the shamans and their patients.

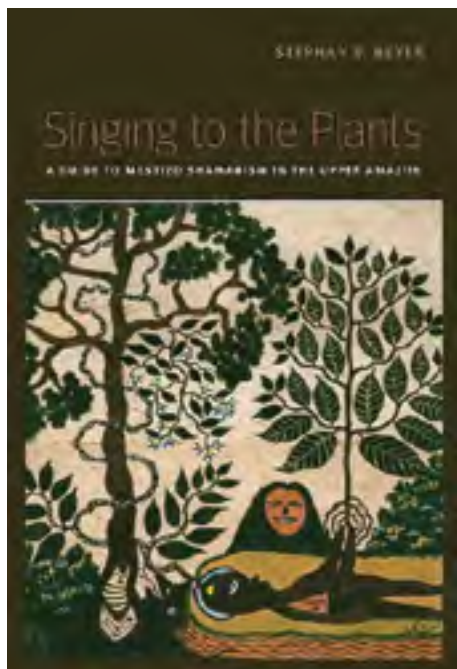
Initiated himself, Beyer provides a cascading and carefully constructed explanation of all facets of mestizo shamanism, from the jungle villages to the large cities, and his journeys are infused with the colorful detail and ring of authenticity. This is a serious and scholarly compendium for the academic and layperson alike. It is to be most highly recommended to those with an interest in Amazonian medicines, shamanism, culture, and the current impact these evolving traditions are having as the West undergoes its own global shamanic resurgence.

—Rak Razam

Author, *Aya: A Shamanic Odyssey*
Mullumbimby, Australia

USP Dietary Supplements Compendium, 2009-2010 by United States Pharmacopeia. Rockville, MD: U.S. Pharmacopeia. Hardcover; 1811 pages. ISBN 978-1889788791. \$425.00.

The United States Pharmacopeia (USP) has produced a dedicated Dietary Supplements Compendium (USP-DS). This hefty, comprehensive first-edition volume includes material taken from the *US Pharmacopeia – National Formulary* (USP-NF) and the *Food Chemicals Codex* (FCC), now a publication of the USP, as well as additional material pertinent to dietary supplements. For those persons unfamiliar with the USP, it is a nonprofit organization with a mission to provide standards for medicines and foods, thereby ensuring their quality and safety. This volume, the USP-DS, provides standards monographs for dietary supplements in addition to dietary ingredients and other materials used in the formulation of dietary supplements.



The USP was formed in 1820 by a convention of physicians whose goal was the elimination of regional differences in names and formulations of medicines in the United States. The USP standards were officially recognized by federal law in 1848. Today the USP is combined with the *National Formulary* (NF). The NF was established by the American Pharmaceutical Association in 1888 to provide standards for “unofficial preparations,” that is, remedies not included in the USP but commonly used by pharmacists. The NF was purchased by the USP in 1975 and its information was incorporated into a single publication along with the USP, forming the USP-NF. The USP purchased the FCC from the Institute of Medicine’s National Academy of Science in 2006. The FCC is a compendium of standards for the purity and identity of food ingredients. The USP-DS incorporates standards from all 3 of these bodies, the USP, NF, and FCC.

Early editions of the USP were concerned with the standardization of botanical drugs, but these were phased out in the 1940s and 50s with the development of single-entity chemical drugs. Following the passage of the Dietary Supplement Health and Education Act of 1994 (DSHEA) by the US Congress, the USP renewed its role in providing guidance on the quality for therapeutic botanicals, now sold as dietary supplements.

The book begins with a section titled “General Chapters,” which contains selected general chapters from the USP that are considered relevant for the analysis and/or manufacturing of dietary supplements. The chapters include information on apparatus required for tests and assays, as well as procedures for those assays. Tests particularly relevant for botanicals include those for microbial contaminants, heavy metals, residual solvents, ash, foreign matter, fiber, starch, pesticides, and aflatoxins. Also included is a description of the use of authenticated reference materials for botanical identification, using characteristic plant morphology and anatomy. The chapter contains processes for making botanical extracts and tinctures. There is a description of various types of chromatography, including paper, thin-layer (TLC), column, gas, high pressure liquid (HPLC), ion, and size exclusion, as well as interpretation of the chromatograms. Also included is a description of the apparatus and methods to measure disintegration (dissolving to

a soft mass) and dissolution (identification of specified active components in solution) of tablets and capsules. There are descriptions of spectrometry: ultra-violet, visible, near-infrared, roman, atomic, fluorescence, mass spectrometry, and nuclear magnetic resonance. Also defined are quality control operations, record keeping and adverse event reporting. There is small section that includes supplemental information on black cohosh (*Actaea racemosa*, Ranunculaceae), ginger (*Zingiber officinale*, Zingiberaceae), and valerian (*Valeriana officinalis*, Valerianaceae). These 3 example monographs include additional information not included in the general standards monographs; namely pre-harvest conditions and post-harvest handling, references to good agricultural practices; compendia history for the ingredient, sources, cultivation, collection, drying, storage and shipping, as well as chemical constituents. The General Chapters section extends over 400 pages, which may give the reader an idea of the breadth of this information.

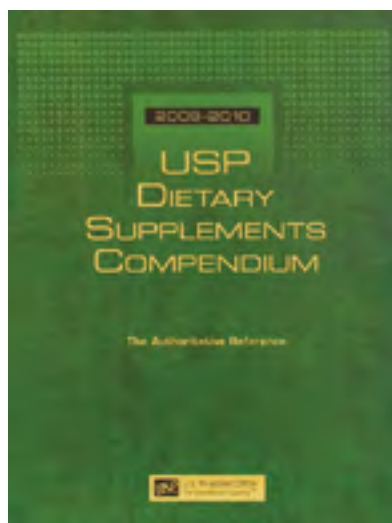
The General Chapters section is followed by “Official Monographs.” Included in these monographs are standards for identity, purity, and quality. The official botanical monographs include aloe latex (*Aloe spp.*, Liliaceae), bilberry fruit (*Vaccinium myrtillus*, Ericaceae), cascara sagrada bark (*Frangula purshiana*, Rhamnaceae), cat’s claw stem bark (*Uncaria tomentosa*, Rubiaceae), chamomile flowers (*Matricaria recutita*, Asteraceae), chaste tree fruit (*Vitex agnus-castus*, Verbenaceae), red clover flowers (*Trifolium pratense*, Fabaceae), black cohosh rhizome/root, cranberry fruit (*Vaccinium macrocarpon*, Ericaceae), echinacea (*Echinacea angustifolia* root/rhizome, *E. pallida* root/rhizome, and *E. purpurea* aerial parts and root/rhizome, Asteraceae), eleuthero root/rhizome (*Eleutherococcus senticosus*, Araliaceae), slippery elm inner bark (*Ulmus rubra*, Ulmaceae), feverfew leaves (*Tanacetum parthenium*, Asteraceae), garlic bulb (*Allium sativum*, Alliaceae), ginger rhizome, ginkgo leaf

(*Ginkgo biloba*, Ginkgoaceae), American ginseng root (*Panax quinquefolius*, Araliaceae), Asian ginseng root (*P. ginseng*), goldenseal root/rhizome (*Hydrastis canadensis*, Ranunculaceae), green tea leaf (*Camellia sinensis*, Theaceae), hawthorn leaf with flower (*Crataegus monogyna*, Rosaceae), horse chestnut seed (*Aesculus hippocastanum*, Hippocastanaceae), licorice root (*Glycyrrhiza glabra*, Fabaceae), tomato fruit (*Lycopersicon esculentum*, Solanaceae), maritime pine stem bark (*Pinus pinaster*, Pinaceae), milk thistle seed (*Silybum marianum*, Asteraceae), stinging nettle root (*Urtica dioica*, Urticaceae), plantago/psyllium seed, husk (*Plantago spp.*, Plantaginaceae), pygeum bark (*Prunus africana*, Rosaceae), St. John’s wort flowering tops (*Hypericum perforatum*, Clusiaceae), saw palmetto fruit (*Serenoa repens*, Arecaceae), senna leaf, pod (*Senna alexandrina*, Fabaceae), soy bean isoflavones (*Glycine max*, Fabaceae), turmeric rhizome (*Curcuma longa*, Zingiberaceae; with separate monograph for isolated curcuminoids) and

valerian root/rhizome. Each botanical may have several separate monographs as there are distinct listings for powdered plant materials, extracts, capsules, tablets and fluid extracts. More botanicals are included in the NF section of the compendium, which follows the Official Monographs section.

There is a large section in the USP-DS that includes information from the FCC, such as monographs for essential oils obtained from botanicals used as food ingredients.

