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Hops Literature Review • Costa Rican Plants • Rose Hip and Arthritis • Chili Pepper Grenade • Psychedelic Botanicals

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# Aloe vera

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# Aloe

*Aloe vera* (syn. *A. barbadensis*)

Family: Asphodelaceae\*

## INTRODUCTION

Aloe species can be found throughout the tropics and warmer regions worldwide. Aloe is thought to have originated in North Africa or the Nile region in Sudan.<sup>1</sup> There are approximately 360 species and subspecies of succulent plants (herbs, shrubs, and trees) in the genus *Aloe*, distributed in Africa, the Arabian Peninsula, and certain islands of the Indian Ocean.<sup>2,3</sup> The wild origin of *Aloe vera*, however, is uncertain.<sup>4</sup> The commercially significant aloes are perennials with 15 to 30 fleshy leaves up to 1.5 feet long, 3 to 4 inches across the base, and with saw teeth marking the margins of the leaves.<sup>1</sup>

## HISTORY AND CULTURAL SIGNIFICANCE

Aloe's use dates back almost 6,000 years.<sup>2</sup> Its uses were first documented on a Mesopotamian clay tablet dating from 2100 BCE and the Ebers Papyrus (ca. 1550 BCE), discovered in Egypt in 1873, listing at least 12 aloe-containing preparations for treating internal and external ailments. In the 1<sup>st</sup> century CE, the Greek physician Dioscorides (ca. 40-90) recommended it for boils, chapping, genital ulcers, hair loss, hemorrhoids, inflammation, and mouth irritation.<sup>3</sup> Pliny the Elder (ca. 23-79 CE) and Galen (ca. 130-200 CE) used aloe to treat wounds and gastrointestinal disorders. Additional ancient medicinal uses include treatment for acne, arthritis, burns, dermatitis, headache, high blood pressure, indigestion, peptic ulcers, pruritus (itchy skin caused by various disorders), and psoriasis.<sup>2</sup> The Egyptian queens Nefertiti and Cleopatra used it as a beauty aid,<sup>3</sup> and it was used for embalming according to Pliny the Elder.<sup>5</sup>

Various species of *Aloe* have long been used to treat constipation, specifically with the anthraquinone-containing latex found in cells inside the leaves. In 1981, the German Commission E approved the use of the latex from *A. barbadensis* (syn. *A. vera*) and *A. ferox* for constipation.<sup>6</sup> In 2006, the European Medicines Agency (EMA) published a final monograph on aloe, which is now relevant for the registration of well-established use herbal medicinal products in all EU Member

Aloe *Aloe vera* Photo ©2010 Steven Foster



States. Standardized aloe preparations of *European Pharmacopoeia* (PhEur) quality are approved by EMA for short-term use in cases of occasional constipation.<sup>7</sup>

In North America, in 2008, Canada published 2 final aloe monographs (oral and topical) for the purpose of natural health product (NHP) compendial product license applications. In the final monographs, Health Canada approved the oral use of aloe latex as a stimulant laxative for relief of occasional constipation<sup>8</sup> and the topical use of the leaf gel to help relieve minor burns including sunburn and to assist healing of minor wounds such as cuts, burns, and minor skin irritations.<sup>9</sup> In the United States, aloe was included in the first edition of *United States Pharmacopoeia* (USP) of 1820,<sup>10</sup> and it remains official in the 33<sup>rd</sup> revision of the USP in 2010 as an official laxative drug.<sup>11</sup> However, the US Food and Drug Administration (FDA) banned the use of aloe latex in over-the-counter (OTC) stimulant laxative drugs in the United States in 2002 due to the lack of submission of evidence of safety.<sup>12</sup> Aloe, however, remains a component of the OTC mucosal protectant drug product *Compound Benzoin Tincture USP*.<sup>13</sup> Additionally, aloe dried latex and aloe juice can still be labeled and marketed as dietary supplement products so long as the marketer submits an FDA notification letter attesting that it has substantiation

to support the proposed structure/function claim statements and that the product is manufactured under dietary supplement cGMPs (current good manufacturing practices).

Externally, aloe vera inner leaf, often called "gel," and leaf juice have been used in cosmetics, post-treatment of dermabrasion (treatment of acne scars, tattoos, fine wrinkles, etc. from the skin), to promote wound healing, and to alleviate psoriasis.<sup>2</sup> In cosmetics, aloe vera juice and gel is added to moisturizers, cleansers, shampoos, suntan lotions, and sunburn treatments. Though other species of *Aloe* are used in products globally, *Aloe vera* is believed to be the most widely used species throughout the world.

## MODERN RESEARCH

At least 3 human clinical studies have been conducted on aloe vera's effect on psoriasis. Psoriasis is a condition in which the immune system sends faulty signals that accelerates the growth cycle of skin cells via

*Continued on page 2*

\*The genus *Aloe* has been classified/reclassified according to recent taxonomic investigations into several different families, e.g., Aloaceae, Liliaceae, Xanthorrhoeaceae et al., i.e., depending on the source. ABC currently uses the GRIN (Germplasm Resources Information Network) database at the US Department of Agriculture as the primary authority on botanical nomenclature and related taxonomic issues.

increased DNA turnover. A 2010 randomized (R), comparative, double-blind (DB), 8-week study on 80 patients found topical aloe vera cream (prepared with 70% mucilage by the Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen, Thailand) to be more effective than 0.1% triamcinolone acetonide in mild to moderate cases.<sup>14</sup> In a 2005 R, DB, placebo-controlled (PC) trial, 40 patients with psoriasis were treated with either Aloe Vera Gel (98% aloe vera leaf gel, Aloe Vera Group ApS, Søborg, Denmark) or a placebo gel with identical ingredients (i.e., xanthan gum, potassium sorbate, sodium benzoate [SB], sodium sulfite, and citric acid) except for water replacing the aloe. The aloe group experienced a 72.5% improvement while the placebo group experienced an 82.5% improvement.<sup>15</sup> The surprisingly high response rate in the placebo group indicated to the study's designers that the placebo might have had some effect in its own right that made the aloe gel treatment results seem less effective than placebo. A plausible explanation is that SB works on DNA like drugs used to treat psoriasis, and aloe will bind some of the SB in the aloe preparation, thereby probably reducing the potential beneficial effect of aloe's component acemannan, an immune modulator that works through the DNA.<sup>16</sup> In a DB, PC study in 1996, 60 patients with psoriasis were self-treated with a 0.5% aloe extract in a hydrophilic cream (50% aloe leaf ethanol extract prepared at the University of the Punjab, Lahore, Pakistan) or placebo 3 times daily for 5 days per week for 4 weeks.<sup>17</sup> After 16 weeks, the aloe cream had cleared up the psoriasis symptoms in 25 of 30 patients, compared to 2 of 30 in the placebo group.

Two studies address the effectiveness of aloe against lichen planus, a chronic skin condition characterized by an itchy rash. In one RDBPC trial of 54 patients with oral lichen planus, 22 of 27 patients treated with aloe vera gel (prepared with 70% aloe mucilage by the Faculty of Pharmaceutical Sciences, Khon Kaen University) had a good response after 8 weeks of treatment (compared to 2 of 27 in the placebo-treated group), and 2 had complete clinical remission.<sup>18</sup> In a RDBPC trial in 2008 of 34 female patients with vulval lichen planus, 14 of 17 patients treated with aloe vera (100% aloe vera gel, NBTY, Ronkonkoma, NY) improved by at least 50% after 8 weeks of treatment, compared to improvement of only 1 of 17 in the placebo group.<sup>19</sup>

A 2009 randomized, controlled study on 30 patients with 2 same site second degree burns that had occurred within 24 hours were treated twice daily with spray-dried aloe vera powder (0.5 g in cream made with powder obtained from filtrated inner leaf gel, Zarband Phytopharmaceuti-

cal, Tehran, Iran) on one site and silver sulfadiazine (SSD) cream on the other. The sites treated with aloe healed approximately 3 days sooner (mean  $15.9 \pm 2$  days) than the SSD-treated sites.<sup>20</sup> Additionally, a 2006 meta-analysis of 4 studies that explored aloe vera's effects on burns used duration of wound healing as an outcome measure and determined that, despite differences in products and dosages used, aloe might speed up the wound healing process and increase the rate of healing success in first and second degree burns.<sup>21</sup>

In 2008, a RDBPC study explored the anti-inflammatory properties of aloe leaf gel on 40 volunteers who were irradiated with a 1.5-fold minimal erythema dose of UVB.<sup>22</sup> The test areas were treated on 2 subsequent days with 97.5% aloe leaf gel (manufacturer not stated), 1% hydrocortisone in placebo gel, or 1% hydrocortisone in cream. The aloe gel significantly reduced UV-induced erythema after 48 hours, performing better than the hydrocortisone in gel but not as well as the hydrocortisone in cream.

An open comparison study in 2003 evaluated dry-coated aloe vera gloves (freeze-dried aloe vera leaf gel dissolved in distilled water to prepare a 25% gel/solution applied to the inner surface of the glove; Aloetouch, Medline Industries Inc., Mundelein, IL) on participants who were factory assembly-line workers with repeated occupation-induced superficial skin trauma.<sup>23</sup> After 7-17 days (mean time 10.4 days) marked improvement in skin quality (erythema, fissures, and excoriation) of the gloved hands were observed. There was no improvement in the non-gloved hands of any participant.

In a 2002 preliminary open, non-comparative study, crude aloe vera leaf gel was judged to be as effective in the treatment of scabies as was a benzyl benzoate lotion.<sup>24</sup> A 2006 study concluded that freeze-dried aloe extract added to cosmetic formulations improves skin hydration.<sup>25</sup>

A small clinical trial in 2006 explored changes in urine composition in children after consuming aloe.<sup>26</sup> Thirteen healthy male volunteers between the ages of 9 and 13 ingested 100 g of freshly prepared aloe leaf gel twice a day for 7 consecutive days. Based on composition of urine samples taken throughout the trial, the authors concluded that aloe gel consumption has the potential to prevent kidney stone formation in children.

In a 2004 DBRPC study, 44 hospital outpatients between the ages of 18 and 80 with mild to moderately active ulcerative colitis and no recent changes in conventional prophylactic therapy were randomly given 100



*Aloe Aloe vera*  
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mL twice daily of an aloe vera leaf gel liquid (n=30; formulation not stated, Forever Living Products, Jersey, Channel Islands) or a placebo liquid (n=14) for 4 weeks.<sup>27</sup> In the patients who took the aloe, 30% (n=9) experienced clinical remission, 37% (n=11) experienced improvement, and 47% (n=14) responded to the treatment but did not have significant improvement—compared to 7% (n=1), 7% (n=1), and 14% (n=2) respectively in the placebo group. The authors concluded that oral aloe gel taken for 4 weeks produced a clinical response more often than placebo, reduced the histological (cellular) disease activity, and appeared to be safe.

A number of studies have also been conducted using acemannan, an acetylated polymannose identified in the 1980s as a primary active component in aloe vera leaf gel.<sup>2</sup> Clinical studies have shown its efficacy in acceleration of wound healing in postdermabrasion, partial thickness of wounds, and pressure ulcers. Freeze-dried acemannan was also shown to be effective against painful dry socket treatment as a result of dental procedure complications.<sup>28</sup> Acemannan has also shown benefit in the reduction in AIDS symptoms, synergism and/or no interference with AZT, in improved quality of life and morphologic alterations in HIV patients, and in preventing virus penetration and stimulating the immune system.<sup>2</sup> Acemannan has also shown promise in *in vitro* and *in vivo* studies for managing cancer with no toxicity or adverse side effects. Injectable acemannan is indicated in dogs and cats for use as an aid in treatment and clinical management of fibrosarcoma.<sup>29</sup> However, some aloe processing techniques remove much if not all of the acemannan, possibly explaining some of the inconsistent effects of commercial aloe products.

In 1998, the US National Toxicology Program (NTP) published an Executive Summary on “Aloe Vera Gel,” raising safety concerns about oral aloe products due to the mutagenic properties of one of aloe’s anthraquinone constituents, 1,8-dihydroxyanthracene. However, the summary also stated that most aloe products sold for oral consumption in dietary supplements have reduced quantities of 1,8-dihydroxyanthracene.<sup>30</sup>

Aloe-related chronic toxicity studies were conducted in rodents by the NTP.<sup>31</sup> The first study used “Aloe Vera Gel” with a much higher anthraquinone content than is normally found in commercial aloe products. The anthraquinone in aloe (called aloe emodin) is a powerful stimulant laxative. The high doses caused diarrhea, weight loss, and malnutrition. Chronic diarrhea reduces the short-chain fatty acid (SCFA) content in the colon, and SCFAs enable the body to resist colon cancer.<sup>32</sup> The toxicity observed in the first study would be expected from a lifetime of chronic diarrhea.

Aloe vera, as a component of dietary supplement products, is the subject of ongoing research by FDA Division of Biochemical Toxicology.<sup>33</sup>

## FUTURE OUTLOOK

The main cultivation areas for aloe vera include Africa (e.g., KwaZulu-Natal), the West Indies, Netherland Antilles (Curaçao), South America (coastal Venezuela), North America (Mexico, Florida, Texas, and Arizona), India (hot dry valleys of northwestern Himalaya, coasts of Bombay, Gujarat, and southern India), and China. The Chinese aloe industry has grown rapidly in recent years and plans to become a major player in the global aloe market.<sup>34</sup>

Due to confusion in the labeling of products, the International Aloe Science Council (IASC) has recommended that all aloe vera products manufactured for sale worldwide† use the Standardized Common Name “aloe vera” and specify the plant part (i.e., leaf if the leaf is used in its entirety, inner leaf, or aloe latex).<sup>35</sup> IASC recommends that manufacturers refrain from using the term “whole leaf” and use aloe vera leaf gel/juice/capsules etc. as appropriate. IASC also recommends that aloe vera juice be labeled with the actual percentage of juice in the product along with additional ingredients, that it specify if the juice is reconstituted or from concentrate, and that the quantitative concentration level be clearly specified. HG

—Gayle Engels

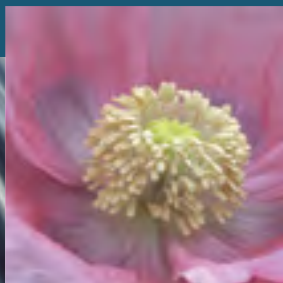
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†Regarding use of the term “worldwide,” it should be noted that this is a recommendation of a national trade association. Governmental agencies may have other specific nomenclature requirements for the labeling of aloe-containing medicinal products, whether oral or topical. In many countries, aloe latex and/or aloe gel are regulated as active pharmaceutical ingredients and, therefore, the labeling of the medicinal product must use the identical nomenclature as provided in the official monograph for which the product license or registration was based. Such labeling may or may not always match the recommendation of a national trade association.

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# dear reader

## Cardiology Journal Refuses to Retract Error-Riddled Herb-Drug Interaction Article

A “state-of-the-art” paper in a scientific or medical journal strongly suggests a review in which the authors are experts in the scientific or clinical discipline being discussed, that they have conducted extensive and appropriate research, that the article has been peer reviewed by experts in the specific field, and that the journal editors have applied all reasonable and appropriate diligence to ensure that the final publication is accurate, reliable, authoritative, and responsible.

Unfortunately, the *Journal of the American College of Cardiology* (JACC) appears to have bypassed this process when it published an article riddled with errors in its February 2010 issue.<sup>1</sup> Written by 3 physicians at the Mayo Clinic in Arizona, the paper does not meet any criteria necessary to merit the term “state-of-the-art,” i.e., unless the term *art* instead of “state-of-the-science” allows leeway to commit what, in our expert opinion, constitutes intellectual dishonesty.

The paper is an abortive attempt to educate the medical profession of the potential dangers of interactions between “herbs” and conventional cardiovascular medications. It falls far short of its intended objective. Presumably, any other respectable medical or scientific journal would be embarrassed to have such an irresponsible article in its pages and on its website. Apparently the JACC editors have little compunction about publishing what we consider junk science.

ABC sent a letter to the editor of JACC to note only some of the many problems in the paper.<sup>2</sup> ABC sent a second letter in July, again calling for the article’s retraction.<sup>3</sup> The ABC letters were co-authored by a multidisciplinary group of experts in various fields of botanical medicine, herb-drug interactions, pharmacovigilance and herb regulation, and family practice medicine. (Two co-authors are members of the ABC Board of Trustees, and four are on the ABC Advisory Board.) ABC also offered to provide JACC with a full, peer-reviewed critique of the article. JACC’s editor-in-chief, however, has declined to publish ABC’s letter, claiming that the journal had already received similar letters, including an offer from Dr. Adriane Fugh-Berman at Georgetown University to write a critique of the article, possibly to be published online only. (The texts of both ABC letters are posted on the ABC website.)

Although this column does not provide sufficient space to catalogue all of the errors and omissions in the article, here are a few that might be of interest to *HerbalGram* readers: The article contains no Latin binomials, sometimes making it difficult to identify the specific plant to which the authors are referring. For instance, they occasionally refer to an herb simply as “ginseng,” yet 3 types of “ginseng” are referenced in the article. The paper states that an infant died whose mother ingested so-called “Siberian ginseng,” but the original reference deals with the infant’s hirsutism—not death. Herbs referred to as “common” erroneously include the toxic garden plants oleander and lily-of-the-valley (as commonly available on the market as supplements), as well as “chan su” (a toxic Chinese bufo toad!). Grapefruit, a common food, is listed as an herbal dietary supplement, which it clearly is not. Reliance on secondary sources, lack of critical evaluation of the primary literature, obvious lack of knowledge of botanicals—these problems, and many others, make this paper, and the inadequate editorial process which allowed it to be published, a case study on the nadir of medical journalism.

As stated in the first ABC letter, “The plethora of such errors, plus others, requires that this article be retracted. Future publications of this type should be properly reviewed by experts competent in medicinal plants, pharmacognosy, and related fields of science.”

We have discussed this issue with numerous experts in areas of clinical botanical medicine and related disciplines. All agree that in the interests of scientific honesty, JACC should acknowledge its regrettable error in publishing its article, fully retract the article, and issue an apology with the same level of public relations fanfare apparently used when the erroneous article was published. Anything less perpetuates confusion and is a disservice to the medical profession and the public.

ABC will publish a more thorough treatment of the article in an HerbClip and elsewhere on the ABC website (at: <http://abc.herbalgram.org/site/PageServer?pagename=JACC>).

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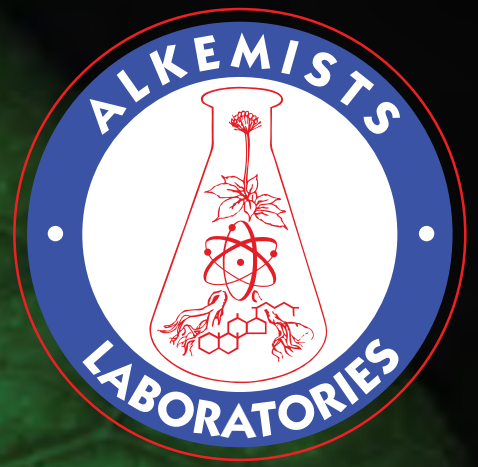
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## features

### 32 Plants of Semillas Sagradas

By Rafael Ocampo and Michael J. Balick, PhD

Semillas Sagradas, the Sacred Seed Sanctuary of the Finca Luna Nueva organic farm in Costa Rica, is home to over 300 species of local and regional medicinal plants. A book published in 2009, *Plants of Semillas Sagradas: An Ethnomedicinal Garden in Costa Rica*, co-authored by Rafael Ocampo and Michael J. Balick, PhD, celebrates the medicinal plants of this sanctuary, as well as the traditional medicinal knowledge that the sanctuary strives to protect. This excerpt from that book profiles 4 medicinal species found in Semillas Sagradas: tree spinach (*Cnidioscolus chayamansa*), ipecac (*Psychotria ipecacuanha*), surinam quassia (*Quassia amara*), and cat's claw (*Uncaria tomentosa*).

### 44 Hops (*Humulus lupulus*): A Review of its Historic and Medicinal Uses

By Uwe Koetter, PhD, and Martin Biendl, PhD

Hops, well-known as an ingredient in beer, is increasingly being recognized for its medicinal value. This article, written by two experts with intimate knowledge of medicinal hops research and the hops industry, provides information about the hops plant, its historical medicinal uses, its various compounds, and its possible mechanisms of action. It further profiles some of the clinical studies that have been performed with hops, primarily investigating the plant's traditional use as a treatment for insomnia, as well as its potential uses for menopausal symptoms and diabetes, among other conditions.

Hops *Humulus lupulus*. Photo ©2010 Steven Foster

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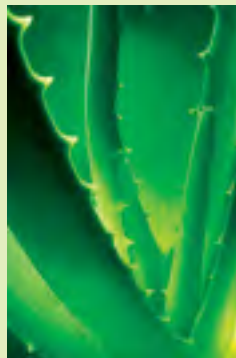
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Aloe *Aloe vera*. Photo ©2010 Steven Foster



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## ABC's 2010 Educational Ecotour to the Peruvian Amazon Rainforest and Machu Picchu

The American Botanical Council's (ABC) annual "Pharmacy from the Rainforest" Botanical Medicine Workshop and Ecotour will take place in Amazonian Peru and the majestic Andes Mountains, from October 7–17, 2010.



Inkaterra Reserva Amazonica Lodge  
Photo ©2010 Denise Meikel.

Since 1994, ABC has partnered with the Amazon Center for Education and Environmental Research (ACCER) to co-sponsor this exciting educational ecotour for health professionals, researchers, industry members, and laypersons. This year's tour is also co-sponsored by West Chester University in Pennsylvania.

The 2010 ABC-ACEER Botanical Medicine Workshop will take place in various locations in Amazonian Peru and the Andes, including the famous mountaintop "lost city" of Machu Picchu, declared a World Heritage Site by the United Nations and often referred to as one of the new "Seven Wonders of the World." This year's adventure also features a special optional extension from October 16–19 to the Wayqecha Research Station and the Manu Cloud Forest Canopy Walkway, the only canopy walkway system in the cloud forests of the Andes.

The trip's first destination is Puerto Maldonado, capital of the Madre de Dios region, which is a tributary of the upper Amazon. Participants will visit a local market, where they will have a chance to view medicinal herb stands and discuss traditional remedies.

Other highlights include visits to Reserva Amazonica and the Inkaterra Canopy Walkway, a series of suspended walkways 100 feet above the floor of the rainforest that provide a spectacular view of forest life in the upper canopy. Participants will also explore the diverse flora and fauna of an oxbow lake reserve, Sandoval Lake, home of the endangered giant river otter and other rare animals.

One of the highlights of the tour is a visit to the Sacred Urubamba Valley near Cuzco, the longest-inhabited city in the



Tree-top walkways in the Amazon Rainforest.  
Photo ©2010 Steven Foster



Trip participants cooling off in the Amazon river.  
Photo ©2010 Steven Foster



Peruvian Shaman.  
Photo ©2010 Denise Meikel.



Machu Picchu.  
Photo ©2010 Steven Foster



Western Hemisphere, plus a day at the spectacular mountain-top site of Machu Picchu. Educational workshops will feature information on medicinal plants, plant diversity, and ecosystems within the rainforest.

This year's tour leaders are Steven Foster, renowned photographer, lecturer, author, and president of the ABC Board of Trustees, and Amanda McQuade Crawford, herbalist and television show host, who specializes in women's health issues and is a member of ABC's Advisory Board. Programs will also be presented by local native healers.

"ABC's Peruvian Botanical Medicine Workshop is one of our most popular and unique educational programs," said ABC Founder and Executive Director Mark Blumenthal. "For over 15 years, people who have attended this amazing Amazon and Andean adventure have told us it has literally changed their lives. I've been to the Amazon at least a dozen times and to Machu Picchu 4 times, and the images of those fascinating locales are indelibly etched in my memory."

The cost of the main trip is \$3,890, which includes domestic airfare within Peru, lodging, meals, ground transportation, baggage handling, and workshops, and excludes the cost of roundtrip airfare to Lima, Peru. The cost of the extension trip is \$400. The full itinerary and registration forms are available on the ABC website at [www.herbalgram.org](http://www.herbalgram.org). More information is also available by calling 800-373-7105. HG

—Kelly E. Lindner

## HerbDay 2010 Celebrated at ABC Headquarters

Botanical organizations and herb enthusiasts across the country celebrated HerbDay on May 1, 2010, through diverse demonstrations and events—and the American Botanical Council (ABC) was certainly no exception.

A group of over 50 attendees, mostly consisting of Central Texas herbalists, gathered at the ABC headquarters in Austin, Texas to learn from renowned herbalist, teacher, and author Christopher Hobbs. Hobbs led an extensive herb walk through ABC's medicinal gardens and later held a lecture on herbal formulas. His participation was sponsored by Rainbow Light Nutritional System, a company with which he has been associated for over 20 years.

In the afternoon, ABC's new Ayurvedic garden—sponsored by Nature's Formulary, Organix-South, and Professor Ikhlas Khan, PhD, of the University of Mississippi—was dedicated by Mark Blumenthal, ABC founder and executive director. Representatives of Nature's Formulary and Organix-South attended the dedication.

Refreshing herbal teas were supplied to all attendees by Zhi Tea and Pukka Tea.

"This was my first HerbDay to plan and put together," said Rebecca Petee, ABC's new education coordinator. "I was very pleased with the turnout from our community and the support of the local herbalists. I look forward to next year's HerbDay celebration, as well as offering the local Central Texas regional community more educational events throughout the seasons."

"HerbDay is an opportunity for people to celebrate the regeneration of plants—both medicinal and ornamental—in the spring, as well as to appreciate the many varied benefits that they have provided to humans for millennia," said ABC's Blumenthal.

"We have inherited an abundance of wisdom and lore from our ancestors on the ways that plants can contribute to our lives," he continued. "The traditional and scientifically documented uses of herbs are part of the collective birthright we've inherited from our ancestors, and HerbDay is an opportunity to stop and pay homage to the plants which have nurtured and healed us."

Although past HerbDays have been celebrated in October, the event was moved this year to May 1. The move was in recognition that in many parts of the country, a larger variety of herbs grows in the spring than in the fall.

HerbDay is a national event that was initiated in 2006. HerbDay was started and is coordinated by the HerbDay Coalition, a group of 5 herb organizations in the United States: ABC, the American Herbalists Guild, American Herbal Pharmacopoeia, the American Herbal Products Association, and United Plant Savers. More information is available at [www.herbdays.org](http://www.herbdays.org). HG



Christopher Hobbs leads an herb walk through the gardens at ABC. Photo ©2010 ABC

Pineapple Guava *Feijoa sellowiana*. Photo ©2010 ABC





## ABC Offers Free E-Greeting Cards

In December of 2009, the American Botanical Council (ABC) developed and released its first set of beautifully-designed Herbal E-Cards. Since then, ABC has continued to expand this service by adding new electronic greeting cards, which ABC members and anyone who has registered on the ABC website can send for free to friends, family, and others.

Currently available cards include birthday cards for the months of December through June, as well as special holiday cards for Valentine's Day, Mother's Day, Memorial Day, and the winter holidays. All cards are illustrated with a high resolution botanical photograph taken by noted photographer and author Steven Foster, plus a description that includes the plant's common and Latin name, habitat, and traditional uses.

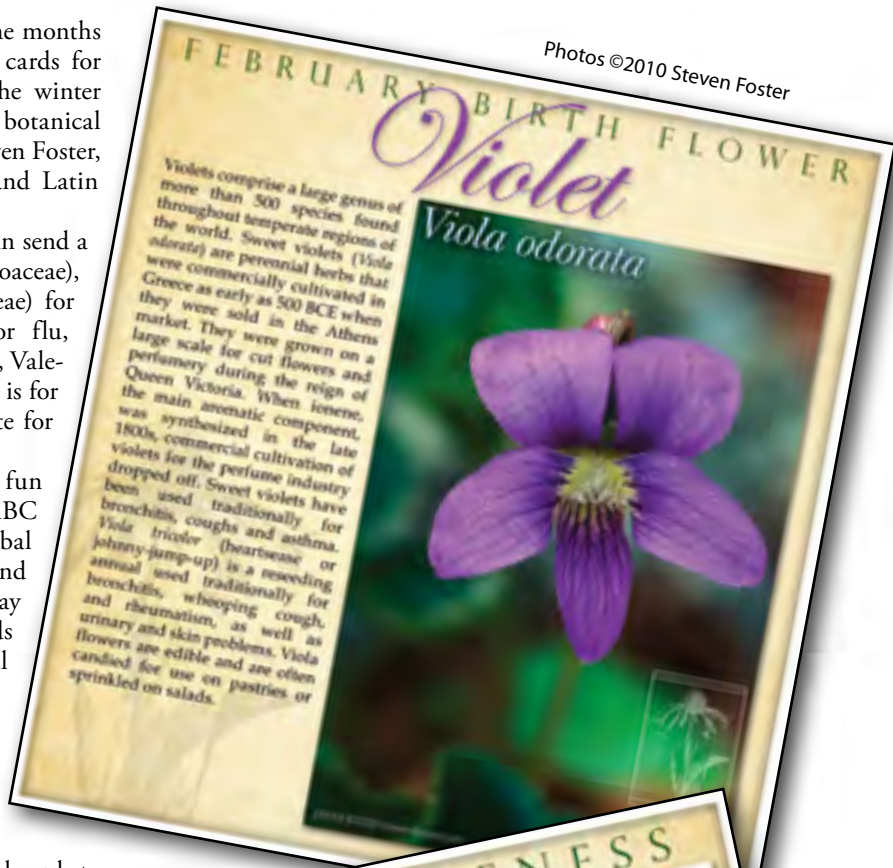
In addition to the cards for specific occasions, users can send a "Thinking of You" card, featuring *Ginkgo biloba* (Ginkgoaceae), or health cards, featuring *Echinacea purpurea* (Asteraceae) for colds, elderberry (*Sambucus nigra*, Caprifoliaceae) for flu, ginkgo for heart health, and valerian (*Valeriana officinalis*, Valerianaceae) for better sleep. (The description on each card is for informational purposes only and not meant to substitute for the advice of a qualified healthcare professional.)

"ABC Herbal E-Cards are an easy, educational, and fun way to connect with friends and colleagues," said ABC Founder and Executive Director Mark Blumenthal. "Herbal E-Cards are fast, environmentally friendly, and support and promote the role that herbs and other beneficial plants play in our culture. At the same time, using the Herbal E-Cards is a way to support and promote the nonprofit educational mission of ABC."

With new cards being added regularly, ABC members and registered users should soon be able to send an informational ABC Herbal E-Card for just about any occasion.

E-cards are available on ABC's website at [www.herbalgram.org](http://www.herbalgram.org). In order to prevent spamming, users can send cards to 10 people at a time but no more than 3 cards per hour. HG

—Kelly E. Lindner



## ABC's Mark Blumenthal Receives Varro E. Tyler Prize from ASP

Mark Blumenthal, founder and executive director of the American Botanical Council (ABC), received the American Society of Pharmacognosy's (ASP) Varro E. Tyler Prize during the 51<sup>st</sup> meeting of ASP, held July 10–14, 2010, in St. Petersburg Beach, Florida.

Founded in 1959, ASP is dedicated to the promotion, growth, and development of pharmacognosy and all aspects of science related to natural products. ASP awards its Tyler Prize each year to someone who has made a significant contribution to medicinal plant research, education, and/or advocacy for plant-based medicines.

According to the Varro E. Tyler Prize Committee, the award was given to Blumenthal because of his long, dedicated service to the botanical supplement/phytomedicine community, effective leadership of ABC, and his commitment to the development and dissemination of accurate information about the safety and benefits of botanicals. In addition, the selection committee noted that Blumenthal's vision for and leadership of ABC is a strong reflection of the style and approach of Professor Tyler.

The award is named after the late Varro E. Tyler, PhD, ScD, former dean of the College of Pharmacy and Pharmaceutical Sciences and vice-president of Academic Affairs at Purdue University. Professor Tyler was a leading authority in science-based botanical remedies, including both plant-derived pharmaceutical drugs and herbal dietary supplements. He was the senior author of several editions of the leading textbook on pharmacognosy (the study of drugs of natural origin) and the author of numerous other professional and popular books and hundreds of articles. He was also a Trustee of ABC.

"I am deeply grateful and humbled to have been chosen by ASP to receive the Tyler Prize," said Blumenthal. "Tip—his nickname he allowed his friends and close colleagues to call him—was a deeply influential mentor in my professional life. He taught me much about the need to keep seeking for evidence of the safety and efficacy of herbal medicines."

Blumenthal has over 36 years of experience with herbs and medicinal plants, initially as an entrepreneur in the herbal industry in the 1970s and 1980s. For the past 23 years, he has served as an advocate for research and science-based education in the area of plant-based medicines and dietary supplements. Blumenthal has authored hundreds of articles and reviews and is the editor and publisher of ABC's peer-reviewed journal *HerbalGram*.

"Through the activities of the American Botanical Council, which Mark founded, his mission and goals were to further educate the public (and hopefully scientists in the area of natural products) to the benefits of herbal supplements through extensive writings in this area and also through his hundreds of lectures

throughout the USA and abroad," said Norman Farnsworth, PhD, distinguished professor and research professor of Pharmacognosy at the University of Illinois at Chicago (e-mail, June 17, 2010). "Tip Tyler would have been proud that Mark Blumenthal has been awarded this prestigious award, and I offer my sincere congratulations."

"Mark and Tip were good friends, and I know that Tip would be very pleased that Mark is receiving the ASP Tyler Award—I am, too," said Ginny Tyler, wife of the late Professor Tyler (e-mail, June 17, 2010). "Mark has done a wonderful job with his *HerbalGram* magazine, which is full of information about herbs."