Another section of the reference tome includes safety reviews produced by the USP Dietary Supplements Information Expert Committee. Following a short description of the means taken to evaluate the literature, there are safety profiles of the following: ashwagandha (*Withania somnifera*, Solanaceae), black cohosh, frankincense (*Boswellia sacra*, Burseraceae), fenugreek (*Trigonella foenum-graecum*, Fabaceae), green tea extracts, mangosteen (*Garcinia mongostana*, Clusiaceae), and



noni (*Morinda citrifolia*, Rubiaceae).

A description of the USP Dietary Ingredients Verification program is included. This is a program that certifies the identity, strength, purity, and quality of manufacturers' ingredients and finished products and subsequently allows them to use the USP verified mark on their packaging and advertising.

A section titled DS regulatory framework incorporates copies of DSHEA, the US Food and Drug Administration (FDA)'s Good Manufacturing Practices (GMPs) for DS and foods, FDA guidance on dietary supplement labeling, adverse event reporting, Federal Trade Commission (FTC) Act requirements related to dietary supplements and advertising guide and, finally, the California Safe Drinking Water and Toxic Enforcement Act of 1986 (better known as CA Proposition 65).

A table of Dietary Reference Intake levels (DRIs), recommended daily intake levels (RDIs), and tolerable upper intake levels (UL) from worldwide sources for vitamins and minerals is also included.

Guidance documents produced by trade associations—the American Herbal Products Association (AHPA), Natural Products Association, Consumer Health Products Association, and Council of Responsible Nutrition—are included. These are: AHPA's guidance for manufacturer and sale of bulk botanical extracts, AHPA's use of marker compounds in manufacturing and labeling botanically-derived dietary supplements, AHPA's guidance for the retail labeling of dietary supplements containing soft or powdered botanical extracts, AHPA's standardization of botanical products: white paper, AHPA-American Herbal Pharmacopoeia's good agricultural and collection practice for herbal raw materials and guidance developed by the joint Standardization Ingredient Information Protocol working group, namely Standardized Information on Dietary Ingredients (SIDI). The inclusion of this information is an acknowledgement by the USP of the expertise contained within these groups and the self-regulatory attempts made by responsible organizations in the dietary supplement industry.

What I enjoyed the most, as a pharmacognosist, was the section titled "Illustrations." This section includes plates with photos of dried raw botanical materials, chemical structures, and example chromatograms. For example, the

section for black cohosh includes a photograph of the dried root and rhizomes along with organoleptic characteristics, a drawing of microscopic features, microscopic photographs of transverse sections of the rhizome, microscopic features of the powdered rhizome, chemical structures of constituent triterpene glycosides, TLC plates, and an HPLC chromatogram.

This book is a beautiful, comprehensive work that brings together in one volume many of the resources needed for the industry. The only complaint I have is that it is a bit cumbersome to use. There is no table of contents in the beginning of the book, which leaves the reader no choice but to use the index to search for items. In addition, information on one topic or one ingredient might be found in several different places in the book. However, all in all, the USP has done a fabulous job creating the Dietary Supplements Compendium. It is timely that the book has been published to coincide with the implication of the dietary supplement GMPs. The USP-DS is highly recommended for all persons involved in the dietary supplements industry and especially for manufacturers.

—Marilyn Barrett, PhD
Pharmacognosy Consulting
Mill Valley, CA

PROTA (Plant Resources of Tropical Africa) 11(1). Medicinal Plants 1 by G.H. Schmelzer and A. Gurib-Fakim (eds). Wageningen, Netherlands: PROTA Foundation/Backhuys Publishers/CTA.; 2008. Paperback; 790 pages. ISBN: 978-3-8236-1532-3. \$199.99.

PROTA 11(1) is the first of 4 volumes describing plant species of tropical Africa traditionally used in local medicine. This volume is a comprehensive description of 134 important medicinal plants including wild, cultivated, and partially domesticated species. The main objective of this volume is to make available the extensive knowledge of medicinal plants of tropical Africa.

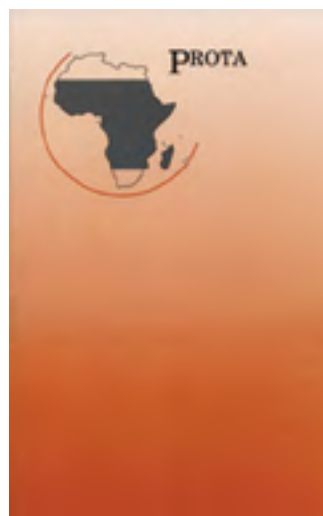
In addition, more than 200 medicinal plants with minor impor-

tance are described and over 400 species with scarce information are mentioned as related species under the subheadings "Other Botanical Information." For example *Clutia abyssinica* (Euphorbiaceae) is extensively reviewed, and at the end of the article, other *Clutia* species from eastern and southern Africa, with limited or less information, were also included.

The book is authored by recognized scientists with extensive collective experience on African medicinal plants. More than 80 contributors are listed at the beginning of the book with affiliations and the species chapters they contributed. All of the species are treated with the same consistent format, which allows the reader to make useful, effective, and convenient comparisons.

The introduction provides a clear explanation of the species included in this volume. PROTA assigns to all plants one primary use (if relevant) and one or more secondary uses. Only those plants having primary uses as medicinal plants are included in *PROTA 11*. In this volume, selected families are treated including *Apocynaceae*, *Asphodelaceae*, *Caesalpinaceae*, *Euphorbiaceae*, *Loganiaceae*, *Menispermaceae*, *Solanaceae*, and other families with fewer medicinal plants. In addition, in the introduction, there is an explanation of the format of each account or article. For example, a distribution map is added for major species, offering a quick visualization of the distribution of the species. Another advantage of this volume is that for each major (and some lesser-known) species, it contains morphological description and a line drawing with the distinctive characteristics of the taxa.

The organization of the taxa in the book is alphabetical, based on the scientific name with the authority and that format continues throughout the book. This includes protologue (first publication of the taxonomic name), family, chromosome number, synonyms (most commonly used), vernacular names (of the area of distribution and only in official languages—English, French, Portuguese and Swahili), origin and geographic distribution, uses, properties (where



possible with support of traditional uses), botany (or description), ecology, genetic resources and breeding, prospects, major references and author(s). All references cited in the text are alphabetically ordered at the end of the book, and constitute an important source of information. The book concludes with an index of scientific and vernacular names. The addition of a glossary would have been useful particularly for the non-specialist or students.

This publication is a great reference and an extensive source of information. The writing is accessible for specialists and non-specialists alike. This book is suggested to anyone studying medicinal plants of Africa, geographic distribution of plant life in Africa, ethnobotanists, ecologists, anthropologists, and to advanced students of plant science. This book will be a practical addition to any research, educational, or industry library.

—**Adolfina Koroch, PhD**
Assistant Professor
Department of Science
Borough of Manhattan Community College
City University
New York, NY

Integrative Women's Health by Victoria Maizes and Tieraona Low Dog (eds). New York, NY: Oxford University Press, Inc; 2010. Hardcover; 688 pages. ISBN 978-0-19-537881-8. \$49.95.

Integrative Women's Health resonates with warmth, care, and empathy, from the foreword by series editor Andrew Weil, MD, to the editors' introductory chapter and epilogue, and throughout the contributing authors' chapters. However, this is not a "touchy-feely" tome, but rather a clear, referenced presentation of the best evidence in the field, covering the most effective conventional treatments alongside relevant adjunct treatments and alternative or complementary approaches from varied traditional and contemporary practices. There is also an uncommon dose of common sense, recognizing that simple lifestyle changes, breathing exercises, or yoga practice may bring about profound health improvements, motivating patients to help and heal themselves.

The editors, Victoria Maizes, MD, and Tieraona Low Dog, MD, are recognized leaders in integrative medicine education and practice, and their selection of contributing authors and content achieves overall balance and impact. Chapters are grouped

into sections: Lifestyle, Systems and Modalities, Reproductive Health, and Common Illnesses in Women. Across sections there is a unifying but flexible format whereby each chapter concludes with practical recommendations, resources, and references. So many edited collections seem fragmented; by contrast, this book forms a cohesive whole even though the chapters can be read separately and selectively.

Setting the tone, the editors' chapter opens the Lifestyle section by expounding a general philosophy of integrative women's health. Key is the building of a healing partnership whereby each practitioner explores the woman patient's "beliefs, intuitions, and preferences for care," providing an opportunity for the patient to tell her own story, maybe for the first time, and put her medical history into context. Many physicians may complain that this counsel of perfection is rarely possible when practicing under severe time constraints. The profound underlying message is nonetheless valid that "integrative medicine is not simply about learning to use new treatment options. It is about a different way of being with a patient." Ultimately, spending time to get to know the patient may lead to a more effective treatment and a quicker path to long-term healing.

At times I felt uncomfortable with a near deification of women. "Women have the capacity to see the sacred in everyday life. In sunrises, in the changing colors of the mountain in the deserts, and in the laughter of a child, women may be reminded of the ineffable." Is this not also true of men? While I agree that women are generally the glue that binds families together, the keepers of rituals, surely men also may be the holders and keepers of family, faith, and spirituality.

Through the topics of nutrition, dietary supplements, physical activity, mind-body therapies, and recognition of women's "soul wounds," the other chapters in the Lifestyle section continue the theme that patient empowerment, respect for their views, and "low tech" solutions may lead to powerful

medicine. Additionally, practitioners may themselves benefit from refocusing practices between seeing patients.

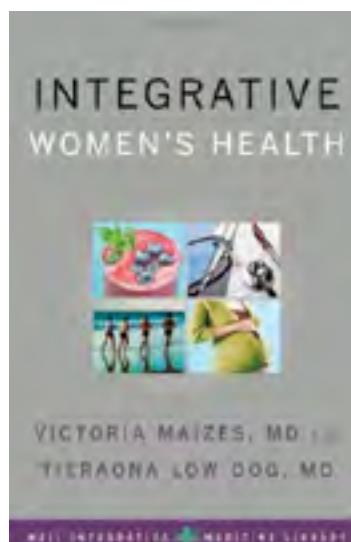
Systems and Modalities covers ancient systems of medicine, represented here by Traditional Chinese Medicine (TCM) and Ayurveda. These traditional systems are characterized by an overarching cosmology and concepts of change and balance that provide new insights into women's ailments. Disease is primarily explained in

terms of patterns of disharmony; cure is a pathway for restoring balance and harmony. Similar dynamics are traced in energy medicine, homeopathy, and manual medicine, with discussions into how these modalities view and treat women's health problems.

The section on Reproductive Health takes a different angle, focusing on the lifecycle of women from menstruation to menopause. Natural life events such as pregnancy and childbirth provide an excellent opportunity

for the integrative practitioner to engage women in self-care practices and healthy choices that can endure a lifetime. While recognizing that conventional medicine has made childbirth safer, many women may choose to incorporate traditional birthing practices such as use of doulas or modern approaches like self-hypnosis for pain. Most practices can be integrated into the hospital environment. Similarly, menopause is a natural life stage that has become over-medicalized but could be seen as a time of "positive, life-changing insights, empowerment, and personal growth."

Women's lifecycle ailments, including chronic pelvic pain, endometriosis, and reproductive system cancers, are covered in separate chapters. In most cases, including in relatively mild problems such as vaginitis, an integrative approach will recognize the distress and often guilt that women may experience. Each chapter looks at conventional treatments and a range of alternative and complementary approaches from botanicals and supplements to lifestyle changes and mind-body practices. Integrative medicine so often denotes a laundry list of any treatment that has ever been linked



New Book Profiles

Guide to Medicinal Herbs: The World's Most Effective Guide to Healing Plants. Rebecca L. Johnson, Steven Foster, Tieraona Low Dog, and David Kiefer. Washington, DC: National Geographic Society; 2010. Hardcover, 384 pages. ISBN: 978-4262-0747-1. \$39.95.

This reference guide features herbal remedies for the whole body, including the nervous, respiratory, and digestive systems. The book is both easy to navigate, thanks to system-specific chapters, and beautiful to look at, thanks to co-author Steven Foster's compelling photography. Each of the 72 herbs listed in the guide is accompanied by information on its growing habits, therapeutic uses, preparation instructions, and precautions.

Xie's Chinese Veterinary Herbology. Huisheng Xie, Vanessa Preast (eds). Ames, IA: Wiley-Blackwell; 2010. Hardcover, 612 pages. ISBN: 978-0-8138-0369-2. \$129.99.

This 37-chapter tome includes a Chinese veterinary *materia medica*, which explains the 4 directions of herbal energy, Chinese herbal formulas, administration forms, and more. The book also provides specific herbal treatment recommendations for animal symptoms broken down by chapter. Black-and-white plant and animal illustrations by Barbara Jean Beckford.

Global Censorship of Health Information: The Politics of Controlling Therapeutic Information to Protect State-Sponsored Drug Monopolies. Jonathan W. Emord. Washington, DC: Sentinel Press; 2010. Hardcover, 190 pages. ISBN-10: 0-9820594-4-x. \$28.95.

Constitutional lawyer Jonathan Emord lays out an overview of government censorship of health information, from the foundations of American free speech to contemporary abuse by what he terms monopolistic drug companies. He also illustrates how said censorship has its roots in the kinds of prior restraint utilized in 16th to 18th century Europe, and what concerned citizens today can do to fight it.

Alchemical Medicine for the 21st Century: Spagyrics for Detox, Healing and Longevity. Clare Goodrick-Clarke. Rochester, VT: Healing Arts Press; 2010. Paperback, 186 pages. ISBN: 978-1-59477-319-8. \$16.95.

This book provides information on a method of plant healing for both physical and mental ailments called spagyric alchemy. Spagyrics was developed by 16th century physician, chemist, and alchemist Paracelsus, who is considered the father of modern pharmacology, and centers on the energy and salt of plants as purported remedies. The book offers mixtures and contraindications, in addition to a history of Spagyrics.

Gemmotherapy: The Science of Healing with Plant Stem Cells. Roger Halfon. Rochester, VT: Healing Arts Press; 2010. Paperback, 120 pages. ISBN: 978-1-59477-341-9. \$14.95.

This book provides basic information and a historic background of gemmotherapy, the medicinal use of plant buds and young shoots. It goes on to list various remedies and a treatment protocol based on research done in the 1950s by Pol Henry, a Belgian doctor. The supposed benefits include clearing the body of toxins and many common disease-states using the extracts from these plant "stem cells."

Uses & Abuses of Plant-Derived Smoke: Its Ethnobotany as Hallucinogen, Perfume, Incense & Medicine. Marcello Pennacchio, Lara Jefferson, Kayri Havens. New York, NY: Oxford University Press; 2010. Hardcover, 247 pages. ISBN: 978-0-19-537001-0. \$45.00.

This book discusses the medicinal, ceremonial, and recreational uses of plant-derived smoke—emphasizing the benefits that have come from their use. Smoking various plants is a long-carried tradition in many areas of the world, often intended to promote or maintain health rather than smoked purely for recreation. Further uses described are for pest control and veterinary applications. The book also includes a list of which smoke is toxic, and a list of which plants are used and how they are employed.

Dill (Anethum graveolens L.): Herb of the Year 2010. Susan Belsinger (ed). Jacksonville, FL: International Herb Association; 2009. Paperback, 130 pages. ISBN: 978-1-61658-665-2. \$12.00.

This book compiles a collection of readings on the herb dill. An interesting resource that encompasses all aspects of dill, including the history of dill, cultivation, medicinal properties, and recipes, the book also includes poetry, photos, and illustrations inspired by the 2010 Herb of the Year. Who knew a simple concoction of dill seed and water is a folk cure for hiccups?

Herbal Principles in Cosmetics: Properties and Mechanisms of Action. Bruno Burlando, Luisella Verotta, Laura Cornara, Elisa Bottini-Massa. Boca Raton, FL: CRC Press; 2010. Hardcover, 460 pages. ISBN: 978-1-4398-1213-6. \$149.95.

In this volume, expert authors expound upon the anatomy of human skin and the mechanisms of action that herbs and herbal compounds have on it. The monographs included detail the phytochemical, ethnopharmacological, and botanical elements of herbal active ingredients, as well as toxicological ones. Each herb is represented with a black-and-white photo.

Botanic Gardens: Modern-Day Arks. Sarah Oldfield. Cambridge, MA: MIT Press; 2010. Hardcover, 240 pages. ISBN: 978-0-262-01516-5. \$29.95.

This gorgeous full-color book, written by the Secretary General of Botanic Gardens Conservation International, discusses the plant extinction crisis and takes the reader on a tour of the world's botanic gardens. Along the way, Oldfield describes the region-specific qualities that make each garden unique and important, as well as the gardens' research and conservation efforts. Plentiful photos, a number of them page-sized, make for a truly immersive experience.

with any particular health condition along with every associated caveat. This is not the case here. When discussing safety, prevention, and long-term health, the approach is rational, enabling, and positive—not clinically over-cautious and disempowering.