Blumenthal is a frequent speaker at national and international professional and industry conferences about herbal medicine. He previously served as an adjunct associate professor of medicinal chemistry at the College of Pharmacy at the University of Texas at Austin for 6 years, teaching a course on herbal products to pharmacy students. Before starting ABC in 1988, he served as co-founder and former vice-president of the Herb Research Foundation (HRF), president of the Herb Trade Association, and was a founding board member of the American Herbal Products Association (AHPA).

Blumenthal is the senior editor of the English translation of *The Complete German Commission E Monographs—Therapeutic Guide to Herbal Medicines* (1998), as well as a follow-up book, *Herbal Medicine: Expanded Commission E Monographs* (2000). He is also senior editor of *The ABC Clinical Guide to Herbs* (2003), a reference book for health professionals. Blumenthal credits Professor Tyler as the primary motivator for him to translate, compile, edit, and publish the German Commission E Mono-

graphs, which are considered some of the most reliable information on herbs in the world. Blumenthal also replaced Professor Tyler as English editor of *Rational Phytotherapy: A Reference Guide for Physicians and Pharmacists*, 5<sup>th</sup> edition (Springer, 2004), when Dr. Tyler died in 2001.

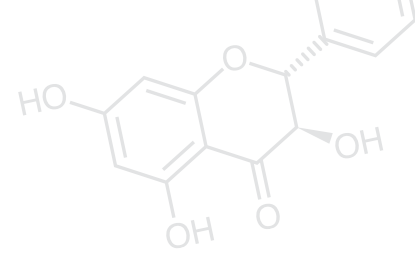
Blumenthal has previously received *Natural Health Magazine's* Hall of Fame Award, the Council for Responsible Nutrition's Apple Award, and a LifeTime Achievement Award from *Nutrition Business Journal*. HG

—Kelly E. Lindner

**The award was given to Blumenthal because of his long, dedicated service to the botanical supplement/ phytomedicine community, effective leadership of ABC, and his commitment to the development and dissemination of accurate information about the safety and benefits of botanicals.**

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## World News

### Bars and Restaurants Introduce Herbal Cocktails

While some alcoholic beverages, like minty mojitos, have included herbs for generations, a more unique collection of herbal cocktails has been growing in popularity recently. The addition of traditional Chinese medicinal herbs to alcoholic cocktails was recently implemented at the Keefer Hotel in the Chinatown of Vancouver (British Columbia, Canada) by Keefer Bar Manager Danielle Tatarin.<sup>1</sup>

After noticing that herbs used in Traditional Chinese Medicine (TCM) were often incorporated into teas, Tatarin began experimenting with making these teas into syrups, which she now adds to her Chinese Medicine cocktails (e-mail, April 14, 2010). Previously Tatarin was with the DB Bistro Moderne in Vancouver, where she also incorporated herbs into syrups for cocktails.

"I became interested in mixology and cocktail history while traveling throughout South East Asia and Australia," said Tatarin. "I loved a lot of things I was seeing for the first time and always wondered 'how would this taste if I mixed it into a cocktail?' Since then I've been incorporating herbs into cocktails through teas, syrups, powders, oils, tinctures, and bitters. All of the applications I have researched on my own and tested recipes through trial and error."

Tatarin also uses common herbs not exclusive to Chinese medicine, such as lavender (*Lavandula* spp., Lamiaceae) and sage (*Salvia officinalis*, Lamiaceae), in her cocktails. Though Tatarin is not an herbalist, she was introduced to herbs like lavender, peppermint (*Mentha x piperita*, Lamiaceae), and ginger (*Zingiber officinale*, Zingiberaceae) at an early age through her stepmother, a nurse who also studied Eastern medicine.

Tatarin's most in-demand drink is the Opium Sour (recipe provided by Tatarin, in sidebar), which is high in vitamins C and B as it contains both grapefruit (*Citrus x paradisi*, Rutaceae) and tamarind (*Tamarindus indica*, Fabaceae). Its poppyseed (*Papaver rhoeas*, Papaveraceae) tincture also helps with relaxation (although it does not actually contain opium, derived from the opium poppy, *P. somniferum*),

and overall, she says the drink aids digestion. Another of her most famous cocktails—the Tigers Tail—consists of astragalus root (*Astragalus membranaceus*, Fabaceae), used in TCM to boost the immune system and *qi* (energy), as well as the Asian beverage *shochu* (most commonly distilled from barley, sweet potatoes, or rice) and Campari®.<sup>1</sup>

"I recommend the Tigers Tail for people with allergies or to boost the immune system, but we can mix the astragalus tea syrup into any cocktail," said Tatarin.

Tatarin also keeps an eye out for interactions with alcohol. "I haven't come across any problems with the ones I'm using now," she said. "I'm always careful to find out what the uses for each herb are before mixing it into the drink."

The idea of promoting herbal cocktails may also be taking root in the United States. The Trudy's restaurant chain and South Congress Café in Austin, Texas introduced a line of cocktails to their menus that they call "herbal reme-



Opium Sour.  
Photo ©2010 Dean Azim Photoworks  
www.deanazim.com

dies” in April 2010. However, according to Chance Robertson, an operations manager at Trudy’s who designed some of the chain’s drinks, the recipes for these cocktails were concocted more for taste than for any actual medicinal or healing value (e-mail, May 8, 2010).

“Aside from the ‘I’ve been at work all day and need to relax’ ailment, I’m not sure what these drinks may cure,” said Robertson. “They are really good for that and the ‘It’s a beautiful day and I want to relax on a patio and kick back’ sickness.”

According to Robertson, the herbal remedies idea came to him while tending his herb garden. “My wife and I decided to throw some basil into a cocktail with bourbon and lemonade,” he said. “It was delicious, and it kind of spawned us to look more closely at basil as an ingredient in our cocktails at Trudy’s. Our bartenders also brought a lot of these ideas to us based on what they drink or have tried at other bars and restaurants around town and beyond.”

The Trudy’s “herbal remedy” drinks include the Brasília (VeeV açai liquor™, Grand Marnier®, Leblon® Cachaça, mint, lime juice, and simple syrup), the Whiskey Basil Lemonade (Jack Daniel’s Whiskey®, basil [*Ocimum* spp., Lamiaceae], and fresh lemonade), the Paraty (Leblon Cachaça, Cointreau®, basil, lime juice, simple syrup, fresh strawberries, and soda), the Agave Fresca (Corzo® silver tequila, agave nectar [*Agave* spp., Agavaceae], orange, lime, and soda), the Caipirinha (Leblon Cachaca, brown sugar simple syrup, and fresh lime juice), and the Mojito (Bacardi® rum, fresh mint, lime juice, simple syrup, and soda).

In addition to the basil and the mint drinks, Austin’s South Congress Café’s herbal drinks feature ginger (*Zingiber officinale*, Zingiberaceae) and rhubarb (*Rheum palmatum*, Polygonaceae) stems, according to Robertson.

Of course, the addition of medicinal herbs to alcoholic beverages is an ancient practice made new; the history of the liqueur industry is based on the blending of numerous medicinal plants and plant extracts to make brandies, cordials, medicinal wines, etc.—many of which were initially intended for medicinal purposes and which survive today primarily as flavorful beverages used as aperitifs,

digestives, and flavoring agents mixed into cocktails, etc. HG

—Kelly E. Lindner

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### “Opium Sour” Recipe:

2 oz bourbon  
 1/2 oz Tamarind Syrup\*  
 3/4 oz Fresh Grapefruit Juice  
 1/4 oz Fresh Lemon Juice  
 2 dashes Poppyseed Tincture  
 Shake first 4 ingredients vigorously on ice for 10–15 seconds. Strain over fresh ice into a highball glass. Finish with poppyseed tincture.

\*To make tamarind syrup, steep fresh or dried tamarind pulp in hot water for 20 minutes and fine strain through a cheesecloth. Add equal part sugar to tamarind water.

### “Tigers Tail” Recipe:

2 oz Shochu (Tatarin uses the shochu variety that is distilled from barley)  
 1/2 oz Campari  
 1/2 oz Astragalus Root Tea Syrup\*  
 4 Pineapple Chunks, dipped in spiced sugar†

Mix first 3 ingredients together and shake on ice vigorously for 20 seconds. Double strain into a whiskey glass. Served neat. Garnish with a skewer of pineapple chunks dipped in spiced sugar.

\*To make astragalus root tea, steep dried roots in hot water for 20 minutes, then strain. Add equal part sugar to tea and mix well. Cool, then store in a clean glass jar.

†To make spiced sugar, chop up a bird’s eye chili pepper (*Capsicum frutescens*, Solanaceae), also known as a Thai pepper, very finely and mix to taste with about 2 cups raw cane sugar and, possibly, a few crushed candied rose petals.

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## India Makes Grenade from World's Hottest Chili Pepper

The Indian military has decided to use the world's hottest chili pepper, *Bhut Jolokia* (*Capsicum chinense*, Solanaceae, a.k.a. "ghost chili"),\* to create a new kind of hand grenade.<sup>1</sup>

"The chili grenade has been found fit for use after trials in Indian defense laboratories," Defense Spokesman Col. R. Kalia told the *Associated Press*.<sup>1</sup>

The effect of these grenades will be similar to tear gas, though arguably more effective. A person exposed to the gas created by this grenade would become temporarily blinded (possibly for up to 3 minutes), experience shortness of breath, and feel a burning sensation on his or her skin, according to chili expert Dave Dewitt, publisher of [www.fierce-foods.com](http://www.fierce-foods.com) and sometimes referred to in the media as the "Pope of Pepper" (oral communication, May 19, 2010).

"I'm not opposed to weapons that disable people instead of killing them—this will certainly disable someone," said Dewitt. "I've never been gassed with *Capsicum*, but I have accidentally gotten juice from fresh chili pods in my eyes and can imagine that it would be very uncomfortable."

However, this grenade may not be more potent than a grenade made from any type of chili pepper: "I think if you isolated any *Capsicum* to create this grenade, it would have the same effect. But people are interested in what's extreme," said Dewitt. "Making a grenade out of the hottest pepper in the world is news."

"These extremely hot chilis have the ability to make your eyes water and leave you gasping—like how you might react to an onion, but a lot stronger," said Janie Lamson, owner of Cross Country Nurseries, a mail-order nursery business located in Rosemont, New Jersey that specializes in chili and other pepper plants (e-mail, May 24, 2010). Lamson also shared that the *Bhut Jolokia* is her best seller: "It's been number one for the past 4 years that we've offered it. Almost everyone has read about it, seen it on TV, or heard about it on public radio. Who doesn't want to try the hottest in the world?"

The *Guinness Book of World Records* recognized *Bhut Jolokia* as the world's hottest pepper in 2007,<sup>1,2,3</sup> after New Mexico State University (NMSU) measured it at 1,001,304 Scoville heat units (SHUs, named after Wilbur Scoville, the first to measure chili heat).<sup>3,4</sup> "That's 3 times hotter than a habanero," said Danise Coon, program coordinator of the NMSU Chile Pepper Institute and research specialist for the Chile Breeding Program (e-mail, May 19, 2010). By comparison, the relatively popular jalapeño peppers, a staple in Mexican and Tex-Mex cuisine, measure only from 2,500 to 8,000 SHUs.<sup>1</sup>

The pepper itself has been traditionally used in India for stomach and digestive issues, as well as a way to raise body temperatures.<sup>1</sup> "The brain perceives it as the same heat from fire," said Coon. "This pepper is extremely hot." In fact, another planned use by the military is to give it to soldiers deployed in cold weather.<sup>4</sup>

Scientists also plan to develop a powder of this chili to deter

*Bhut Jolokia* peppers *Capsicum chinense*.  
Photo ©2010 Chile Pepper Institute



animals from entering army barracks and an aerosol version for use in self-defense and riot control.<sup>1,4</sup>

Those brave enough to consume this pepper might want to try a hot sauce named Holy Jolokia™, sold by CaJohn's Fiery Foods in Columbus, Ohio, though the sauce is diluted. Some of the proceeds from the sales of this hot sauce go to NMSU to fund chili pepper research. HG

—Kelly E. Lindner

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\**Bhut Jolokia* is Assamese for "ghost chili;" Assamese is a regional language in the state of Assam in northeastern India.

## Survey Reveals Doctors Know Little about Herbal Medicine

According to the results of a survey published in April 2010, many medical professionals may know very little about herbal medicine.<sup>1</sup> Although various types of healthcare professionals were sent the survey, the majority of respondents (76.7%) were practicing physicians and 88% were located in the United Kingdom. The survey was sent to 1,157 randomly queried *Drug and Therapeutics Bulletin* (DTB) subscribers, of which 164 (14%) responded.

Despite the small number of responders, the results of the survey have notable majorities: 71.8% indicated that the public has a misplaced faith in herbal medicines, 84.1% do not believe herbal medicine is well regulated, and 62.8% said they did not provide general herbal medicine information to their patients. Furthermore, 75.5% believe that doctors are poorly informed about herbal medicines; 46.6% admitted that they themselves were poorly informed about such therapies. Of the 21.3% who responded that they wouldn't seek more information about an herbal medicine their patient was taking, 60% said they were unsure where to seek such information. Overall, 50% said they'd use Google or similar Internet tools if they were to seek such information.

"I would suggest that that's a terrible source of information where herbal medicine is concerned," said Michael McIntyre, chairman of the European Herbal and Traditional Medicine Practitioners Association and a member of the UK Department of Health Herbal Medicine Regulatory Working Group in a podcast released with the survey.<sup>2</sup> "You could get terrible information, wrong information, and I certainly wouldn't advise patients to do that so I wouldn't advise doctors to do it either."

Herbal medicine has an often confusing and conflicting online identity caused by unreliable sources posing as herbal authorities and the posting of unqualified misinformation to websites; therefore, one would need to consult a reliable herbal medicine source to get the correct information. However, this survey showed that many physicians in the United Kingdom didn't seem to know where to go for such information.

The UK's Medicines and Healthcare products Regulatory Agency (MHRA) also recently commissioned a survey through Ipsos MORI to identify the UK public's view on herbal medicines.<sup>3</sup> This included opinions about safety and regulation as well as where the public obtained information on herbal medicines. According to this survey, 41% of the responding British adults believed doctors would be a good source of reliable herbal information while 23% thought the same for pharmacists. Also, 67% of

respondents agreed that it is necessary to tell a general practitioner if one is taking herbal medicine.

According to the Ipsos MORI survey, most patients expect doctors to be well informed, said Linda Anderson, PhD, principal pharmaceutical assessor at the MHRA, in the podcast.<sup>2</sup> "And I think they'd be pretty horrified if they thought the doctors were just relying on something on the Internet that wasn't qualified."

Likewise, in the United States, botanical experts have described the phytomedicinal education of medical professionals as "still woefully inadequate," as Mark Blumenthal, founder and executive director of the American Botanical Council, told *The Tan Sheet*.<sup>4</sup> Blumenthal also pointed out that "the potential for potentially serious [herb-drug] interactions still exists, and all healthcare professionals, not just physicians, should be adequately trained on these potential interactions, as emerging scientific and clinical data reveal them."

However, the results of the DTB survey seem to show overall that physicians, at least in the United Kingdom, have a "lack of knowledge, a lack of understanding" and "perhaps even more worryingly, an absence of interest" in herbal medicine, said DTB Editor Ike Iheanacho in the podcast.<sup>2</sup> HG

—Kelly E. Lindner

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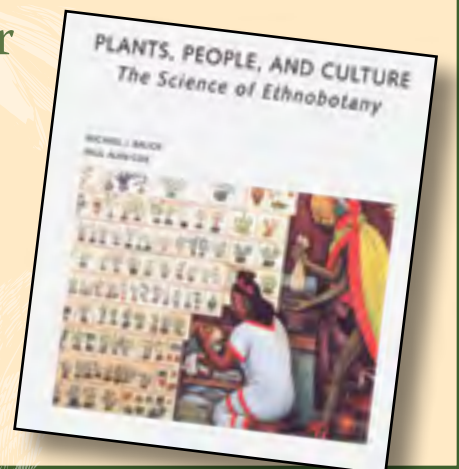
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## Efforts to Increase Sustainability of Ayurvedic Plants in India

The vast majority of medicinal plants used within the Ayurvedic system of medicine are collected from the wild, a situation that has resulted in the over-exploitation of many botanical species in India.<sup>1</sup> Faced with the potential loss of such important medicinal resources, India's government has recently initiated various projects aimed at conserving medicinal plants, and some Ayurvedic companies have begun to increase their commitments to cultivation and to sustainable wild collection standards.

Approximately 70% of India's population—estimated at over 1,173,000,000 people—uses plants for healthcare.<sup>2</sup> A recent study commissioned by India's National Medicinal Plants Board (NMPB) and conducted by the Bangalore-based institution Foundation for the Revitalization of Local Health Traditions (FRLHT) has estimated that 177,000 metric tons of medicinal plants are used each year by India's domestic herbal industry, that 86,000 metric tons are employed within rural Indian households, and that 56,500 metric tons are exported through international trade.

The high level of domestic use of Ayurvedic plants, coupled with increasing demand for exports, has resulted in rapidly dwindling natural supplies, said Muhammed Majeed, PhD, founder of the international company Sabinsa Corporation, which manufactures Ayurvedic herbal extracts and other ingredients (e-mail, May 7, 2010).

FRLHT has been coordinating rapid threat assessments of prioritized medicinal plants within certain states of India since 1995. According to D.K. Ved, director of FRLHT, 14 assessments have been conducted over the last 15 years in 17 Indian states, using the International Union for the Conservation of Nature's (IUCN) Red List Categories and Criteria. So far, 359 prioritized species have been investigated through the various state-wide assessments, of which 335 (or 93%) have been assigned Red List status ranging from critically endangered, endangered, vulnerable, or near threatened (Ved D.K., e-mail, April 28-May 7, 2010).

Ved stressed, however, that these results do not mean that over 90% of *all* Ayurvedic plants in India are threatened. According to Ved, approximately 1,560 plant species are sources of plant drugs within the Ayurvedic medicine system, and many of those species that are taken from the wild are still abundantly available along roadsides, farm bunds, fallow lands, and waste lands.\*

But rampant, unsustainable harvest from the wild indicates that many Ayurvedic medicinal plants could be—or could become—threatened. Although India's government controls wild collection of medicinal plants through permits and other regulations, “corruption at the local level has a role in over-exploitation of some species,” said P.K. Davé, chief operating officer of the Ayurvedic company Nature's Formulary (e-mail, June 1, 2010).

Further, wild collection is by far the most prevalent means of obtaining herbs in India. “A recent assessment undertaken by FRLHT has shown that almost 85% of botanical raw drugs used by India's herbal industry, excluding well known spices, cereals, and vegetables, are obtained from the wild,” said Ved.

There are several reasons why India's botanical industry has continued to rely upon wild collection.<sup>1</sup> Chief among them is that the price of cultivated plants is typically far higher than the price of wild-collected plants. Additionally, farming expertise is generally lacking in India, so many of the country's marginal farmers are unwilling to risk herb cultivation. Many medicinal plants also take several years to reach proper maturity for therapeutic use, which could force farmers to wait 4 to 10 years before seeing a return on their investment (J. Brinckmann, e-mail, May 28, 2010). Farmers would also need to have enough acreage for planning crop rotations

over decades. These requirements simply cannot be met by most small farmers in India.

Ayurvedic companies Himalaya Drug Co. and Shree Dhootapapeshwar Ltd. reportedly source approximately 20% or less of their raw materials from contract farmers.<sup>1</sup> Verdure Sciences, a company that manufactures botanical extracts in India for export sales, mostly from plants with strong roots in Ayurveda, claims to derive 35-40% of its herbal raw materials from cultivation (A. Patel, e-mail, May 28, 2010). Sabinsa procures around 40% of its botanical raw materials through cultivation efforts, and according to Dr. Majeed, the company is working to increase this percentage with each new growing season.

Dr. Majeed stated that cultivation has become increasingly necessary due to shortages of some wild herbs. “We have known about the growing scarcity of Indian herbs for the last few years,” he said. “It has become more and more apparent as time went on, and our business started showing struggles of this in the recent few years.”

Some currently endangered Indian medicinal plants, which Sabinsa is now attempting to cultivate, include *Caesalpinia sappan* (Fabaceae), *Salacia reticulata* (Celastraceae), *Nardostachys jatamansi* (Valerianaceae), and *Taxus* spp. (Taxaceae).

Other companies have indicated that they plan to rely more heavily on cultivation in the future as well. Verdure intends to rely on cultivation for 50% of its botanical materials by 2012. News reports state that Himalaya Drug Co. intends to enhance its cultivation of medicinal plants each year, with the goal of sourcing 70% of its materials through cultivation by 2015.<sup>1,3</sup> In February 2010, Himalaya entered into an arrangement with one of its suppliers to set up a 75-acre nursery and to begin testing mass cultivation of some medicinal herbs.<sup>1</sup>

According to Dr. Majeed, cultivation is beneficial not just for ensuring availability but also for guaranteeing materials' quality and eliminating adulteration. “Some Indian herbs can have relatively high levels of potential toxins unless you know how to guard against that, which we do,” he said.

Ajay Patel, president and CEO of Verdure Sciences, likewise noted that cultivation can help to ensure the safety and quality of raw materials. “A major concern from the Western world about Ayurvedic botanicals, much in part to California Proposition 65, is heavy metals,” he said (e-mail, May 28, 2010). “Many botanical manufacturers often did not test for these in wildcrafted herbs, assuming they would not have issues with impurities. With wildcrafted herbs you sometimes have a gap in your knowledge of where exactly a raw material came from. For example, with herbs wildcrafted and harvested from roadsides or suburban wetlands, the potential for contamination is high.”

But cultivation has its own challenges and limitations. According to Ved of FRLHT, increased cultivation is likely to have limited success in reducing over-collection of medicinal plants. “Increase in cultivation of medicinal plants can help in meeting the increasing demand of some of the botanical materials obtained from the herbs and shrubs. But keeping in view the fact that many of these plant entities are woody perennials, it may not be feasible to expect that



such cultivations will significantly shift the sourcing of raw materials away from the wild sources,” said Ved.

Ved explained that these woody perennials are difficult to cultivate due to inadequate information regarding their domestication and reproductive biology, as well as to the long gestation period required before they become available for harvesting when raised on farm lands. Such Ayurvedic plants include *Coscinium fenestratum* (Menispermaceae), *Salacia reticulata*, and *Decalepis hamiltonii* (Apocynaceae).

“Such cultivation efforts may, however, assist the conservation of only a very limited number of India’s wild medicinal plant species,” Ved added.

Patel of Verdure pointed to other difficulties associated with cultivation: “You might think it’s easy to take some wildcrafted seeds and plant them in a farm field, but to do it the correct way is a bit more difficult. For example, the phytochemical yield can be higher on wildcrafted plants, which is due to their particular environment. The soil, microclimate, surrounding plants and ecology (even harvest methods) can have a great effect on phytochemistry. Having this knowledge and understanding the unique attributes of each species and variety is paramount in successful and long-term cultivation practices.”

On the other hand, Patel explained that paying attention to these details of cultivation can be particularly beneficial since companies can sometimes enhance the quality of manufactured products that come from successfully cultivated medicinal plants. For instance, he stated that Verdure has had great success in ensuring the potency and batch consistency of its Pomella® pomegranate (*Punica granatum*, Lythraceae) extract, due to its cultivation efforts.

In addition to cultivation efforts, Patel noted that it is important for companies to ensure that wildcrafted herbal materials are ethically and sustainably harvested. “Close relationships with harvesters and with governmental (as well as with non-governmental) organizations and strong communications networks on the raw materials side are key,” he said. “If we are close to the ground, we know about the supply issues that go beyond just market price and are able to take appropriate steps that could possibly include discontinuing a product, regardless of its market demand.”

Davé of Nature’s Formulary likewise noted the importance of pursuing both cultivation and sustainable wildcrafting practices. Nature’s Formulary is in the process of converting its entire product line to reliance upon cultivated organic or wildcrafted materials, and Davé explained that the company gives preference to family farms and tries to partner with suppliers who have a history of compliance with forest collection rules. “We believe that using collectors for wildcrafted herbs serves a purpose since it provides a means of livelihood, as a majority of the collectors are destitute or tribals living in forests,” he said.

Ayurvedic companies are not the only entities that have recently shown interest in protecting the supply of India’s medicinal plants.

“Recently there has been a spurt in the promotional activities relating to cultivation of medicinal plants, as well as their plantation in the forest areas to augment the medicinal plant resources of the country,” said Ved, adding that many of these efforts are being promoted by India’s NMPB.

For instance, a project to establish additional Medicinal Plant

Conservation Areas (MPCAs) in various Indian states was initiated last year. MPCAs foster in-situ conservation of wild medicinal Indian plants; since 1993, they have been coordinated by FRLHT and implemented by state forest departments. There are currently 87 MPCAs throughout India, and new MPCAs are to be developed in the states of Uttarakhand, Arunachal Pradesh, and Chattisgarh.

Further, in collaboration with the World Health Organization, NMPB released guidance documents in 2009 on India-specific Good Field Collection Practices and Good Agricultural Practices for medicinal plants, for use by industry stakeholders to help ensure quality and sustainability of medicinal herbs.<sup>4,5</sup>

Additionally, the Karnataka Forest Department recently received financial assistance from NMPB for 4 new projects relating to conservation, identification, and research of medicinal plants.<sup>6</sup> Another recently announced project will involve cultivating medicinal plants on idle land, including along the sides of the runway of Cochin International Airport in Kerala.<sup>7</sup>

As India’s Ayurvedic medicinal plant industry continues to grow and attract more international customers, the availability and threatened status of various medicinal plants is likely to be an area of increasing concern and discussion, as well as sustainability programs by government agencies, non-governmental organizations, and members of private industry.

“The Indian government already recognizes that its share of the \$65-70 billion world trade of herbs is miniscule,” said Davé. “As it strives to gain share of this, adequate supply will be essential. This can be achieved only through better management of existing species.” HG

—Courtney Cavaliere

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\* Harvesting medicinal herbs along roadsides is generally considered poor collection practice since perpetual exposure to vehicular exhaust may have rendered the plant and its produce unsuitable for human consumption. [Ref: National Medicinal Plants Board, World Health Organization Country Office for India. Guidelines on Good Field Collection Practices for Indian Medicinal Plants. New Delhi, India: Sun Offset; 2009.]

## Special Rose Hip Powder Improves Aspects of Rheumatoid Arthritis

Reviewed: Willich SN, Rossnagel K, Roll S, et al. Rose hip herbal remedy in patients with rheumatoid arthritis—a randomised controlled trial. *Phytomed.* 2010;17(2):87-93.

Clinical studies have examined the efficacy of Danish rose (*Rosa canina*, Rosaceae) hip powder in the treatment of various types of osteoarthritis (knee, hip, wrist), but only a single exploratory study has assessed rose hip powder for rheumatoid arthritis (RA).<sup>1</sup> This randomized, double-blind, placebo-controlled clinical trial evaluated a special type of Danish rose hip powder (LitoZin®, produced by HybenVital ApS; Langeland, Denmark, marketed worldwide as i-flex® by DSM, Basel, Switzerland) in the treatment of RA symptoms.

Patients over the age of 18 who met the American Rheumatism Association criteria for RA were randomized by computer to receive either placebo or rose hip powder capsules. The patients were recruited between April 2005 and August 2006 from outpatient clinics in Berlin, Germany and Denmark. The patients took 5 g of rose hip powder per day in 2 divided doses for 6 months. The placebo had a similar taste, appearance, and smell to the rose hip capsules.

The Health Assessment Questionnaire Disability Index (HAQDI) was the primary outcome measure. The HAQDI is composed of 8 subscales encompassing dressing, arising, eating, walking, reaching, gripping, hygiene, and ability to perform common activities. The degree of disability is rated on a scale of 0-3, with a higher score showing a greater degree of disability. In

addition, the HAQDI uses Visual Analogue Scales (VASs) to assess the patients' pain and a global scale on a range of 0 to 100. The researchers also used the disease activity score (DAS-28) to assess swollen and tender joint counts, erythrocyte (red blood cell) sedimentation rate (ESR) as an inflammatory marker, and the patients' self-assessment of disease activity on a scale of 0-10, with higher scores reflecting greater disease activity. The physicians evaluated disease activity on a VAS of 0-100. The researchers measured health-related quality of life (QoL) using the Short Form (SF-12) and the RA QoL questionnaires. The SF-12 has physical and mental components, with higher scores reflecting better health-related quality of life. The RA QoL has 30 questions, with lower scores reflecting better outcomes. The patients continued to take their usual conventional pharmaceutical medications, and medication use was recorded in patient diaries and the physicians' case report forms.

At baseline, 89 patients were enrolled in the study, including 44 in the i-flex rose hip group and 45 in the placebo group. By the end of the study, 15 patients had withdrawn from the study, leaving 33 patients in the rose hip group and 41 in the placebo group. In the rose hip group, reasons for withdrawal included personal reasons (n=3), relocation (n=1), vomiting (n=1), vasculitis allergica (skin eruptions) (n=1), difficulty swallowing capsules (n=3),



Rose Hip *Rosa canina* Photo ©2010 Steven Foster

diarrhea (n=1), and nausea (n=1). In the placebo group, the withdrawal reasons were difficulty swallowing capsules (n=1), personal reasons (n=1), stomach problems (n=1), and ineffective treatment (n=1). The drop-outs were included in the intention to treat (ITT) analysis.

The HAQDI scores improved in the rose hip group and were significantly better than the placebo group scores at 3 and 6 months of treatment (P=0.014 and P=0.032, respectively). There were no significant differences between the groups in the HAQ patient pain and global scales. The rose hip group experienced a greater improvement in DAS-28 scores compared to the placebo group with a trend towards statistical significance (P=0.056) at 6 months. (For example, the number of tender joints [as noted in the DAS-28 score] showed a significant decline in the per-protocol population of 45% (P=0.042).)

The physicians' global assessments indicated a greater improvement in the rose hip group compared to the placebo group at 6 months (P=0.012). At 6 months, the SF-12 physical and RA QoL scores were also significantly better in the rose hip group compared to the placebo group (P=0.013 and P=0.043, respectively). There was not a significant difference in the SF-12 mental component scores. ESR values declined significantly in the rose hip group compared to the placebo group in both the ITT analysis and the per-protocol analysis that included patients enrolled for at least 3 months (P=0.060 and P=0.045, respectively). No changes in medications were noted for either group.

There were 14 adverse effect reports in the rose hip group and 28 reports in the placebo group. In the rose hip group, 1 patient experienced a serious adverse event (vasculitis allergica); the authors write, "It was not clear whether this event was related to the study medication [rose hips] as the patient was also taking a number of other medications." The authors also note the same rose hip powder has not been linked to any other serious adverse events in previous studies in osteoarthritis patients.

The authors conclude, "This study suggests some benefit of patients with RA treated with the present rose hip powder." Due to the small size of the study, the authors comment that these results should be viewed with caution. Additional studies with larger samples of patients are needed to confirm these results and provide adequate power for multivariate analysis. The authors write that dose-finding studies and research on different rose hip formulations are also warranted.

Kaj Winther, MD, of Frederiksberg Hospital and the lead author of the trial, also noted that most natural dietary supplements that show some potential benefits in treating symptoms associated with RA (e.g., fish oil) do not seem to be useful for osteoarthritis, and vice versa (personal communication to M. Blumenthal, June 17, 2010). Based on the currently available clinical data, the rose hips, he noted, may be useful for both types of arthritis, although more research is warranted to confirm this. HG

—Marissa Oppel-Sutter, MS

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## Siliphos® Special Milk Thistle Extract Shows Benefit in Chemotherapy Hepatotoxicity in Children

Reviewed: Ladas EJ, Kroll DJ, Oberlies NH, et al. A randomized, controlled, double-blind, pilot study of milk thistle for the treatment of hepatotoxicity in childhood acute lymphoblastic leukemia (ALL). *Cancer*. 2010;116(2):506-513.

Milk thistle (*Silybum marianum*, Asteraceae) is a medicinal plant prized for its hepatoprotective effects. A case report has suggested that it may be beneficial in treating liver toxicity caused by cancer chemotherapy.<sup>1</sup> During the maintenance phase of treatment, chemotherapy in children with acute lymphoblastic leukemia (ALL) is often interrupted due to liver toxicity, which is the main cause of cumulative long-term drug withdrawals that can potentially increase the risk of bone marrow relapse in pediatric ALL patients.

In this randomized, double-blind, multi-center, pilot clinical trial, researchers examined the safety and effectiveness of a proprietary milk thistle extract in reducing hepatotoxicity in pediatric ALL patients receiving maintenance-phase chemotherapy.



Milk Thistle *Silybum marianum* Photo ©2010 Steven Foster

The milk thistle seed (technically the fruit) extract product used in this study was Siliphos®\* (marketed by Thorne Research;† Sandpoint, ID; produced by Indena SpA, Milano, Italy), a proprietary 1:2 mixture of silibinin and soy phosphatidylcholine. Silibinin is a 1:1 mixture of silybin A and silybin B, which are two of the 7 flavanolignans found in milk thistle extract. (The nomenclature of various milk thistle constituents is somewhat confusing; a recent review explains the differences in detail.<sup>2</sup>)

The researchers conducted *in vitro* bioassays using CCRF-CEM T-cell ALL cells to investigate potential antagonism of the cytotoxic chemotherapeutic agents used in ALL treatment. The trial was conducted on children, adolescents, and young adults, aged 1-21 years, who were in the maintenance phase of chemotherapy and receiving treatment according to the protocols of the Children's Cancer Group, the Children's Oncology Group, or the Dana Farber Cancer Institute ALL Consortium. These protocols utilized the following pharmaceutical drugs: vincristine, prednisone or dexamethasone, 6-mercaptopurine or thioguanine, and methotrexate. The participants were eligible for the study if they had a hepatic toxicity grade of 2 or more according to the Common Toxicity Criteria of the National Cancer Institute on at least 1 of 3 tests: the levels of liver enzymes aspartate amino transferase (AST), amino alanine transferase (ALT), or total bilirubin (TB).