The final section, Common Illnesses in Women, departs from specific women's issues to diseases that affect women differently from men: cardiovascular health, musculoskeletal problems, HIV, a range of mental conditions, and diseases of aging. The penultimate chapter looks at a whole woman approach to healthy aging, followed by the editors' epilogue, which raises issues affecting the social construction of gender inequality in health: economic inequality, environmental factors, the paucity of clinical and scientific research on sex and gender differences, and the need to recognize women's traditional role as healers.

Written by women, primarily for women, this book provides a powerful and practical set of guidelines for an integrative, celebratory, whole person approach to women's health.

—**Jacqueline C. Wootton**
President, Alternative Medicine
Foundation, Inc.
Director, HerbMed® HerbMedPro™
Potomac, MD

Garlic and Other Alliums: The Lore and the Science by Eric Block. Cambridge, UK: *Royal Society of Chemistry Publishing*, 2010. Hardcover; 474 pages. ISBN: 978-0854041909. \$49.95. Available in ABC's online catalog #577.

Probably every adult on earth is familiar with the unique sulfur-related flavors and scents of garlic (*Allium sativum*, Alliaceae) and onions (*A. cepa*). Millions also associate garlic with some type of health benefit, often handed down from grandparents. A major purpose of this book is, as succinctly stated in the subtitle, to help the reader understand the history and multi-cultured background of the lore and how the lore has been supported or not supported by modern scientific investigation.

The author has done an excellent job of fulfilling this purpose. There is certainly not a more skilled person to handle this task than Professor Eric Block, who has spent about 40 years studying and deciphering the complex chemistry of sulfur compounds associated with the *Allium* plants and the types of transformation

compounds found in kitchen preparations of garlic and onions. In his extensive travels, he has studied and photographed how the *Alliums* are used and revered worldwide. This experience and his interest in history have resulted in many unique and very interesting features not expected in a strictly scientific book, such as *Alliums* in art (see especially Appendix 2), literature, and architecture, and uses as herbicides and pesticides.

Although the book goes into great and important detail describing the chemistry of *Allium*-derived sulfur compounds, every attempt is made to explain things in a manner that can be understood by non-professionals. Marvelous parallels and deviations are described between the sulfur chemistry of garlic and onions, highlighting the important differences that occur between 2-propenyl and 1-propenyl compounds and the critical importance of the unique *Allium* enzymes, alliinase and lachrymatory factor synthetase. The author also describes several new mass spectral methods that have allowed the identification of short-lived sulfur compounds and proof of mechanistic pathways. The history of the discovery of garlic's sulfur compounds is well described and includes unique photos of several of the early (pre-1950) founding scientists. Appendix 1 contains an extensive table of the cysteine sulfoxides (flavor precursors) content of 39 *Allium* species.

While the author has had limited experience in conducting clinical trials, he has done an admirable job of critically reviewing the evidence and the meta-analyses on clinical trials of garlic supplements for cardiovascular effects and epidemiological studies on the possible anticancer associations. He is thorough in listing and describing worldwide expert panel reviews on the possible health benefits of garlic, such as those by the National Center for Complementary and Alternative Medicine (NCCAM) at the US National Institutes of Health, Health Canada, The European Scientific Cooperative for Phytotherapy (ESCOP), and the World Health Organization (WHO). The author describes the

levels of evidence that are used to assess human health benefits and the elements that should be part of any high-quality randomized clinical trial. Because garlic has been used for centuries for what we now would call its antimicrobial effects, the author provides an extensive table in Appendix 1 on the *in vitro* antimicrobial activity of allicin, ajoene, and the allicin-derived allyl sulfides on 41 different bacteria, fungi, and protozoa. He also expounds upon the adverse effects that some *Allium* compounds (thiosulfonates) can cause, with alarming photos of topical (skin) garlic burns that can occur when too much fresh garlic is applied for too long.

Garlic: The Science and Therapeutic Application of Allium sativum L. and Related Species, the first scientific book in English

on the chemistry and possible health effects of garlic, was published in 1996 by Williams & Wilkins (and was co-edited by this reviewer). With 2,500 references, that book represents an exhaustive review of the scientific literature on garlic to that date. The 2010 book by Block, with its 1,100 references, is the second most extensive scientific book on the chemistry and medicinal studies on garlic. It provides, among many other unique features, important updating

of the chemistry and health studies that have been conducted in the intervening 14 years. When the 1996 book was written, numerous clinical trials on the cardiovascular effects of garlic products had shown more positive effects than the also numerous trials that have been conducted since then, probably due to inferior quality in the conduct of the earlier trials. Hence, Block's book summarizes and emphasizes the serious doubts that exist about the effects of garlic on serum cholesterol and platelet aggregation, although the effects on lowering blood pressure among hypertensive individuals has been supported by two recent meta-analyses. Thus, Block's book is an important and complementary reference work to the aforementioned 1996 publication. Non-scientists should find much of the book to be most interesting, while anyone with a serious interest in the chem-



istry and possible health benefits of the *Alliums* will find the book to be essential reading.

— **Larry D. Lawson, PhD**
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Orem, UT

Herbal Medicine: Trends & Traditions
 by Charles W. Kane. Oracle, AZ: Lincoln Town Press; 2009. Hardcover; 325 pages. ISBN: 978-0-9771333-3-8.

A frequently-expressed concern of laypeople regarding herbal medicine is that it takes too much effort to decide which sources to trust. Some scientists criticize popular herb use, believing that Western herb traditions have no discernable system or standards. *Herbal Medicine: Trends & Traditions* admirably addresses both ends of the spectrum, communicating how to use herbs effectively, safely, and within guidelines understandable at any level of expertise. In his introduction, Charles W. Kane addresses the common fears of the herbal neophyte as well as the research-driven expert.

This book is mainly a *materia medica*, but with useful additions. Clinical herbalists will appreciate a vitalist orientation without jargon. In the introduction, terse philosophical paragraphs explain why Kane avoids formulas for symptoms and conditions. This harmonizes well with the emphasis in integrative medicine on “patient-centered medicine,” a term coined by Michael Lerner of Commonweal.

Kane concisely summarizes actual rather than theoretical applications of herbs representing a standard Western dispensary. Actions such as “astringent” or “vulnerary” are as significant a shorthand for the Western tradition as descriptive terms are in Eastern systems of medicine. Using these actions in context, Kane gives simple physiological effects to make herbal actions more understandable.

The author has taken pains to answer lay questions alongside those concerns more likely to occur to a professional. The first question his book helps answer may be,

“Do I need to go the Emergency Room, make a doctor’s appointment, or treat this with herbs?” Assuming self care is appropriate, *Trends & Traditions* provides a way for the reader to choose from among over 100 popular herbs.

A few hundred more herbs are listed in appendices that are usefully divided into a therapeutic index, a repository with preparation and dosing details, plus a grouping of herbs by botanical family.

The beauty of connecting to nature is evident in *Trends & Traditions’* 58 color plates. Kane provides a short, fine guide on the ethics of gathering to readers who are new to herbal medicine. Proper drying with low technology leads from introductory pages into the section on preparations, ranging from tea to syrups, tinctures, and an explanation of percolation that is inviting to anyone previously intimidated by phytopharmacy. The preparations section is as comprehensive as a modern herb guide needs to be. Appendices that augment the section include “Weights and Measures,” and worksheets to practice making percolations. There is a 30-page bibliography where several scientific papers are cited for each herb, though for *Cannabis sativa* (Cannabaceae) the omission of Dr. Ethan Russo’s published body of work seems odd.

The *materia medica* section describing medicinal uses for each herb is the most extensive. Firmly rooted in the Western tradition, Kane writes with confidence about the system that draws from Eclectic, Physiomedical, historical, and contemporary branches of herbal

medicine.

The monograph format abides throughout, though it has been extended by Kane to weave in points on wild-crafting, medicine-making, constitutional concepts of human physiology, and more philosophical discussions.

Herbs appear in alphabetical order by common name, from agrimony (*Agrimonia* spp., Rosaceae) to yucca (*Yucca* spp., Agavaceae). Each entry begins with the family, binomial, synonyms, a botanical description full of color and detail for newer herbalists yet accurate terms of identification to

suit more experienced collectors. Information includes distribution, collection technique, and, as needed, commercial availability. Short paragraphs on chemistry, or constituent lists, are fairly standard but up to date and accurate. For instance, yerba mate’s (*Ilex paraguariensis*, Aquifoliaceae) alkaloids reflect scientific consensus rather than unsubstantiated marketing claims.

The actions given for each plant cover internal and topical uses in each of the relevant body systems the herb helps. Kane points out useful herb combinations for specific problems, and offers prevention tips in addition to the occasional entertaining aside. How to use the herb is followed by a bulleted list of indications for a quick review of highlights. Kane avoids any controversy regarding the way doses are given, perhaps in light of his explicit aim to communicate in common language.