The patients were randomized to receive either Siliphos (n=23) or a placebo (n=26) orally for 28 days beginning the day after administration of intravenous chemotherapy. The researchers measured hepatic toxicity on days 0, 28, and 56. Weekly telephone interviews and returned medication containers were used to monitor compliance, and the researchers defined "adherence" as the completion of at least 80% of the assigned treatment. A standardized questionnaire administered by a research assistant over the telephone was used to monitor adverse effects.

Each Siliphos capsule was designed to contain 240 mg of Siliphos standardized to 80 mg of silibinin, with a target dose of 5.1 mg/kg/day silibinin. The doses were 80 mg/day for 15-20 kg patients, 160 mg/day for 21-40 kg patients, 240 mg/day for 41-60 kg patients, and 320 mg/day for 61-70 kg patients. The placebo capsules were similar in odor and appearance to the Siliphos capsules. The purity, quality, and stability of the Siliphos and placebo capsules were assessed by the North Carolina laboratory of Nick Oberlies, PhD, one of the co-authors of this trial.

\*Editor's note: Siliphos is not typical of many milk thistle seed extracts in the marketplace; it is limited to silibinin and phosphatidylcholine, whereas most milk thistle extracts are standardized to 70-80% silymarin, the term for the 7 flavanolignans: silybin A, silybin B, isosilybin A, isosilybin B, silychristin, isosilychristin, and silydianin; there is also 1 flavonoid, taxifolin. Hence, to help prevent confusion regarding the composition of Siliphos and to distinguish it from traditional "milk thistle extract," the editors have chosen to refer to the proprietary product's trade name throughout this review.

†Thorne Research markets Siliphos through licensed health professionals only.

Dr. Oberlies has been studying the chemistry of milk thistle for over 5 years and has found “a slight but consistent” overfill of the Siliphos capsules, resulting in 281.6 mg capsules with 97 mg silibinin. Each capsule provided 42.4 mg silybin A and 54.6 mg silybin B. The stability of the material was consistent over the 21-month course of study.

The *in vitro* results revealed that Siliphos does not reduce the cytotoxicity of the chemotherapeutic drugs vincristine or L-asparaginase. The results also showed “a degree of antileukemic synergy between vincristine and silibinin,” based on fixed concentration-ratio experiments and cell-survival data. Between May 2002 and August 2005, 50 patients were recruited for the study, and 1 patient withdrew due to refusal to take the Siliphos. At baseline and at day 28, there were no significant differences in ALT, AST, or TB between the groups. (While the abstract states that on day 56, AST was significantly lower in the Siliphos group compared to the placebo group [P=0.05], the text states that the P value was 0.04.) The authors did not observe significant differences between the groups in the changes in ALT and AST levels from baseline to day 28. There was a trend toward greater reduction of ALT (P=0.07). The researchers did not observe significant inter-group differences in TB levels. By day 28, they observed a reduction in TB greater than 50% in 5 patients in the Siliphos group and none in the placebo group (P<0.007).

There were no significant differences in the toxicities, rates of infection, chemotherapy doses, reductions of doses, or delays in treatment between the groups. Patients in the Siliphos group reported diarrhea, flatulence, irritability, and stomachache, while the placebo group reported decreased appetite, diarrhea, stomachache, and soft stools. All patient-reported adverse side effects were mild and pre-existing complaints. Compliance was only 68% in the Siliphos group (nonadherence) and 96% in the placebo group.

The authors conclude that Siliphos “may be a safe, effective, supportive-care agent.” The results show that Siliphos reduces AST levels in children receiving chemotherapy for ALL and does not antagonize the actions of vincristine and L-asparaginase. The authors state that the study was not sufficiently powered to detect significant treatment effects at day 28. In addition, the lower level of compliance in the Siliphos group may have obscured treatment effects. Further research is needed to confirm these results and to determine the appropriate dose and duration of treatment. The authors suggest future clinical trials on Siliphos in cancer patients for whom “hepatic toxicity prevents provision of the recommended chemotherapy.” HG

—Marissa Oppel-Sutter, MS

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## Andrographis Extract Shown to Provide Relief for Common Cold Symptoms

Reviewed: Saxena RC, Singh R, Kumar P, et al. A randomized double blind placebo controlled clinical evaluation of extract of *Andrographis paniculata* (KalmCold™) in patients with uncomplicated upper respiratory tract infection. *Phytomed.* 2010;10:178-185.

Andrographis (*Andrographis paniculata*, Acanthaceae) is an annual herb native to India and Sri Lanka. It is used to treat the common cold, a viral infection of the upper respiratory tract. The andrographis component andrographolide has anti-inflammatory and immunostimulant mechanisms of actions. The purpose of this study was to evaluate the efficacy of an extract from the leaves of andrographis called KalmCold™ (M/s Natural Remedies Pvt. Ltd.; Bangalore, India).

Patients (18-60 years old) suffering from 2 or more symptoms of the common cold (cough, expectoration, running nose, headache, fever, sore throat, earache, malaise/fatigue, and sleep disturbance) and who had been sick for fewer than 3 days participated in this randomized, double-blind, placebo-controlled study. Those suffering from anything other than the common cold or using medicines that might impact its symptoms were excluded. Participants were recruited from 4 centers in India between May and November 2007. Patients of both genders were randomly assigned to receive placebo (n = 111) or 200 mg/day of KalmCold (n = 112) for 5 days, taking a capsule after breakfast and dinner. KalmCold contains 31.30% w/w andrographolide per 100 mg capsule. Patients rated

each of the 9 symptoms on a visual analogue scale on days 1, 3, and 5 of treatment.

Three patients in the placebo group were lost to follow-up and excluded from analysis. No KalmCold-treated patients discontinued from the study. However, the compliance of the participants actually taking either placebo or the test medication is not presented. At baseline, both treatment groups had similar symptom severity scores. In both treatment groups, the mean symptom scores decreased significantly from day 1 to day 3 ( $P < 0.05$ ), and there was no significant difference between the 2 groups. However, in the placebo group, from day 3 to day 5, no symptoms except expectoration improved significantly. In contrast, in the KalmCold group, from day 3 to day 5, all symptoms improved significantly ( $P < 0.05$ ), except earache. At day 5, 14 of 108 placebo-treated patients reported that their symptoms were aggravated. This is significantly more than the single KalmCold-treated patient who reported an aggravation of symptoms at day 5 ( $P < 0.05$ ). A total of 17 placebo-treated patients and 2 KalmCold-treated patients had either an increase of overall symptom scores or showed no response to treatment ( $P < 0.05$ ).

Six KalmCold-treated patients had minor adverse events (AEs): vomiting (n=1), epistaxis (nosebleed, n=1), urticaria (itchy rash, n=1), and diarrhea (n=3). Two of the 3 patients with diarrhea also had nausea or lethargy. Three placebo-treated patients had AEs: diarrhea (n=1), vomiting (n=1), and moderate rigor (stiffness, n=1). There was no significant difference between groups in the number of AEs. Except for vomiting and urticaria in the KalmCold-treated patients, all other AEs spontaneously resolved without treatment.

The authors conclude that KalmCold was 52.7% more effective (based on the effect size) than placebo at treating the common cold. The findings are in agreement with other clinical studies of andrographis, most of them based on a proprietary andrographis extract combined with extract of the root of eleuthero (*Eleutherococcus senticosus*, Araliaceae) (Kan Jang®, manufactured by Swedish Herbal Institute, Goteborg, Sweden).

One parameter that was not included in this trial that would have been a constructive addition is “patient satisfaction.” Patient satisfaction questions—such as “Would you use this treatment again?”—are commonly used in clinical trials of pharmaceuticals. It is an additional indicator of whether the patient believes that the treatment provided a benefit. Aside from this point, the study was well-designed and executed. HG

—Heather S. Oliff, PhD

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## Green Tea Review Suggests Ability to Control Obesity and Diabetes among Many Other Health Benefits

Reviewed: Chacko SM, Thambi PT, Kuttan R, Nishigaki I. Beneficial effects of green tea: a literature review. *Chinese Medicine*. 2010;5:13-21.

Tea (*Camellia sinensis*, Theaceae), which is usually consumed as green (unfermented), black (fully fermented), or Oolong (partially fermented) tea, is associated with many health benefits. The most significant beneficial effects have been reported with the consumption of green tea.<sup>1</sup> Among those health benefits are the risk reduction and prevention of several types of cancer and prevention of cardiovascular diseases, as well as anti-inflammatory, antiarthritic, antibacterial, antiangiogenic, antioxidative, antiviral, neuroprotective, and cholesterol-lowering effects. The authors of this article researched the available literature to highlight the efficacy, mechanisms of action, and adverse side effects of green tea and its constituent catechins.

Green tea is composed of proteins (15-20% dry weight), amino acids (1-4% dry weight), carbohydrates (5-7% dry weight), minerals and trace elements (5% dry weight), and trace amounts of lipids, sterols, vitamins, xanthic bases, pigments, and volatile compounds. The health benefits of green tea are attributed primarily to its polyphenol content. Most of the polyphenols are flavonols, commonly known as catechins (epicatechin, epigallocatechin, epicatechin-3-gallate, and (-)-epigallocatechin-3-gallate [EGCG]).

For this review, the authors searched PubMed, EMBASE, AMED, and China Academic Journals Full Text Database. They included articles about green tea's health benefits in humans and animals, absorption of metal ions and drug-metabolizing enzymes, antioxidation and inhibition of oxidative stress, carbohydrate metabolism and diabetes mellitus, and adverse effects. The authors selected 105 peer-reviewed articles in English for this review.

Cited in this review are animal studies reporting that green tea catechins provide some protection against degenerative diseases, that green tea has an antiproliferative activity on hepatoma cells and hyperlipidemic activity in hepatoma-treated rats, that green tea catechins could act as antitumorigenic agents and as immune modulators in immunodysfunction caused by transplanted tumors or by carcinogen treatment, and that green tea is effective in preventing oxidative stress and neurological problems.

Green tea has been linked to the prevention of certain types of cancer. The antioxidant, antimutagenic, and anticarcinogenic effects of green tea could offer protection against cancer caused by environmental agents. Green tea's anticarcinogenic effects against breast cancer have been reported in experimental studies; however, according to the authors, epidemiologic evidence is inconsistent. Several epidemiological studies and clinical trials have shown that green tea may reduce the risk of chronic diseases, particularly hypertension and coronary heart disease. Other cited animal and human studies report an inhibitory effect of green tea on *Helicobacter pylori* infection and on the influenza virus, as well as an antifungal activity against *Candida albicans*.

Green tea consumption has also been associated with increased bone mineral density and protection against hip fractures.

The authors report that tea catechins can affect iron absorption, particularly in those at risk for iron deficiency. Noting that the catechins' effects on other ions are not well understood, the

authors suggest that they may affect absorption and metabolism of ions because flavonoids interact with various metal ions.

Green tea catechins, along with the antioxidant vitamins C and E and certain enzymes (e.g., superoxide dismutase and catalase), are hypothesized to contribute to the total antioxidant defense system. *In vivo* studies have reported that green tea catechins increase total plasma antioxidant activity. The content of the oxidative stress marker malondialdehyde has been shown to decrease after green tea intake. One cited study of 25 patients with different gastrointestinal complaints measured the tolerance of green tea tablets and their effect on antioxidant status indices; a decreased level of oxidative stress was seen in the treatment group.

Tea catechins, especially EGCG, appear to have antiobesity and antidiabetic effects. Recent data from human studies indicate that the consumption of green tea or green tea extracts may help reduce body weight, mainly body fat, by increasing postprandial thermogenesis and fat oxidation. One cited study of 6 overweight men given 300 mg EGCG daily for 2 days suggests that EGCG alone has the potential to increase fat oxidation in men and may thereby contribute to the antiobesity effects of green tea.

Cited studies in animal models of diabetes reported reductions in serum glucose levels with the administration of green tea polyphenols. In normal rats, green tea catechins reduced plasma triglyceride levels in an oral glucose-tolerance test. Green tea and green tea extracts have been demonstrated to modify glucose metabolism beneficially in experimental models of type 2 diabetes mellitus. A human study reported that green tea promoted glucose metabolism in healthy human volunteers as shown in oral glucose-tolerance tests.

The authors point out that the effects of green tea and its constituents may be beneficial up to a certain dose and may cause some as yet unrecognized adverse effects at higher doses (this is the authors' conjecture; potentially adverse higher dose levels were not specified). Also, the effects of green tea catechins may vary from person to person. The harmful effects of too much tea are mainly due to its caffeine content, the possible presence of aluminum in some teas (which is problematic for patients with renal failure), and the effects of tea polyphenols on iron bioavailability.

The authors conclude that long-term consumption of tea catechins could be beneficial to high-fat diet-induced obesity and type 2 diabetes and could reduce the risk for coronary disease. Further research should focus on the pharmacological and clinical effects of green tea and its mechanisms of action. HG

—Shari Henson

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## Pelargonium Root Extract Tablet Tested for Safe and Effective Treatment of Acute Bronchitis

Reviewed: Matthys H, Lizogub VG, Malek FA, Kieser M. Efficacy and tolerability of EPs 7630 tablets in patients with acute bronchitis: a randomised, double-blind, placebo-controlled dose-finding study with a herbal drug preparation from *Pelargonium sidoides*. *Curr Med Res Opin*. April 15, 2010; [Epub ahead of print]. doi:10.1185/03007991003798463.

Up to 95% of acute bronchitis cases may be viral, yet antibiotics continue to be frequently prescribed. Clinical trials have demonstrated that the hydroalcoholic extract from the roots of *Pelargonium sidoides* (Geraniaceae) EPs 7630, which is the active ingredient in Umckaloabo® (ISO Arzneimittel, Ettlingen, Germany; imported into the United States as Umcka® by Nature's Way, Springville, UT) is effective in treating acute bronchitis in adults, infants, and children.<sup>1,2</sup> *In vitro* studies have demonstrated moderate direct antibacterial activity, enhanced phagocytosis, improved ciliary beating, and immunomodulatory effects for the extract. Prior clinical trials have used liquid EPs 7630 formulations. The purpose of this prospective, double-blind, placebo-controlled dose-finding clinical trial "was to investigate the efficacy and tolerability of EPs 7630 administered as tablets in the treatment of adults suffering from acute bronchitis."

This clinical trial was conducted at 16 study centers in the Ukraine between February and April 2006. EPs 7630 extract consisted of a dried 11% w/w ethanolic root extract (1:8-10). The patients were randomized using a computer-generated randomization list to a placebo group or 1 of 3 treatment groups: 30, 60, or 90 mg EPs 7630/day. Following a screening visit, the patients took

their assigned treatment 30 minutes before meals 3 times daily for 8 days.

The primary efficacy measure was the change in the total bronchitis-specific symptoms (BSS) score from day 0 to day 7 as rated by an investigator. The BSS total score consists of 5 bronchitis symptoms rated on a scale of 0 (not present) to 4 (very severe): coughing, sputum, pulmonary rales at auscultation (an abnormal bubbling sound in the chest caused by mucous build-up, heard with a stethoscope), chest pain while coughing, and dyspnea (shortness of breath). Patients and investigators completed the Integrative Medicine Outcome Scale (IMOS), which rates the treatment outcome on a scale from 1 (complete recovery) to 5 (deterioration). The SF-12 Health Survey and EQ-5D were used to assess health-related quality of life. The Integrative Medicine Patient Satisfaction Scale (IMPSS) was used to assess the patients' satisfaction with treatment from 1 (very satisfied) to 5 (very dissatisfied). The researchers assessed further parameters, including laboratory safety parameters, adverse events, acetaminophen use, inability to work, and change of general symptoms. The patients were over 18 years of age and had been suffering from acute bronchitis starting 48 hours or less prior to inclusion into the study. They were

Pelargonium *Pelargonium sidoides* Photo ©2010 Steven Foster



allowed to take no more than 1,500 mg acetaminophen per day.

Out of 406 patients who were randomized, 405 were included in the full analysis set. The per protocol set included 404 patients because 1 patient in the 30 mg EPs 7630 group took a forbidden concomitant medication. The full analysis set included 102 patients in the placebo group, 102 patients in the 30 mg EPs 7630 group, 101 patients in the 60 mg EPs 7630 group, and 100 patients in the 90 mg EPs 7630 group. There was 1 withdrawal in the placebo group (lack of efficacy), 2 withdrawals in the 30 mg group (other reason, forbidden concomitant medication), and 1 withdrawal in the 90 mg group (adverse event).