The *materia medica* section could be improved with line drawings of each plant not represented in photos. In a comprehensive resource, a picture is worth an awful lot of botanical words, and those new to plants are likely to benefit from even a small image.

First drafted as a counterpoint to Army life while Kane was stationed in east Afghanistan, this herbal guide sustains a vital, positive feel, though sometimes the tone is sober. As if the immediacy of larger issues during the initial period of writing informed Kane’s style, there is a welcome and blunt summary on key points. In contrast to herbalists who have written lengthy introductions defining the place of herbs in modern healthcare, Kane suggests that the usefulness of plants needs no justification, though there is room for clarification.

Herbal Medicine: Trends & Traditions shares with readers the pragmatic experience of a focused man rather than the notions of one who reads and teaches about herbs. The point of the book, then, is to communicate in an accessible way how plants help people. *Trends & Traditions* achieves its aim with a clarity that makes it an essential resource for everyone who wishes to use both popular and less familiar Western herbs for medicine.

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James A. Joseph 1944–2010

James (Jim) A. Joseph, PhD, a respected neuroscientist whose groundbreaking body of research documented the anti-aging effects of certain fruits and vegetables on the brain, died June 1, 2010, from complications following surgery to replace an aortic valve. He was 66 years old.¹

Dr. Joseph was well known for coauthoring *The Color Code: A Revolutionary Eating Plan for Optimal Health* (Hyperion, New York, NY).

This 2002 book has been translated into 5 languages, improved the diets of many people in the United States and other countries, and was largely behind the national campaign “5-A-Day The Color Way,” which encouraged eating at least 5 servings of colorful fruits and vegetables each day.

A great deal of important research by Dr. Joseph preceded this trendsetting book. In 1993, he established and began his directorship of the Neuroscience Laboratory at the United States Department of Agriculture (USDA)-Agricultural Research Service (ARS) Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, MA. It was there that he focused his research on fruits’ and vegetables’ ability to affect age-related memory loss and motor and cognitive behavior deficits.

“His view, stated to me many years ago, was that it could be that unique combinations of antioxidants present in food, particularly polyphenolic compounds, might be the key to efficient supplementation,” said Donald Ingram, PhD, director of Animal Metabolism and Behavior Core at Louisiana State University’s Pennington Biomedical Research Center, who knew Dr. Joseph for 25 years (e-mail, August 30, 2010).

Dr. Joseph and his research team evaluated the effects that certain fruits and vegetables with high antioxidant content—including spinach, strawberries, and blueberries—had on many parameters of brain aging in rodent models. “For the first time ever, this work was able to demonstrate that diets rich in extracts of particular foods were able to retard, and in some cases reverse, age-related alterations in brain and behavioral function in rats,” said Dr. Ingram. “Until this work was initiated, there were virtually no studies showing that fruits and vegetables per se could have similar effects in the aging brain.”

Barbara Shukitt-Hale, PhD, of HNRCA, worked with Dr. Joseph for about 16 years and remembers when the research team found such encouraging results (oral communication, September 8, 2010). “The fact that these things that you could eat that were healthy for you and tasted good, it excited all of us,” said Dr. Shukitt-Hale. “I think that’s where his enthusiasm really took off.”

Dr. Joseph’s later research had similarly important findings. In 2003, he found that a diet supplemented with blueberries could prevent the development of cognitive declines in a mouse model

for Alzheimer’s disease. He had also begun researching the effects of blueberries’ antioxidant properties on signaling pathways that cells use to protect themselves against stressors.² Additionally, Drs. Joseph and Shukitt-Hale found in 2008 that the anti-inflammatory properties in blueberry polyphenols boosted brain function, perhaps due to altering gene expression.

Not only was Dr. Joseph’s work important in itself, it also led to the formation of a sizeable field of study on nutrition and the brain. “[His research] opened up a whole new area of study for a variety of commodities (e.g., cranberry, strawberry, walnuts), which had previously concentrated primarily on the cardiovascular effects of fruits and vegetables,” said Dr. Ingram. “Jim’s research has provided legitimacy and prestige to examining in a scientifically rigorous fashion the potential benefits of specific foods on brain aging.”

“Really anyone who is looking at fruits and vegetables or other natural products, took off from this work,” said Dr. Shukitt-Hale, who is one of the several scientists continuing Dr. Joseph’s research legacy. Dr. Shukitt-Hale recalled a time she and Dr. Joseph went to meet a large group of blueberry growers. “I felt like I was with the president,” she said. “Everybody wanted to shake his hand, like a rock star.”

For his achievements, Dr. Joseph was awarded the 1989 Sandoz Prize in Gerontology, the Stephanie Overstreet Award in Alzheimer Research, the 2000 Alex Wetherbee Award, the Glenn Foundation Award in 2002, the American Aging Association’s (AAA) Harman Research Award in 2004, the International Award for Modern Nutrition in 2005, USDA’s 2007 North Atlantic Area Scientist of the Year Award, and the 2009 GlaxoSmithKline award for flavonoid research.¹

Though he had a renowned body of work, Dr. Joseph was not “your typical boring scientist,” said Dr. Shukitt-Hale. Every day he brought new ideas to the lab and encouraged the other scientists to do the same and use imagination in their work. “He was a very creative scientist, a very good friend,” she continued. “He let everybody blossom in their own way.”

“In working with Dr. Joseph, there was always a sense of adventure,” said Dr. Ingram. “He liked to push the envelope, to be provocative. Unlike so many other scientists who are advanced in their careers and run large laboratories from their desks, Jim remained by choice a “hands-on” researcher. Because of his outgoing and warm personality, he was well liked by his colleagues and by those who worked in his laboratory. He had a tremendous sense of humor and always kept those around him in great spirit.”

Though sometimes his research challenged conventional wisdom on certain topics, he was not one to shy away from speaking his mind or standing up for his work. “He thought in a bigger picture than most people,” said Dr. Shukitt-Hale. “He wasn’t afraid to think outside the box. And a lot of people are like that. But he would speak out about it.” When Dr. Joseph presented the findings from his initial research on fruits and vegetables, for example, many in the scientific community were hesitant to accept. But he stuck with the work, she added.

Dr. Joseph was born in West Virginia and earned a bachelor’s degree in biology from Fairmont State College, a master’s degree from West Virginia University, and his doctorate degree in behavioral neuroscience from the University of South Carolina.¹ Before his time at HNRCA at Tufts, Dr. Joseph also served as a lead researcher at the Gerontology Research Center (GRC) of

the National Institute on Aging (NIA), Lederle Laboratories, the Armed Forces Radiobiological Laboratory, and American Cyanamid, which was later acquired by Wyeth Pharmaceuticals.² He authored or co-authored more than 260 scientific articles and 40 book chapters, as well as 2 books.¹

Dr. Joseph is survived by his wife, Marlene. AAA has set up a memorial fund to honor Dr. Joseph. Donations will support AAA presentations and awards on current research similar to that of Dr. Joseph. More information is available at: www.americanaging.org/JimJosephFund.htm.

—Lindsay Stafford

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Peter Jenson 1936–2010

Peter Stonewall Jenson, founder of Amazon Explorama Lodges, died of cancer on June 20, 2010, at the age of 73. He spent his final days in the Peruvian rainforest he deeply cherished, at his home in Explorama's Ceiba Tops.¹

Peter Jenson was born September 25, 1936, in Ladysmith, Wisconsin¹—a state

he would later describe as “a very good place to be *from*” (L. J. Smith, e-mail, August 4, 2010).

Long before Jenson became synonymous with ecotourism in the Peruvian Amazon, he was an educator and adventurer in the American Midwest. During high school and college, Jenson was a guide at Crystal Cave in Spring Valley, Wisconsin. After earning bachelor's degrees in both geology and archaeology from Hamline University, and then his master's from the University of Minnesota, Jenson continued to imbue knowledge and champion learning as curator of geology and archaeology at the Science Museum of Minnesota in St. Paul.¹

In the early 1960s, Jenson dedicated himself to 2 years of service with the Peace Corps in Peru, a decision that would dramatically impact the direction of his life and legacy. At the end of his commitment, Jenson took what he thought would be a short trip to Iquitos, the old center of the rubber-tapping industry in the Peruvian region of Loreto—but his vacation destination became home, and it was there that his real life's work began.¹

Jenson's mission to share the majesty and biodiversity of the Peruvian Amazon rainforest began humbly. “He started by becoming friends with the Yagua Indians and renting a boat to take tourists to their village.”¹ In 1964, Jenson and Marjorie Smith started the river-excursion venture that would blossom into Explorama, and a tiny, rustic hut was constructed soon after to accommodate overnight guests. Forty-six years later, Explorama comprises myriad tours and 5 lodges—including the American Conservatory of Tropical Studies (ACTS) Station²—and in 2009 the company received an Educational Travel Conference “Responsible Tourism Award.”¹

Almost from its inception, Explorama was a home-away-from-home for scientists, educators, and students. Hardy Eshbaugh, PhD, professor emeritus of botany at Miami University, first met Jenson at the Iquitos airport in 1971, during a 4-month chili-pepper-collecting expedition (oral communication, August 4, 2010). Jenson was quick to invite the Eshbaughs—virtual strangers with 3 young children in tow—back to Explorama, or “his place,” where he aided Dr. Eshbaugh's continued research.

Nearly 20 years later, Dr. Eshbaugh found himself back at Explorama, teaching with the International Rainforest Workshop, and in the years since he has sent a number of students there for research. “They run one of the very best operations in the Upper Amazon,” Dr. Eshbaugh said. “But perhaps the most remarkable thing [Jenson] did that changed everything for the people down there was when he welcomed Linnea Smith.”

Fellow Wisconsin native Linnea Smith, MD, fell in love with Peru when she visited with a tour group in 1990 (e-mail, August 4, 2010). Shortly after, she received permission from Explorama to utilize its Yanamono Lodge, for a discounted rate, to treat local patients. “However, after the first month,” Dr. Smith said, “Peter stopped charging anything at all and has continued to provide my food, transportation, and social support for the last 20 years.”

“Knowing that the improbable was possible” was Jenson's greatest quality, according to Pam Bucur, Explorama's reservations manager (e-mail, August 4, 2010). “Peter hoped that Explorama would always be a place that inspired people to go home and make a difference. He even inspired some of us to stay here and make a difference.”

In addition to the Yanamono Medical Clinic, Jenson facilitated a number of passion projects at Explorama, including the ReNu-PeRu Ethnobotanical Garden. In the mid-'90s, “with Jenson's permission and encouragement,” economic botanist, author, and ABC founding Trustee, James A. Duke, PhD, helped to develop the teaching garden (e-mail, August 4, 2010). It now preserves 240 species of flora and enables guests of Explorama to learn about their uses.³

Beyond fostering the well-being of Iquitos' indigenous people and nurturing the global scientific community, Jenson went to great lengths to preserve the rainforest in which Explorama is nestled. “Explorama has purchased and maintains thousands upon thousands of acres that cannot be logged, hunted, or built upon.”² His good work was not lost on the nation of Peru. In 2008, Jenson was honored with an award from the Peruvian Ministry of the Environment for “Preservation of the Environment.” The award was presented to Jenson by none other than the president of Peru

himself, Alan Garcia.¹

"The American Botanical Council owes a huge debt of gratitude to Peter," said ABC Founder and Executive Director Mark Blumenthal. "For the first 10 years that ABC sponsored 'Pharmacy from the Rainforest' ecotours to the Peruvian Amazon, we always stayed at Peter's Explorama Lodge on the Amazon or the Explor-Napo Lodge near the Napo River, one of the Amazon's major tributaries, downriver from Iquitos."

"It was Peter's larger than life vision that created such unparalleled settings from which to launch our journey of learning and discovery," said Charlotte "Chuck" de Frances, former director of International Healthcare Expeditions. "It was also the beginning of a journey that gave us the opportunity to listen beyond [his] booming powerful voice and hear the nuances of Peter's honed supportive nature."

"Peter's truly pioneering work in the Amazon created the opportunity for thousands of biologists, botanists, and conservationists, as well as pharmacists, physicians, and others to have a reasonably comfortable venue from which to conduct their studies or to

simply become exposed to the wonders of the rainforest environment," said Blumenthal.

Jenson contended with esophageal cancer for 9 months. Upon discovering that the disease had spread, Jenson asked to return to Peru, where he died enveloped by the beauty of the Amazon, in the company of his Explorama family. Per his request, on July 4, 2010, his ashes were released from the topmost point of the Canopy Walkway into the rainforest below.¹

—Ashley Lindstrom

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Georgina Jolliffe 1923–2010

Georgina Jolliffe, a much loved lecturer and noted botanical microscopist, passed away due to an abdominal hemorrhage on July 1, 2010. She was 86 years of age.

Affectionately known by family and friends as "Georgie," Jolliffe was a favored lecturer of many pharmacy students at Chelsea College, University of London. One of her former students, Amala Raman-Soumy-

anath, PhD, pharmacognosist and associate professor at Oregon Health and Science University, fondly noted: "For undergraduates away from home for the first time, Dr. Jolliffe was a warm and approachable tutor, with a reassuring sense of humor."

Dr. Jolliffe was born Georgina Henry in Aberdeen, Scotland on October 25, 1923. She studied pharmacy and pharmacognosy at Chelsea College (London University), which is now King's College London, and graduated in 1952. According to her husband, Geoffrey Jolliffe, PhD, she was always interested in plants and their anatomy and, naturally, the microscope was a help in understanding the basic structure of plant materials.

Georgina and her husband Geoffrey met at the chemistry bench, as undergraduate students studying for the bachelor's of pharmacy. They were arranged in alphabetical order—she under her maiden name, Henry, and he as Jolliffe. According to Geoffrey, "I have always had problems with the interpretation of color, and performing titrations using Methyl Orange was, for me, extremely difficult. I would hold up the conical flask used for titrations and ask Georgie 'has it gone yet?' Eventually I learned how to use that particular indicator by recognizing a change in brightness. I gradu-

ally got to know that Georgie trained as a nurse at Westminster Hospital and, during the war, went down to Basingstoke to help with the treatment of service personnel." Several years later, the two began what would be a 55-year professional collaboration and marriage.

Georgie obtained her PhD in 1968 in the field of thin layer chromatography (TLC) analysis of amino acids in seeds. As well as being a stalwart of pharmacognosy teaching at Chelsea, Georgie, with her husband, played a part in the development of pharmacy education in Nigeria, spending some time teaching in the University of Ife in Ibadan in the early 1970s. Georgie became an expert in both standard light and electron microscopy, identifying powdered herbal drugs and many other materials. She served on many committees, applying her microscopy skills both in the United Kingdom and overseas.

Dr. Jolliffe taught botanical microscopy within the pharmacognosy element of the pharmacy course. According to Dr. Soumyanath, "We learnt in detail from her the different cells and tissues found in medicinal plant parts and how their variations could serve as a means of identifying plant material, even in dry powder form. To keep us alert in class, she used to provide meticulously hand-drawn diagrams of the features she was describing...but not notes. We had to leave appropriate spaces in the notes we were taking as she talked and later cut and pasted the pictures in our own spare time. A decade later, when I myself became a pharmacognosy lecturer, I often referred to these notes and diagrams, which I had fortunately preserved."

The 2 Dr. Jolliffes combined their respective expertise in microscopy and computer programming to create MICROAID, a computer database of plant microscopic features. The presence or absence of diagnostic microscopic features in an unidentified sample of plant material could be entered, and the program would suggest a possible identity. Developed in the 1970s, MICROAID provided characterizations for almost 100 powdered crude drugs and spices, by the presence or absence of 32 microscopy features. This was in the early days of personal computing, and the Jolliffes were awarded a prize for the program by *Practical Computing*

magazine. According to Dr. Soumyanath, “The MICROAID program remained an integral part of pharmacognosy laboratory course long after the Dr. Jolliffes retired, and at a time when much of the detailed microscopy teaching was removed due to curriculum pressures.”

Georgie was neat and meticulous, with an eye for detail, which served her well in the microscopical study of medicinal plant material. However, in common with the general thrust of pharmacognosy at Chelsea at the time, and under the leadership of Georgina’s friend and colleague Professor Joseph Shellard, she embraced newer techniques such as chromatography and became a key player in formulating and teaching the masters program in Pharmaceutical Analysis, which was introduced in the department in 1969. (Ironically, Professor Shellard passed away just 2 weeks before Georgina at the age of 96.)

She was very involved with herbalists and homeopaths in the United Kingdom in the development of quality standards for the homeopathic Mother Tinctures that they were using, as well as supervising PhD students and teaching undergraduates.

She was also well known for her sense of humor and her caring motherly attitude. According to London University Professor of Pharmacy Dr. Peter Houghton, “Although sometimes Georgie could appear to be seriously precise, she was in fact a very pleasant person to know and could interact with a wide range of people.”

Perhaps most telling of Dr. Jolliffe’s character, whenever she would give one of her talks, any fee she received was always sent to the Keech Hospice. Georgina retired from the University of London in 1984 and was able to spend more time doing things she enjoyed.