The total BSS score decreased from day 0 to day 7 by  $2.7 \pm 2.3$  (mean  $\pm$  standard deviation) in the placebo group,  $4.3 \pm 1.9$  in the 30 mg group,  $6.1 \pm 2.1$  mg in the 60 mg group, and  $6.3 \pm 2.0$  in the 90 mg group ( $P < 0.0001$  placebo vs. 30 mg, 60 mg, and 90 mg EPs 7630 groups). The total BSS score was also significantly lower in the 30, 60, and 90 mg EPs 7630 groups compared to the placebo group at days 3-5 ( $P < 0.0001$  for all active treatment groups compared to placebo), and the difference increased in a dose-dependent manner through day 7. The authors write that the decrease in the total BSS score was significantly greater in the 60 mg group compared to the 30 mg group ( $P$  value not given). At day 7, the total BSS score was below 3 points for 5.9% of the placebo group patients and for 24.5% of the 30 mg group, 57.4% of the 60 mg group, and 55.0% of the 90 mg group ( $P = 0.0002$  placebo vs. 30 mg,  $P < 0.0001$  for placebo vs. 60 and 90 mg groups). The total BSS score decreased by at least 7 points from day 0 to day 7 for 6.9% of the placebo group patients and 14.7%, 43.6%, and 46.0% of the patients in the 30, 60, and 90 mg EPs 7630 groups, respectively ( $P < 0.0001$  for placebo vs. 60 and 90 mg EPs 7630 groups). The reduction in the intensity of the individual BSS symptoms increased with increasing EPs 7630 dose ( $P < 0.0001$  for all). The reductions in coughing and pulmonary rales at auscultation from day 0 to day 7 were significantly greater in each of the EPs 7630 groups compared to the placebo group ( $P < 0.0001$  for all). The reductions in sputum, chest pain while coughing, and dyspnea were greater in the 60 and 90 mg groups compared to the placebo group ( $P < 0.0001$ ).

Patients in the EPs 7630 groups experienced dose-dependent decreases from day 0 to day 7 in hoarseness, headache, limb pain, and fatigue/exhaustion ( $P = 0.0006$ ,  $P = 0.0001$ ,  $P = 0.032$ , and  $P = 0.0001$ , respectively). Both the patients' and investigators' IMOS ratings were better in all 3 EPs 7630 groups compared to the placebo group ( $P < 0.0001$  for all). In the placebo group, 10.8%

of patients had completely recovered or had major improvement ratings, while 39.2%, 69.3%, and 77.0% of the 30, 60, and 90 mg EPs 7630 groups, respectively, had completely recovered or achieved major improvement ratings. The patients in all 3 EPs 7630 groups experienced earlier onsets of treatment effect compared to the placebo group ( $P < 0.0001$  for all). The median duration of inability to work was 8 days in the placebo group and 6 days in all 3 of the EPs 7630 groups ( $P < 0.0001$  for all). The EPs 7630 groups experienced shorter durations of activity limitation during the treatment period than the placebo group ( $P < 0.0001$  for all). The physical component score of the SF-12 improved to a greater degree in the EPs 7630 groups compared to the placebo group ( $P < 0.0001$  for all). The overall SF-12 score improved to a greater degree in all 3 EPs 7630 groups compared to the placebo group ( $P < 0.0001$  for all). The IMPSS scores showed that the EPs 7630 groups were more satisfied with the treatment than the placebo group patients ( $P < 0.0001$  for all). There were no significant changes in laboratory safety parameters. The majority of patients (97.8%) took their treatments as prescribed, with no significant differences in compliance rates between the groups. There were 92 mild-to-moderate adverse events in 18.5% of patients during the study, and most were gastrointestinal complaints. The incidence of gastrointestinal disorders was dose dependent, with 4.9% in the 30 mg group, 8.9% in the 60 mg group, and 14.9% in the 90 mg group. No serious adverse events occurred.

These results are in alignment with other clinical trials that have shown liquid EPs 7630 to be effective in treating acute bronchitis. The authors conclude that the "60 mg EPs 7630 daily constitutes the optimal dose with respect to the benefit-risk ratio of EPs 7630 tablets." Since "a useful alternative for the treatment of acute bronchitis outside the strict indication for antibiotic use is expedient," EPs 7630 could be considered as a safe and effective means of reducing unnecessary antibiotic use and/or public health system and sick leave costs. HG

—Marissa Oppel-Sutter, MS

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The Arenal Volcano. Photo ©2010 Steven Foster

PLANTS OF  
SEMILLAS  
SAGRADAS  
By Rafael Ocampo and Michael J. Balick, PhD



Chaya *Cnidoscolus chayamansa* Photo ©2010 Steven Foster

Editor's Note: In 1994, Paul Schulick, founder of the herb and dietary supplement company New Chapter (Brattleboro, VT), established Finca Luna Nueva, an organic farm, in the volcanic rainforest of northern Costa Rica. Its mission is the organic production of tropical plants for use in New Chapter's products. A decade later, through the enthusiasm and commitment of three other individuals, Rafael Ocampo, Steven Farrell, and Thomas Newmark, along with the hard work of many local people, Semillas Sagradas—the Sacred Seed Sanctuary—was established on the grounds of Finca Luna Nueva. This sanctuary is now a place where a collection of over 300 species of medicinal plants grows, is studied by researchers, and enjoyed by visitors. Semillas Sagradas, the first in a movement of many similar gardens to be established around the world, is devoted to preserving the diversity of local and regional medicinal plants, as well as the traditional wisdom and cultural knowledge of healing herbs.

A book celebrating the plants of Semillas Sagradas was published in 2009, co-authored by Rafael Ocampo and Michael J. Balick, PhD, and edited by Ruth Goldstein and Katherine Herrera. Ocampo is a botanist, author, and technical advisor on many medicinal plant projects in Central America, and Dr. Balick is a noted ethnobotanist, author, and vice president and director of the Institute of Economic Botany at The New York Botanical Garden, as well as a long-time member of the ABC Board of Trustees. Their book, freely available online, profiles 30 of the plant species currently growing in the Semillas Sagradas garden at Finca Luna Nueva.

The authors and publishers of *Plants of Semillas Sagradas: An Ethnomedicinal Garden in Costa Rica* have kindly given the

American Botanical Council permission to excerpt passages on a few of the medicinal plant species profiled in the book. Those excerpts are reprinted here with only minor stylistic editing.

The American Botanical Council thanks the book's authors and publishers for sharing this content with *HerbalGram* and its readers. Those interested in learning more about the plants of the extraordinary Semillas Sagradas garden are encouraged to access the full text of the book at <http://fincalunanuevalodge.com/sacred-seeds/semillas-sagradas.pdf>. Some may even consider viewing the gardens in person. Visitors can make arrangements to stay at Luna Nueva Lodge while exploring the garden and its environs (<http://fincalunanuevalodge.com/>).

# *CNIDOSCOLUS CHAYAMANSA*

**Synonym** - *Cnidocolus aconitifolius*

**Family** - Euphorbiaceae

**Common names** - chayamansa, chicasquil (Central America); chay (Maya Indians, Guatemala), chaya (Guatemala); chaya, chaya mansa (Mexico); tree spinach (English).

## Description

A succulent shrub growing up to 2 m high. Leaves are round with 5 lobes, more broad than long, with abundant latex. Flowers white, small, less than 10 mm long, blooming frequently, with male and female flowers found together at the end of long stems and having a faintly unpleasant scent. Fruit pods are rounded and approximately 2.5 cm in width.

## History and Traditional Use

This plant is an important food as well as a medicinal plant in the American tropics.<sup>1,2</sup> There are 2 species, *Cnidocolus chayamansa* and *C. aconitifolium*, which are both edible and very similar in appearance. The former can be eaten raw, while the second needs to be cooked due to the presence of glycosides that are inactivated on cooking.

*Cnidocolus aconitifolium* present in Costa Rica is popularly known as chicasquil, a name of Nahuatl origin that could be derived from *zicatl* (ant) and *quilitl* (young shoot), in reference to the irritating hairs on the young parts of small branches. The young leaves are eaten cooked and are highly nutritious.<sup>3</sup> The chayamansa (*C. chayamansa*) is a recent introduction that is more palatable and nutritious, having been brought from Mexico in the 1980s by Costa Rica's Ministry of Agriculture and Livestock. The chaya (*C. chayamansa*) is cultivated in the Yucatán and Peten in Guatemala.

In Costa Rica, greater genetic variety of the genus *Cnidocolus* is to be found in the Quitirrisí area of Puriscal and in Santa Cruz, Guanacaste. It is important to note that 5 types of chaya have been chronicled, 2 domesticated varieties and 3 wild ones. Of the first two, one has narrower leaves and is known by Mayan Indians in Mexico as *kekenshay* or *chaykeken*, and this seems to be the favorite not just because it has fewer thorns but also because it cooks better and is tastier. The wild varieties, known as *tzintzinchay*, have more thorns and longer leaves.<sup>4</sup> The protein content of this

plant exceeds that found in such common vegetables as spinach and alfalfa.

In Yucatán, Mexico, this species is used medicinally to treat a wide variety of conditions through the stabilization of blood pressure, to reduce weight, increase available calcium, improve blood circulation, aid digestion, reduce eye irritations and the inflammation of veins and hemorrhoids, treat constipation, help in the expulsion of urine and breast milk, and to lower levels of cholesterol and uric acid. It is also used to prevent coughing, and as a decongestant and to disinfect lungs, to prevent anemia, improve memory and brain function, relieve arthritis, treat diabetes, and cure infections of the teeth, gums, and the tongue as well as skin diseases. It helps in the growth and development of bones and muscles in children and increases energy levels of women during menstruation.<sup>5</sup>

## Pharmacology and Biological Activity

The raw leaf extracts in *Cnidocolus chayamansa* and the related species, *C. aconitifolius*, have been shown to have strong antioxidant activity due to the high concentrations of total phenolic content.<sup>6</sup>

## Toxicity

Wild varieties can be harmful if eaten raw, due to their spines and their sap.

## Conservation Status and Trade

There is no information available on the plant's conservation status. However, being commonly cultivated, it is assumed the species is not under threat. The plant has been promoted by national and international organizations as a dietary complement due to the high level of calcium in its leaves. It is sold on the international market in pickled form.

Chaya *Cnidocolus chayamansa* Photo ©2010 Steven Foster





# PSYCHOTRIA IPECACUANHA

**Synonym** - *Calicocca ipecacuanha*, *Cephaelis ipecacuanha*, *Evea ipecacuanha*, *Uragoga ipecacuanha*

**Family** - Rubiaceae

**Common names** - raicilla, ipecacuana (Costa Rica); raicilla (Nicaragua); raicilla (Panama); poaia, ipecacuanha preta, ipecacuanha anelada, raíz preta, poaia do mato, ipeca do rio, ipeca de mato grosso (Brazil); raicilla (Colombia); ipecac (English).

## Description

Small herbaceous plant 20–30 cm tall, with a thin, twisted, and slightly woody stem. Leaves opposite, oval-lanceolate. Flower small, white in a terminal inflorescence. Small oval fruit with blackish berries.

## History and Traditional Use

Costa Rica, Nicaragua, Panama, and Colombia pioneered rational exploitation of the medicinal plant *Psychotria ipecacuanha*. The extract of the root of ipecacuana is used as an amoebicide, an emetic, and as an expectorant. Its main components are isoquinolic alkaloids, of which emetine is the most important for the pharmaceutical industry.<sup>7</sup> In Europe, the use of ipecacuana as a plant-based drug dates back to 1762. In the 1940s it became one of the pharmaceutical industry's most important drugs in the United States and Europe.<sup>8,9</sup> Since pre-Columbian times, ipecacuana was one of many plants used by indigenous populations in the American humid tropics. When Spaniards learned of the virtues

of its root, it was taken back to Spain, from where its use spread throughout Europe. The plant from Brazil was first mentioned by Purchas, the well-known traveler, in 1625. According to Fischer, it was introduced into European medicine in 1686 when King Louis XIV of France bought the secret remedy from a charlatan called Hervetius, who successfully used the remedy to treat diarrhea and dysentery and discovered that the ipecacuana was the main ingredient.<sup>10</sup> It was not until 1817 that Pelletier and Magendie discovered emetine, the main alkaloid.<sup>7</sup>

Ipecacuana has been and continues to be an irreplaceable drug. It is also to be noted that the synthetic drug does not have the same medicinal properties as that extracted directly from the plant, especially when this plant-based drug is derived from plantations.<sup>11</sup> García-Barriga refers to its cultivation as a result of depletion of wild populations.<sup>12</sup> Morton reports on its origins in tropical forests between Bolivia and Brazil and notes its cultivation in Nicaragua, Costa Rica, and Panama.<sup>9</sup> It is currently cultivated in Nicaragua and Costa Rica.<sup>13</sup>

Ipecac *Psychotria ipecacuanha* Photo ©2010 Steven Foster



The rhizomes and roots of this species are used in syrup form as an expectorant in Costa Rica, in powdered form as a diaphoretic, and in higher doses, also in syrup form, as an emetic. Nuñez mentions its effectiveness in treating amoebic dysentery, alveolar pyorrhea, and other amoebal infections, as well as the slight effect cefaline, one of the plant's alkaloids, has as an antitussive and expectorant when taken as a syrup.<sup>14</sup> Gupta notes that in Brazil it is said to be effective against diarrhea, as an expectorant and an amoebicide, that it is also used in treating bronchitis and amoebic dysentery, and for its antitussive and sudorific properties.<sup>15</sup> In Colombia, the root of ipecacuana is used in small doses as a repulsive to stimulate intestinal movements and in higher doses to provoke vomiting.<sup>12</sup>

### Pharmacology and Biological Activity

Gupta indicates that the latex/sap is used to make a syrup to treat accidental poisoning in children, but that the fluid extract of ipecacuana should not be used to induce vomiting.<sup>15</sup> Emetine hydrochloride is the medicine of choice for hepatic amoebiasis,<sup>16</sup> and Trease and Evans report on the compound being extensively used in the treatment of amoebic diseases and alveolar pyorrhea.<sup>7</sup> Morton also reports on it having an expectorant effect and its use in various cough medicines.<sup>9</sup> Emetine is a protein synthesis inhibitor, and in doses over 1 g administered over a long period, it can cause myositis at the injection site, diarrhea, sickness, hypotension, dyspnea, palpitations, hematuria, circulatory collapse, and present neuromuscular symptoms.<sup>15</sup> According to Morton it can also cause itching and inflammation of the skin.<sup>9</sup> The aqueous extract of the root has shown strong anti-viral activity against type 2 herpes, A2 influenza, type 2 poliomyelitis, and vaccinia (small pox virus).<sup>15</sup> It is a plant that is widely used in homeopathy and by the pharmaceutical industry.

### Toxicity

Ipecacuana powder is a respiratory irritant, and repeated exposures can cause rhinitis (a type of sinus allergy) and asthma.<sup>15</sup>

### Conservation Status and Trade

Populations of this species in Colombia and Costa Rica had already disappeared by the 1970s and were replaced by cultivated plots.<sup>12</sup> Despite its economic and historic importance, there are no studies to shed light on its conservation status.<sup>13</sup> Costa Rica and Nicaragua are the only countries that have cultivated ipecacuana under forest cover since the 1950s. It was previously harvested from the wild, causing conflict with indigenous populations who also used the plant. The plant has now disappeared from the wild, and various attempts to substitute the naturally occurring medicinal components with synthetic preparations have been unsuccessful due to the quality of cultivated material. Both Costa Rica and Nicaragua are currently producers of raw material for the international market due to the quality of their rootstock. In 2006, the European industry was eagerly seeking new sources of the raw material from producer countries as supply had fallen as low prices paid in earlier years had discouraged farmers who grew this crop.



# QUASSIA AMARA

**Synonym** - *Quassia alatifolia*, *Quassia officinalis*

**Family** - Simaroubaceae

**Common names** - kini, quiniclu (Bribri Indians, Costa Rica), kinina (Cabecar Indians, Costa Rica), hombre grande, big man (Costa Rica); cuasia (Mexico); hombre grande, palo grande (Guatemala); cuasia, hombre grande, limoncillo, tru (Honduras); hombre grande, chile de río, chirrión de río (Nicaragua); guabito amargo, crucete, hombre grande (Panama); cuasia, bitter-ash (West Indies); cuasia amarga (Bolivia); pau quassia, quina, falsa quina, murubá, murupa (Brazil); cuasia, creceto morado, contra-cruceto (Colombia); quashiebitters, quassia-bitters (Guyana); amargo, cuasia, simaba (Peru); surinam quassia (English).

## Description

A shrub or treelet growing to 6 m, with a stem reaching 10 cm in diameter. Leaves pinnately compound, 5–11 cm long by 4–7 cm wide, obovate to oblong, dark green on upper surface, slightly pale on the underside. Flowers in thin panicles, red with pink base, petals 2.5–4.5 cm long. Fruits black, 1.5 cm oblong, each with one seed.