One of her last contributions to botanical microscopy was acting as a technical editor of the American Herbal Pharmacopoeia’s (AHP) soon-to-be published *Microscopic Characterizations of Botanical Medicines* (CRC Press). According to AHP Executive Director Roy Upton, “Dr. Jolliffe worked with us for a period of

almost 4 years reviewing every aspect of the text and providing detailed commentary on the more than 140 microscopic characterizations contained in the Atlas portion of the text. It is perhaps fitting that her last work will have been in the development of the first English-language text to unite classic illustrations of microscopic structures with modern microphotographs of the same structures and tissues. This work will help keep alive one of her passions—botanical microscopy—at a time when worldwide it has been on a steady decline, and now perhaps is on the rise again.” Georgina’s academic excellence coupled with practical experience was a great contribution to the text and, working on it in her 80s, according to husband Geoffrey “was a labour of love.”

Both the personal and professional accolades and remembrances of Georgina Jolliffe were a testimony to a life well lived and well loved by many. According to family members Mary and Richard Jolliffe: “One of her greatest gifts was that, despite being so talented in every part of her life, she made everyone feel her equal however limited their own abilities were. This is rare indeed. She found something positive to encourage people in any situation and was never judgemental.”

One of her friends added, “Whenever we spoke she was always kind enough to give the impression that we were the most important and interesting people that she had ever met for a long time, always the hallmark of a generous spirit and modest high achiever of distinction.”

According to her friends Penelope and Bernard Rapson: “It’s hard to believe that in the midst of life there is death—but there it is—and we can but rejoice that the brief span has brought with it so much pleasure and lasting friendship. It is true that friends can never be said to have passed away until they are last remembered by the people who knew them. Georgie will live long to us all.”

—Geoffrey Jolliffe, Amala Raman-Soumyanath, Peter Houghton, Roy Upton, and a host of Georgina’s friends



José Luis Guardiola Bárcena 1943–2010

José Luis Guardiola Bárcena, head of the Plant Biology Department of the Polytechnic University of Valencia from 1986 until 2009, died on May 22, 2010, at the age of 67, after

a long illness. His talent for good, honest scientific work, his lively frame of mind, and his disposition to teach made him a positive example for numerous researchers and colleagues from several countries.

Dr. Guardiola was born on March 5, 1943, in Valencia, Spain. He was educated as an agronomist at the High Technical School of Agronomy of Valencia, then received his doctorate in plant physiology from the University of Sussex (England) in 1970. He also earned a doctorate in agronomy from the Polytechnic University of Agronomy of Valencia (UPAV) in 1971.

In 1975, Dr. Guardiola became a professor of plant physiology at UPAV. He then served as the director of the High Technical School of Agronomy from 1978–1983. In 1986, he became head of the Plant Biology Department of UPAV. He was occasionally asked to serve as chancellor or vice-chancellor of the university, but he chose to work full-time teaching and conducting scientific work.

Through his teaching efforts, he contributed to the training of many agronomists and researchers for more than 30 years. He initiated and directed an International Master of Citriculture program, and more than 300 students from various countries have been trained through this international course.

Although best known for his work in citrus plants (Rutaceae), which led to more than 150 experimental and review articles in international journals and conference proceedings, Dr. Guardiola also made significant contributions to the understanding of the physiology of saffron (*Crocus sativus*, Iridaceae). In collaboration with the General Company of Saffron of Spain, he led the effort in extending the harvest period for saffron from 15 days under traditional cultivation to 6 months under controlled greenhouse conditions. At the First International Symposium of Saffron, held in Albacete, Spain, in 2003, he worked with other saffron researchers to promote and establish a European collaborative project

in saffron, an effort that led to the formation of the CROCUS-BANK. Through this organization, an international group of researchers from 13 countries cooperatively collect, multiply, characterize, and share information and germplasm of saffron and other *Crocus* species.

Of his many other accomplishments, Dr. Guardiola organized the 8th International Symposium on Plant Bioregulators in Fruit Production in Valencia in 1997, served as a member of the editorial advisory board of various Spanish and international scientific journals, and acted as a technical adviser for different governmental organizations of Spain, Israel, South Africa, and the United States. His professional advice also helped citrus cooperatives.

Dr. Guardiola's know-how, organizational and leadership skills, warmth, kindness, pleasant disposition, love of teaching, and passion for research will be remembered by all he touched. He leaves his wife, Amparo García-Luis, who was his co-worker and support for many years, as well as 3 sons, 4 grandchildren, and those of us who had the privilege of knowing and working with him. Dear José Luis, rest in peace.

—Rosa-Victoria Molina
Senior Lecturer in Plant Biology
Universidad Politécnica de Valencia
Spain



Edward Joseph Shellard 1914–2010

Distinguished Professor Edward 'Joe' Shellard died on June 19, 2010, at the age of 96.

Professor Shellard entered the Pharmacy Department at Chelsea College (London) in 1957, and soon afterwards he was awarded his doctorate for studies on resins from

plants in the genus *Ipomoea* (Convolvulaceae), including jalap root (*I. jalapa*). The pharmacy department at Chelsea was gaining worldwide recognition in the late 1950s and the 1960s for the quality and amount of research being carried out there, and Professor Shellard played a major role in building this reputation by establishing a pharmacognosy research group that was the leader in the United Kingdom. It was due to his efforts that the technique of thin-layer chromatography was introduced to pharmaceutical science in the United Kingdom. It is difficult to exaggerate the huge difference that this made at the time to the rapid isolation of compounds from plant extracts and its value in evaluating crude drugs, since it added a completely novel dimension to the "classical" macroscopical, microscopical, and 'wet test' techniques that had been used until then.

In the 1960s, Professor Shellard became known throughout the world for his research on the alkaloids found in the genus *Mitragyna* (Rubiaceae); he published over 40 research papers on the topic. These alkaloids are still the subject of interest and research in various countries because of their effects on the central nervous system, on the cardiovascular system (as ingredients of the hooks of *Uncaria rhynchophylla* used in Chinese medicine), as a hypotensive, and as immunostimulant compounds in the herb cat's claw (*U. tomentosa*). There is little doubt that this corpus of research made a large contribution to Shellard's well-deserved appointment to Chair in Pharmacognosy at Chelsea in 1969.

He was a great encourager of young scientists, and his research lab became the incubator for those who would go on to become prominent pharmacognosists in several countries overseas, notably Ghana and Thailand. However, in his later years, he was always very proud that his research group had also produced 4 British

professors in pharmacognosy (Professor J. Dave Phillipson, Professor Norman G. Bisset, Professor Peter Hylands, and myself).

This was notable because the strength of Chelsea's pharmacognosy program was in contrast to the subject's fate in most other British schools of pharmacy in the 1960s and 1970s. Its survival in the United Kingdom was largely due to the heroic efforts of Professor Shellard, in the teeth of considerable hostility from some quarters. He championed the subject in discussions with the Royal Pharmaceutical Society and at various conferences.

Joe Shellard became known throughout the world through his leadership and active involvement in the Medicinal and Aromatic Plants Section of FIP (the International Pharmaceutical Federation). In the 1950s this was the only international forum for pharmacognosists, and Professor Shellard was a popular and very active leader in the group, as he was in the European Society for Medicinal Plant Research for many years. He established contacts with many different countries, and there was always at least one visiting researcher in his labs at Chelsea—which initiated a tradition that continued for decades at King's College London.

Professor Shellard pioneered the teaching of pharmacognosy in the United Kingdom from a chemical, as well as a botanical, aspect. He introduced the use of small projects in teaching undergraduates at Chelsea in the late 1960s, when this approach was still very novel in UK universities.

Special mention should be made of the part played by Professor Shellard in the early 1970s in setting up a dialogue with British herbalists and introducing them to scientific aspects of their field of interest. A weeklong summer school for herbalists and herbal product manufacturers on scientific evaluation techniques was organized in 1974 and was a key factor in the development of the *British Herbal Pharmacopoeia*, in which he took a key interest.

Professor Shellard was not someone who could be forgotten easily because of his strength of character, his enthusiasm, his political and administrative skills, and most of all, his warmth of heart towards his staff and students and their families. After his retirement, he had the satisfaction of seeing pharmacognosy at Chelsea (later King's) not only survive but flourish, while pharmacognosy teaching and research also progressed at several other UK schools of pharmacy. His valiant efforts in preserving the principles and practices of pharmacognosy have borne fruit in their now being much more accepted as necessary for the scientific evaluation of herbal and other complementary medicine products.