## History and Traditional Use

During the 18<sup>th</sup> century, a Surinamese man called Quassi acquired fame in treating fevers with a secret treatment using this plant, the medicinal reputation of which spread throughout Europe after Rolander took it to Sweden in 1756. Linnaeus later identified this plant as *Quassia amara*, in reference to Quassi and its bitter taste. Calulus M. Blom published its first description in 1763,<sup>17,18</sup> referring to it as *Lignum quassiae*, and it became highly popular as a febrifuge, a tonic, and to treat dysentery.

*Quassia amara* is a traditionally used medicinal plant, known for its bitter properties and its qualities as a tonic by indigenous populations in South America.<sup>19</sup> Pittier noted it as being “very scarce in dry forests in Costa Rica’s Pacific region and one of the main remedies used by Indian communities. They break the trunk into 30–60 cm pieces, one of which they take with them on their travels, and occasionally manage to sell in markets in the interior, being used for fevers, and an infusion of the grated pieces being taken as an aperitif.”<sup>20</sup>

Historically, the wood of *Quassia amara* has been confused with another bitter species, *Picrasma excelsa*, commonly referred to as Jamaican quassia, quássia-das-Antillas, quássia-nova, and lenhodesan martín, which is widely used as a medicinal plant in Jamaica and other Caribbean islands.<sup>7</sup> The most widely used common name for *Quassia amara* in Latin America is cuasia, followed by *hombre grande* (big man), the latter not in fact corresponding to any particular characteristic of the species. The internationally used common name is Surinam quassia. The vernacular names used by indigenous groups in Costa Rica—quiniclu, kini, and kinina—have a common denominator in that they all refer to the bitter taste of its tissue and to quinine (*Cinchona* spp.) that is also bitter.

According to Taylor, the common names of quassia amarga and quassia amer have been used to refer to *Simarouba amara* and *S. glauca*, of the family Simaroubaceae, which has amoebicidal properties.<sup>21</sup> In Argentina *Q. amara* has also been confused with other species of bitter wood, and specifically the family Simaroubaceae (*Picrasma crenata*) present in the humid subtropical region of Misiones. According to Oliveira, Akisue, and Akisue, the name Quássia-do-Brasil refers to the species *Picrasma crenata*, which has a variety of other common names, including quássia amarga, pau-tenente, pau-amarelo, and pau-quassia.<sup>22</sup> Two species exist in

Brazil: *Q. amara*, known as false quinine, which grows wild in the humid Amazonian region of Belén and Pará, and *Picrasma crenata*, also known as *Aeschryon crenata* and commonly known as Pau-amarelo, which grows wild in Mata Atlântica. Morton refers to the use of *Picramnia antidesma*, a small shrub common to forest undergrowth and known as *hombre grande* and *cascara amarga* in Central America, the Caribbean, and Mexico.<sup>9</sup>

Plants characterized by the presence of bitters in their tissues are important natural resources in traditional remedies but have given rise to considerable confusion when establishing their botanical identity. However, it is clear that although there is no confusion in the traditional use of *Q. amara* for medicinal purposes in the tropics, misunderstandings have arisen in literature due to confusing local names and the lack of access to botanical specimens.<sup>23</sup>

An infusion of the macerated wood is used as a bitter tonic in Costa Rica to stimulate the appetite and to treat diarrhea. It is considered to be effective in treating fever, and liver and kidney stones, as well as in treating weakness of the digestive system.<sup>24,25</sup> In Panama an infusion of the wood is used as a febrifuge, for the liver, and for snake bites,<sup>26</sup> and in Brazil it is used to combat dysentery, dyspepsia, intestinal gases, vesicular colic, malaria, and as a febrifuge.<sup>9,15</sup> In Peru an infusion of the bark is used as a febrifuge and to treat hepatitis, and it is also macerated in water or alcohol, used as a tonic;<sup>27</sup> and in Colombia as a bitter for dyspepsia, anorexia, and malaria.<sup>12</sup> In Honduras the boiled bark is used for stomachache, diabetes, urinary problems, diarrhea, and migraine, and to fortify the blood,<sup>28</sup> and in Nicaragua the root is used for snakebites. For this a 20 cm piece of root is crushed, water is added, and then the liquid strained and drunk; and for malaria, 2 ounces of the bark are cut, boiled in water, and drunk 3 times daily.<sup>29,30</sup> Barnes, Anderson, and Phillipson refer to its being used as a gastric stimulant and as having anthelmintic properties.<sup>31</sup> It has been traditionally used for anorexia, dyspepsia, and nematode infestations (taken orally or rectally). A dose between 0.3 and 0.6 g of dry wood in an infusion is recommended 3 times a day.

## Pharmacology and Biological Activity

The aqueous extract of *Quassia amara* wood, used to evaluate intestinal movement in mice (doses of 500 and 1,000 mg/kg), results in an increase in intestinal motility when compared with the control group, only in the case of the highest dose.<sup>32</sup> Another study shows that doses of both 500 mg/kg and 1,000 mg/kg result in increased intestinal movement.<sup>33</sup> The same authors find that the aqueous extract, independently of the dosage, shows important activity in protecting against gastric lesions caused by indomethacin, ethanol, and stress. Teixeira et al. refer to a personal communication with S.C. Oliveira, who carried out an *in vitro* study with aqueous solutions obtained from the lyophilized leaves of *Q. amara* that showed activity against types of erythrocytic *Plasmodium*





Surinam quassia *Quassia amara* Photo ©2010 Steven Foster



Surinam quassia *Quassia amara* Photo ©2010 Steven Foster

*falci-parum* in concentrations of 0.05mg/ml and 0.125 mg/ml.<sup>34</sup> Barnes, Anderson, and Phillipson refer to quassinoids present in *Q. amara* wood being 50 times more bitter than quinine.<sup>31</sup>

### Toxicity

Research on the acute toxicity of *Quassia amara* wood was carried out in Costa Rica on NGP-UCR albino mice. Two tests involved oral administration and intraperitoneal injection. The first test showed no mortality or evident signs of toxicity after 48 hours of observation. The results of the second test with a dose of 500 mg/kg showed signs of piloerection, a reduction in motor activity, and a partial loss of righting reflex. All test subjects recuperated 24 hours after the extract had been administered. Similar signs were apparent with the 1,000 mg/kg dose, but all animals died within 24 hours after being administered the raw aqueous extract.<sup>32</sup> Another bioassay carried out on the lethality of *Artemia salina* containing an ethanolic extract of the chloroformic (alkaloidal) fraction of *Q. amara* wood, shows a high level of toxicity.<sup>35</sup> Cáceres refers to a study carried out by Njar et al. on reproductive toxicity;<sup>36,37</sup> methanolic extract of the bark administered orally to rats at doses of 100, 1,000, and 2,000 mg/kg over 8 weeks significantly reduces testicle weight, epididymo, seminal vesicle and sperm count, and increases the size of the pituitary gland. No changes were noted in sperm motility or morphology. The levels of serum testosterone, luteinizing hormone (LH), and follicle stimulant hormone (FSH) were significantly reduced. The levels of testosterone do not vary within the groups that had been administered with the extract plus LH and quassin plus LH, compared with the control group. No relationship was shown between dose-

dependence and the administered doses. All the effects disappear 8 weeks after suspension of treatment. No lethal effects were found on Leydig cells *in vivo* and *in vitro*.<sup>37</sup> The chloroformic extract in doses of 12.5, 25, 50, and 100% were administered to rats once a day for 15 days. No behavioral or body weight changes were noted in the animals during treatment with any of the dilutions. Testicular weight and the epididymo were reduced through dose-dependent treatment. The sperm parameters of the epididymo presented evidence of toxicity related to the dose in that there was a significant decrease in sperm count, motility, and the viability and morphology of the sperm.<sup>38</sup>

### Conservation Status and Trade

Although there are no studies on the conservation status of wild populations in the region, Ribero et al. refer to its endangerment in Brazil.<sup>39</sup> The 20<sup>th</sup> century saw a marked reduction in wild populations as a result of trade, and in 1998 it was observed that raw material entering Germany from the Americas was no longer *Q. amara* wood. Its substitution with other bitter raw materials of the Simaroubaceae family is a clear indicator that the species is under threat and, according to Ocampo and Díaz, justifies the development of agroecological cultivation models in Costa Rica.<sup>25</sup>

The wood and bark of *Q. amara* are sold on local markets for medicinal use and as tinctures through herb stores in the tropics,<sup>40</sup> and the wood and dry bark have been commercialized in large volumes on the international market as chips for pest control.<sup>25</sup> For example, in 2006 a small trader from Germany requested 3 tons of the dried wood from Costa Rica.

# UNCARIA TOMENTOSA

**Synonym** - *Nauclea aculeata*, *Nauclea tomentosa*, *Ourouparia tomentosa*,  
*Uncaria surinamensis*, *Uncaria tomentosa* var. *dioica*

**Family** - Rubiaceae

**Common names** - rangallo, bejuco de agua (Costa Rica); uña de guara (Honduras); rangaya (Panama); unha de gato (Brazil); bejuco de agua, tua juncara, uña de gato (Colombia); uña de gato (Ecuador); samento and unganangui (Ashaninka Indians, Peru), pao tati mosha (Shipibo–Conibo Indians, Peru), uña de gato, uña de gavilán, garra gavilán, garabato amarillo, garabato colorado, (Peru); uña de gavilán (Venezuela); cat's claw (English).

## Description

Climbing vine reaching 30 m in the rainforest canopy, with a stem diameter up to 30 cm. Branches have strong, sharp woody thorns, curved downwards like cats' claws, reaching 2 cm in length and 0.4–0.6 cm wide. Leaves ovate or elliptical, 9–17 cm long by 4.3–9.0 cm wide. Terminal or axillary inflorescence reaching 9 cm length. Flowers sessile, yellowish in color.

## History and Traditional Use

According to Barnes et al., the root, bark of the root and stem, and the leaves of *Uncaria tomentosa* are employed for traditional medicine.<sup>31</sup> In Peru the plant is used to treat inflammation in organs and/or organ systems such as arthritis, dermal inflammations, genitourinary tracts, asthma, gastric ulcers, and diabetes.<sup>41</sup> Gupta refers to its use in treating malignant tumors, rheumatism, arthritis, diabetes, and cirrhosis.<sup>15</sup> Two spoonfuls of the plant are boiled in 1.5 l of water for 30 minutes; the liquid is strained and cooled, and half a glass is drunk 3 times a day before meals.

The Shipibo-Conibo indigenous population in Yarinacocha, of the Ucayali department in Peru, refer to *Uncaria tomentosa* as *pao tati mosha*, *paoti* meaning curved, and *mosha* meaning thorn. Reference is made to a variety of uses such as venereal diseases, gastric and intestinal ulcers, kidney problems, and snakebites for which the juice of the fresh vine or the liquid from boiled bark is drunk. In the case of snakebites, the fresh bark is also grated and applied as a poultice. The abundant, slightly bitter juice (water) of the vine can be drunk to quench the thirst, which also has medicinal properties.<sup>42</sup>

According to Schultes and Raffauf, in Guayana the juice from the boiled bark is used in the treatment of dysentery,<sup>43</sup> and EMBRAPA reports the bark being commonly used in Brazil against diarrhea, cystitis, gastritis, diabetes, and viruses.<sup>44</sup>

## Pharmacology and Biological Activity

Among the isolated compounds, pentacyclic oxindolic alkaloids were shown to have immuno-stimulatory and

inhibitory effects on the growth of leukemia cells,<sup>45</sup> and according to Wagner, Kreutzkamp, and Jurcic, the isolated alkaloids cause a considerable increase in phagocytosis.<sup>46</sup> The aqueous or ethanolic extracts also show cytostatic action, as well as having contraceptive and anti-inflammatory capacities.<sup>47</sup> The anti-inflammatory activity in free extracts of the tannins<sup>48</sup> and the anti-viral activity<sup>49</sup> have confirmed these results. This plant decreases inflammation in osteoporosis, and the mechanism appears to involve the ability of the plant extract to inhibit the protein called tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), as well as acting as an antioxidant.<sup>50</sup>

## Toxicity

There is no reported cytotoxic effect on bacterial cells in the following concentrations: 10, 20, 30, 40, 50, 75, and 100 mg/ml.<sup>45</sup>

## Conservation Status and Trade

The boom for cat's claw on national and international markets has given rise to massive harvesting from wild populations with devastating effects, especially in Peru. Although conservation strategies have resulted, no studies exist to determine its conservation status.

Information is available on trade in Colombia, but no reference is made to volumes and prices.<sup>51</sup> In Brazil, Silva et al. refer to internal trade and export, but make no reference to volumes or prices.<sup>52</sup>

Peruvian statistics on production and trade collected by the National Institute for Natural Resources (INRENA) indicate that cat's claw started acquiring commercial value on national and international markets in 1992 when various marketing channels emerged. In 1995, INRENA issued 400 permits for the commercialization of the plant, and it was in that same year that the volume traded reached 726,684 kg—of which 89% was bark—exported to 24 countries and resulted in a sudden increase in the extraction. However, this was followed by a slump in international demand, due to market saturation and excessive reserves at the main collection points.<sup>53</sup> HG



Cat's Claw *Uncaria tomentosa* Photo ©2010 Steven Foster

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Rows of Hops (*Humulus lupulus*) at a farm in the Czech Republic.  
Photo ©2010 Petr Švec

# HOPS



*Humulus lupulus*

**A Review of its Historic and Medicinal Uses**

By Uwe Koetter, PhD, and Martin Biendl, PhD

## Introduction

The value of hops in the beer-making process has been undisputed for centuries; the plant's medicinal uses, on the other hand, are less widely known and have many facets. A brief overview of hops and its uses outside beer production are provided below.

## Botany

Hop or hops (*Humulus lupulus*) is a climbing vine belonging to the genus *Humulus* in the family Cannabaceae, order Urticales. Older taxonomists included the genera *Humulus* in the mulberry family (Moraceae).

The genus name *Humulus* has its origin in the Slavic term for hops, *chmele*, which was later Latinized. The species name *lupulus* is a diminutive derived from *lupus*, the Latin word for wolf, based on the plant's habit of climbing on other plants as a wolf does a sheep.<sup>1</sup> Its common name is derived from the Anglo-Saxon *hoppan* (to climb).<sup>2</sup>

Hops is a dioecious perennial plant native to the Northern Hemisphere. It grows vigorously from the end of April to the beginning of July in the temperate climate zone. It is found in shrubbery and at the edge of forests with access to sufficient water, and it reaches a height of up to 7–8 m (23–26 feet). Thus, under good conditions, the growth rate

per day of the aerial parts can reach 30 cm (1 foot). The total area covered by the leaves can reach 20 square meters (215 square feet), and the total length of the roots can reach 100 m (328 feet) in one growing season.

When the plant reaches a certain height, it starts to blossom. A second trigger for the advent of blossoming is the length of the day. Too far south the days are too short for hops to blossom; too far north the climate is adverse. Hence, hops grows only at certain latitudes (38° to 51° latitude). This explains why hops cultivation in North America is primarily done in areas like Oregon and Washington. Although Northern California has a history of hops cultivation (e.g., Hopland, CA), today the 3 important regions are Idaho with 10%, Oregon with 15%, and Washington with 75% of the annual harvest. The National Hop Report, released in December 2009, found that production in those regions increased from 60 million pounds in 2007 to 95 million pounds in 2009.<sup>3</sup>

In Europe, hops is cultivated in Germany, Great Britain, Poland, and the Czech Republic. In Asia, cultivation takes place in certain areas of China and to a limited extent in Japan. For the Southern Hemisphere, cultivation of hops occurs in Australia from 37° to 43° and in New Zealand from 41° to 42° latitude.

Only the female hop flowers are cultivated in order to

Hops *Humulus lupulus*. Photo ©2010 Steven Foster



**Table 1: Hop Products Used Worldwide**

Hop Products	Percentage
Hop strobiles (raw, dried)	5%
Hop pellets (cut, milled, and homogenized)	60%
Hop extracts (produced with ethanol or supercritical carbon dioxide)	25%
Modified hop products	10%

Adapted from Biendl and Pinzl (2008)<sup>8</sup>

prevent the ripening of fruits (nuts), which are heavy and of no commercial value. In breeding programs, male plants are essential.

Many female flowers form an inflorescence, called strobiles, which consist of membranous stipules and bracts that are attached to a zigzag, hairy axis. Each small branch of the axis bears a bract, represented only by its pair of stipules, which subtends either 4 or 6 bracts, each enclosing a flower or fruit. The stipules and bracts resemble one another closely but are actually numerous shining glands. When separated, these constitute the drug lupulin.<sup>4</sup> The bracts and stipules of the hop contain polyphenols; the odor and taste of the drug is due mainly to the very complex secretion contained in the lupulin glands.

The ideal time for harvesting is August to September in the Northern Hemisphere, while it is February south of the equator. The entire aerial part of the plant is cut and transported to a processing unit, which separates the inflorescences from the rest of the aerial parts. The roots and rhizome remain in the ground, where they will begin another vigorous growing season the next year. The rootstock itself can reach an age of 50 years.