—Peter Houghton, PhD

November 13-14: AHPA Seminar: "Microscopic Identification of Popular Botanical Materials." Los Angeles, CA. This seminar, put on by the American Herbal Products Association (AHPA), aims to assist manufacturers and suppliers in conducting identity testing and establishing the identity of dietary supplement ingredients used in their products, as required by the US Food and Drug Administration's (FDA) current good manufacturing practices (cGMPs). The 2-day educational training will have participants spending a significant amount of time using a microscope so that they can leave the seminar with the experience required for conducting microscopic analysis on a variety of botanical ingredients. More information is available at: www.ahpa.org.

November 16-18: Health Ingredients Europe 2010. Madrid, Spain. This 3-day conference and trade show for the health food and beauty industries, will feature 35 available hours of educational content, 60 speeches from industry leaders, and more than 7,000 exhibition attendees. Companies and speakers from more than 90 countries will gather at this event, making it an opportunity to network with industry peers from across the world, while also gaining an international perspective on industry trends and products. The conference section of the event features discussion on topics such as natural health claims, labeling, sustainability and ethics, sourcing natural and organic ingredients, stevia opportunities in 2011, and the top 3 industry trends. More information is available at: www.hieurope.ingredientsnetwork.com/.

November 18: National Health Research Institute (NHRI) Scientific Symposium. Bloomingdale, IL. NHRI is a non-profit organization that

supports science-based research on natural health and wellness and its 2010 annual conference takes on the theme of cost effectiveness and safety of dietary supplements. Each of the conference's 2 sessions will feature presentations by dietary supplement experts, such as Rick Kingston and Paul M. Coates, on a variety of topics such as citrus products use against bacteria, Pycnogenol treatment of diabetes and heart disease, and adverse event reporting. More information is available at: www.naturalhealthresearch.org/nhri/?cat=43.

November 22-26: TropHort 2010. Kingston, Jamaica. This 1st international symposium on tropical horticulture aims to promote the exchange of information and networking between scientists and other specialists who are involved or interested in tropical horticulture. Researchers, technologists, workers, and commercial users of tropical crops will have the opportunity to attend presentations and discussions on topics such as botanical anatomy, nomenclature, and physiology; growing, irrigation, and pest management; post-harvest physiology, biochemistry, and technology; processing and biotechnology; marketing and supply; and sustainability. More information is available at: www.ocs.mona.uwi.edu/ocs/index.php/th/th1.

December 3-4: 7th International Conference: "Functional Foods in the Prevention and Management of Metabolic Syndrome." Dallas, TX. Experts in the fields of medicine, biology, and food will gather for this event that focuses on how functional foods play a role in the prevention and treatment of metabolic syndrome. Conference topics will include definition, components, and clinical outcomes of metabolic syndrome; functional foods for metabolic syndrome and its related conditions; and modern diets, herbs, supple-

ments, and functional foods for metabolic syndrome control and prevention. Sixteen hours of continuing education units (CEUs) are available. More information is available at: www.functionalfoodscenter.net/Conference2010.html.

December 6-19: Permaculture Design Course. La Ribera, Baja Sur, Mexico. Permaculture is an ecological design system that aims to incorporate sustainability into all areas of human activity, such as building homes, growing food, and restoring ecosystems. This course, sponsored by the Raw Institute of Permaculture Education (RIPE), offers a variety of permaculture classes in both Spanish and English on numerous topics like organic gardening, ecological design, water conservation, seed saving, and local economics. The class comes to a close with participants creating a group design project. More information is available at: www.rawpermaculture.org/events.php.

March 15-17, 2011: 8th International Conference: "Functional Foods for Chronic Diseases: Science and Practice." Las Vegas, NV. This conference will discuss functional foods' part in preventing and treating chronic diseases such as diabetes, obesity, cardiovascular diseases, and cancer. More specifically, conference presentations will feature content on epidemiology and health economics, modern diets for chronic diseases, formulating new functional food products for chronic diseases, clinical studies of functional foods and chronic diseases, and herbs and non-traditional plants as sources of functional food products. A maximum of 24 CEU credits are available. More information at: www.functionalfoodscenter.net/Conference_2011.html.

More calendar listings at
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 See "News" Tab

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The NCCAM Clinical Digest is the new e-newsletter from the National Center for Complementary and Alternative Medicine (NCCAM) at the US National Institutes of Health. Each month, the Digest provides a summary of the current state of science on CAM therapies for a specific health condition (e.g., chronic pain), as well as 4 specific sections that take a closer look at possible CAM treatments and preventions for that month's condition of focus. The clinical guidelines section features detailed information on the different kinds of each condition (e.g., migraine, low back pain) and discusses the available CAM therapies. The scientific literature section features links to PubMed citations of systematic reviews, meta-analyses, and randomized controlled trials testing CAM interventions for the specific health condition. In the research spotlights section are selected results of NCCAM-funded research on related conditions. The last section of the Digest provides detailed information for patients on specific conditions and CAM therapies. The e-newsletter can be automatically delivered to subscribers' e-mail inbox monthly. Available at: www.nccam.nih.gov/health/providers/digest/chronicpain.htm?nav=upd.

Goodshop.com is a new website where visitors can shop at online retailers (e.g., Target, Expedia, Amazon.com) while donating a percentage of purchases to their favorite nonprofit organization or school. Working with more than 1,500 retailers, Goodshop.com enables shop-

pers to pay the normal prices offered by the retailer. The website will also donate a penny to users' favorite charities for each Yahoo-powered search conducted through its website's search function. An average of 3% of the purchase total will be donated to the previously-selected charity or school (each retailer donates a different percentage of purchases, with some giving up to 20%). Over 93,000 nonprofits have joined Goodshop.com, including the American Botanical Council. Available at www.goodshop.com.

The Encyclopedia of Dietary Supplements, 2nd edition, was recently completed by the US Office of Dietary Supplements (ODS) of the National Institutes of Health (NIH). Edited by several ODS and NIH leaders, this 916-page text serves as a definitive guide on the possible benefits and side effects of dietary supplements. Each of its 97 peer-reviewed chapters, also composed by dietary supplement and botanical experts, aims to rigorously examine the most significant scientific research on the major vitamin and mineral micronutrients, single herbs, phytochemicals, and other bioactive preparations. This edition includes new chapters and updated entries that integrate basic chemical, preclinical, and clinical data, including new sections on botanicals such as aloe vera, bilberry, bitter orange, black cohosh, kava, and saw palmetto. Available at: www.informahealthcarebooks.com/encyclopedia-of-dietary-supplements-2nd-edition.html.

NewHope360.com is a new website from New Hope Natural Media providing content on the herbal, dietary supplement, and health food industries, with a special focus on the process products take from "supply to shelf." The site contains news, feature, opinion, and blog articles on new industry products, companies, trends, and research. NewHope360 also aims to be an online community tool for the industry that will encourage the creation and marketing of quality products. It also provides multimedia content on topics including industry trends, regulations, business and team management, sourcing and fulfillment, and customers' new product demands. Available at: www.newhope360.com.

GRAS Notice Inventory is a database compiled by the US Food and Drug Administration (FDA) that contains all notices filed for Generally Recognized As Safe (GRAS) designation. Substances that are intentionally added to food are considered by FDA as food additives and must have FDA premarket review and approval unless the substance obtains GRAS status. This inventory, which is updated monthly, collects all GRAS notice applications that have been submitted to FDA since 1998 and also provides FDA responses to GRAS notices when available. Available at: www.access-data.fda.gov/scripts/fcn/fcnNavigation.cfm?rpt=grasListing.



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Publications

American Herb Association Quarterly Newsletter: \$20/yr. AHA, P.O. Box 1673, Nevada City, CA 95959.

Australian Journal of Medical Herbalism: Quarterly publication of the National Herbalists Association of Australia (founded in 1920). Deals with all aspects of Medical Herbalism, including latest medicinal plant research findings. Regular features include Australian medicinal plants, conferences, conference reports, book reviews, rare books, case studies, and medicinal plant reviews. AUD/\$95 plus AUD/\$15 if required by airmail. National Herbalists Association of Australia, 33 Reserve Street, Annandale, NSW 2038, Australia.

Medical Herbalism: Subtitled "A Clinical Newsletter for the Herbal Practitioner." Edited by Paul Bergner. \$36/yr, \$60/2 yrs. Canada \$39/yr. Overseas \$45/yr. Sample/\$6. Medical Herbalism, P.O. Box 20512, Boulder, CO 81308.

Other

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Plant Lovers Journey to the Patagonia. Join Rosemary Gladstar and Dr. Richard Liebmann March 1-12, 2011. Summer herbal adventure in Argentina and Chile. Email richardliebmann@gmail.com.

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