After harvesting, the inflorescences are dried immediately to a water content of about 10% for stability reasons. Also, depending on the environmental conditions, hops is kept under constant refrigeration during some or all steps from harvest to final product. The bitter principles are known to break down rapidly during storage and, unless refrigerated, their concentration decreases by 50 to 70% in only 6 months.<sup>5</sup> One study has shown that after 9 months of storage, hops retained only around 15% of its original activity.<sup>6</sup> The alpha and beta acids are sensitive to oxygen. The alpha acids undergo the most intense degradation right after harvest, leveling off during storage. An increase of 10°C doubles the loss, but other factors like the hops variety and even the environmental conditions during the growing season have an effect on alpha acid levels and its decrease during storage.<sup>7</sup>

Besides the limited stability of the dried inflorescences, they are non-homogeneous and have a low bulk density. Consequently, today only 5% of the total annual harvest is used without further processing (raw). About 60% of the inflorescences are converted into pellets. The hop flowers are cut, milled, homogenized, and pressed into granules. The granules are stored and shipped in a method that protects them from air and light, increasing their stability significantly. Such granulation also increases the density of the hops by a factor of up to 10 times,



improving costs of transport.

Twenty-five percent of the harvested hop strobiles are extracted with ethanol or supercritical carbon dioxide to obtain as many alpha-acids as possible. Since ethanol and carbon dioxide are naturally occurring during the brewing process, the use of these solvents is of no concern.

When brewing is not done according to the German purity law for beer, the addition of modified hops is possible at the end of the process. During the beer brewing process, compounds of hops undergo isomerization. The substances have been identified, and it is known that these isomers can be formed by catalytic modification outside of the brewery. About 10% of the annual hops strobile harvest is used for this purpose today. (See Table 1.<sup>8</sup>)

From the immense biomass production, the inflorescences (strobiles) are the only part of the hops plant that is used. Except for some use of young shoots, eaten in salads, there is no human use for the stems, leaves, rhizomes, and roots. The above-ground (aerial) parts are composted and used for fertilization of the fields. As stated previously, the under-ground parts (roots, rhizomes) remain in the ground.

### Historic Uses

Unlike other well-established medicinal plants like valerian (*Valeriana officinalis*, Valerianaceae), hops does not have a 2,000-plus-year history of traditional medicinal use within European herbal medicine. The historic use of hops is interesting as its technical properties—as flavor and for the preservation of beer—were discovered in the mid ages, but reports of its medicinal use from that time were not very encouraging. Hildegard von Bingen, the noted German abbess, herbalist, and author (1098–1179), wrote in *Physica*, a text on observations of nature and creatures and their virtues, that hops has little use for humans, noting that it “increases melancholy in men.” However, she notes that “its bitterness fends off decomposition of beverages and increases shelf life.”<sup>9</sup>

With these antimicrobial properties and its ideal flavor, in the region of Germany from the 11<sup>th</sup> century on, hops replaced all other substances that were formerly used to attempt to improve the taste and increase the storage time of beer.<sup>10</sup> The *Reinheitsgebot* (the German beer purity law) was formulated in 1516, which stated that beer could be made only of malt, hops, and water. (Yeast, an obviously essential ingredient to create the fermentation process, was not known at that time, nor the chemical processes that take place during the brewing process.)

This undisputed benefit of hops in brewing probably resulted in more widespread recognition and distribution, which in turn may have increased the attention on hops for additional (e.g., medicinal) uses. According to Wiesner (1883), so-called herb-beers were produced in the years 1300–1500, with various herbs added for medicinal purposes.<sup>11</sup> Basically, beer was the base, which delivered the medicinal properties of the added plants.

Paracelsus (1493–1541) used hops as a digestive aid, and Matthioli (1501–





Hops *Humulus lupulus*. Photo ©2010 Steven Foster

1577) mentioned its diuretic and bile-increasing effects. These authors did not specify plant parts used. Bock (1498–1554) and Lonicerus (1528–1586) praised the use of the young hops shoots for cleaning the blood, liver, and spleen.<sup>1,11</sup>

The use of hops flowers was described by Hecker in 1814, who mentioned its strong tonic features as a bitter (Amarum) and noted its calming properties (without having the effects of a strong sleep aid). Clarus (1864) used the female flowers to treat anorexia due to gastritis and sleeplessness. Other authors of that time, including Osiander (1824), Stephenson and Churchill (1834), and Maton (1860), reported on the sleep-promoting properties of the female inflorescences.<sup>1</sup>

One of the most prominent patients treated with hops was George III, King of the United Kingdom (1738–1820), who was supposedly bedded on pillows filled with hops to calm him.<sup>11</sup> The physician Kahnt (1905), in his book on phytotherapy, recommended the use of hop pillows,\* teas, or extracts for sleeping problems associated with nervous disturbances.<sup>12</sup> It was believed that hops acted through its strong and heavy odor, causing somnolence.<sup>13</sup>

The supplement to the *Edinburgh New Dispensary* (1829) states the observation that inhabitants from London were less subject to bladder stones since they had been accustomed to adding hops to their beer.<sup>14</sup>

Other historic uses of hops include the preparation of remedies against hair loss. Washing the head with beer was believed to increase hair growth.<sup>11</sup> According to a personal note from Stieber to Madaus (1938), an infusion prepared from hops is an ideal hair care product.<sup>1</sup> Braungart (1906) cites Strufs, who recommended washing the hair daily with a freshly-prepared hops tea to prevent hair loss, as well as Herzfeld, according to whom hops oil was said to restore even to the bald the beauty of full hair. Unfortunately, the authors do not provide details about the formulation used.<sup>11</sup>

For an overall rejuvenating effect, people formerly bathed in



cold brewery-sludge, which contained about 30% hops extracts. According to legend, King Wenceslas IV in 1406 permitted the incorporation of the hops cone into the coat of arms of the brewers in recognition of the rejuvenating effects of the cold brewery sludge bath.<sup>15</sup> Outside of Europe, other cultures have also

demonstrated traditional medicinal uses for hops. For instance, in the Arabic world, Mesue the Younger (d. 1015) wrote that hops helps in the purification of blood, aids in reducing fever and purging yellow bile, and that it has proposed anti-inflammatory properties.<sup>8,11,16</sup> Avicenna (980–1037) discussed hops as one of many herbs in his book *al-Qanun fi'l-tibb*.<sup>17</sup> Ibn-Al Baitar (1188–1248), an Arab scientist, botanist, pharmacist, and physician, described digestive and calming properties of hops.<sup>16</sup>

In North American traditional medicines, the Cherokee used hops as a sedative, anti-rheumatic, analgesic, gynecological aid for breast and womb problems, and kidney and urinary aid for “gravel” and inflamed kidneys.<sup>18</sup> The Delaware used hops against earache and toothache. The Navajo used it for coughs and cold, and the Dakota for wound healing and against gastrointestinal disturbances.<sup>19</sup> For relaxation and as a sleep aid, it was used by the Delaware and the Fox.<sup>19</sup>

In Indian-Ayurvedic medicine, hops has been recommended for restlessness associated with nervous tension, headache, and indigestion;<sup>20</sup> its actions are reported as sedative, hypnotic, and antibacterial.<sup>21</sup>

According to an inventory of medicinal plants used in different countries, commissioned by the World Health Organization (WHO) in 1978, the use of hops was also established in Asia in China, Japan, and Korea, in addition to the before-mentioned India.<sup>22</sup>

A summary of the indications generally noted for hops since the beginning of the last century are listed in Table 2.<sup>23,24</sup>

## Hops for Sleeplessness

### *Lupulin*

One of the most widely known and studied medicinal properties of hops is its ability to induce sleep. Lupulin, the fine yellow resinous substance of the female flowers from hops, was first isolated by the French pharmacist Planche in 1813.<sup>25</sup> Reports on systematic chemical investigation of lupulin can be found in the United States as early as 1820. Ives, a physician, reported from his own experience that it frequently induced sleep and “quiets great nervous irritation.”<sup>26</sup> Planche praised its aromatic, tonic, and narcotic (sleep-promoting) virtues. In many cases, it provokes sleep and appeases excessive nervous

**Table 2: Traditional Medicinal Indications of Hops and Plant Parts Used**

Indications	Plant parts employed
Sedative, hypnotic effects	Hops, hops preparations and combinations with other plants, hops fragrance (sleep pillows), hops tea, lupulin
Mild pain-reducing effects	Lupulin
Amarum aromaticum-like effects	Lupulin, hops bitter acids, hops glands
Anti-diabetic effects	Hops, hops shoots
Beneficial effects on the urinary tract (cystitis, prostatitis, incontinence, diuretic effects)	Hops, hops shoots, syrup made from hops or hops shoots
Anaphrodisiac effects	Lupulin
Effects on skin conditions and against baldness	Hops herb, hops tea, hops juice

\*A 3-arm pilot study was conducted in 2001, investigating the effects of sleep pillows on sleep architecture in 30 patients. The pillows were of 3 sizes and filled with a proprietary combination of herbs, including hops, lemon balm leaves (*Melissa officinalis*, Lamiaceae), lavender (*Lavandula angustifolia*, Lamiaceae), orange flowers (*Citrus aurantium*, Rutaceae), and macela flowers (*Achyrocline satureioides*, Asteraceae). The larger pillows showed a trend towards improvement of sleep parameters using polysomnography. [Ref: Füssel A, Wolf A, Büter B, Schrader E, Brattström A. Effizienter Einsatz von Schlafkissen bei Personen mit nicht-organischen Schlafstörungen--eine Pilotuntersuchung. *Forsch Komplementarmed Klass Naturheilkd*. 2001;8(5):299-304.]



Hops *Humulus lupulus*. Photo ©2010 Steven Foster

irritation, but without causing constipation.<sup>14</sup> This was a great advantage compared to the effective treatment with opium (the dried latex of *Papaver somniferum*, Papaveraceae).

Fresh lupulin consists of various compounds, mainly bitter acids, volatile oils, and polyphenols. The aromatic odor of the hops strobiles is due to a volatile oil, present in a yield of about 0.3-1.0%. Active compounds thought to be responsible for its medicinal effects include 15-30% resins (such as humulon, lupulon, and its derivatives 2-methyl-3-butenol), tannins, and flavonoids, as well as essential oils (with its main constituents myrcene, alpha-humulene and beta-caryophyllene, and farnesene).<sup>24</sup>

Despite the early praise by Ives, little work was published on hops' value for sleep in subsequent years. Nevertheless, hops has been consistently employed in combination products with other sleep-promoting herbal preparations. In amounts of 0.3 g and up to 1 g several times a day, lupulin was used against incontinence, to reduce sexual desire (anaphrodisiac), and to treat excessive irritability or sensibility to stimulation of the sexual organs (erethismus genitalis), to treat sleeplessness, and to work against nervousness, migraine headache, and sluggish digestion.<sup>25</sup>

In a 1967 pilot study with capsules containing 250 mg of lupulin, however, none of the 15 volunteers indicated that the capsules had a sleep-promoting effect during 5 days of use, although dizziness was reported in the morning by some of the participants. The conclusion of the author was that the volatile oil present in the lupulin had probably caused the effect,

as anecdotal evidence suggests that it would have been the only compound that could have made hop pickers sleepy. In a second trial with bitter acids equivalent to 5 bottles of beer, again no special sleep-promoting effect was reported.<sup>27</sup>

#### *Possible Mechanisms of Action*

There have been numerous reports demonstrating that preparations of hops have sedative-like activity in frogs, pigeons, mice, goldfish, and golden carp. However, a full understanding of the biochemical mechanism and the conclusive identification of compounds responsible for such activity have not yet been achieved.<sup>28</sup>

Animal studies testing the possible tranquilizing effect of hops were published by Dreser (1887),<sup>29</sup> Staven-Gronberg (1927),<sup>30</sup> Steidle (1931),<sup>31</sup> Rusicki and Sikorski (1937),<sup>32</sup> Grumbach (1957),<sup>33</sup> and others. Bravo et al (1974) showed a significant decrease in spontaneous activity after intraperitoneal application.<sup>34</sup> During these early studies, no specific sedative principle was found.

However, in 1983, a volatile alcohol, 2-methyl-3-buten-2-ol (dimethylvinyl carbinol), was isolated from hops and is believed to account for at least part of the plant's sedative properties.<sup>35</sup>

Interestingly, the amount of this substance increases during storage.<sup>36</sup> It may be a degradation product of hop bitter acids, and it may be formed after ingestion as well.<sup>37</sup>

Nevertheless, researchers were very cautious about the clinical relevance of the results of their animal studies.<sup>38</sup>

Recent *in vitro* experiments on sedative activ-



ity indicated activity on the melatonin receptor. Melatonin, a hormone secreted by the pineal gland in humans, through binding to its receptor, is responsible for maintaining the diurnal circadian rhythm in vertebrates.<sup>39</sup>

Hops extracts had significant hypothermic effects *in vivo* in male mice analog melatonin.<sup>40</sup> This effect was antagonized with the competitive melatonin receptor antagonist luzindole. The data suggest that potential sleep-inducing effects of hops extract are possibly centrally mediated through activation of melatonin receptors.

Other *in vitro* and *in vivo* research points towards involvement of the GABA<sub>A</sub> receptor.<sup>41</sup> The fraction containing beta-acids of a lipophilic CO<sub>2</sub> hops extract was investigated in a benzodiazepine receptor-binding assay. Hops beta-acids affected the plateau of the GABA currents dose dependently without mediating this effect via the benzodiazepine receptor.

Another study examined the effects of beer, hop oils, and fragrance components on the GABA<sub>A</sub> response using the

*Xenopus oocyte* expression system and an electrophysiological method.<sup>42</sup> The 2 hops oils alpha-humulene and myrcene caused only a small potentiation of the GABA<sub>A</sub> receptor response. However, these compounds did not work as agonists. More pronounced were the effects of fragrances, which caused a potentiation of the GABA<sub>A</sub> receptor response.

In mice, the sedating activity of hops could be attributed to alpha-bitter acids as the most active constituents. Beta-bitter acids and the volatile oil contributed to the activity in ethanolic and carbon dioxide extracts of hops. Spontaneous locomotor activity was reduced, ketamine-induced sleeping time increased, and body temperature was reduced, thus confirming a central sedating effect.<sup>43</sup>

Most promising are the results from Butterweck et al. (2007), as they provide direction for future isolation and structure elucidation work. With the mode of action potentially linked to melatonin, structural analog substances or precursors may now be identified in hops.<sup>44</sup>

### *Clinical Support for its Efficacy as a Sedative*

Positive monographs for hops on the treatment of sleep disturbances have been published by the German Commission E<sup>45</sup> and the Scientific Committee of European Experts of the European Scientific Cooperative on Phytotherapy (ESCOP).<sup>46</sup> Both have extensively reviewed literature to form a consensus opinion on indication, method of administration, and posology (dosage, duration of use, etc.).

No pharmacodynamic data are available for hops as a single herb; hops has been investigated pharmacodynamically as part of fixed combinations containing other herbal ingredients (e.g., valerian root). In all studies, the study medication showed an effect, which differentiated from that of placebo. For example, Müller-Limmroth et al. (1977) showed that under artificially disturbed sleep, the study medication (containing hops and valerian root extracts [Seda-Kneipp®, Kneipp, Germany] alters brainwaves monitored by EEG in a manner different from placebo.<sup>47</sup> The EEG changes indicated better sleep as deep sleep and REM sleep increased objectively.

Brattström<sup>48</sup> and Schellenberg et al.<sup>49</sup> demonstrated that a proprietary fixed combination containing hops and valerian root extracts (Ze 91019, Max Zeller Söhne AG, Switzerland) affects the central nervous system within an hour. This confirms the historically established dose regimen to be taken around 1 hour before bedtime. The effect measured by Schellenberg (2004) is meaningful in regard to the proposed indication as artificially-aroused patients show an increase in alpha-1-power, a wavelength which indicates relaxation. Also beta-2-power,



Hops *Humulus lupulus*. Photo ©2010 Steven Foster

which indicates higher alertness and mental activity, is reduced.

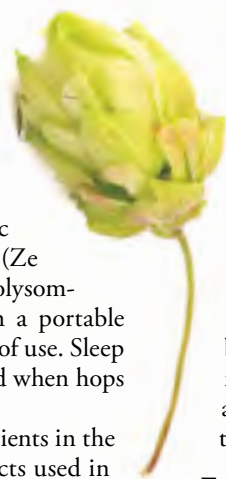
In a recent randomized, double-blind, placebo-controlled, three-arm, parallel group trial, the effects of hops in combination with valerian were compared with just valerian. In this trial, 30 patients (16 women, 14 men) with non-organic insomnia received a hops-valerian combination (Ze 91019), placebo, or just valerian for 4 weeks. Polysomnographic recordings were obtained at home with a portable recording device twice at baseline and after 4 weeks of use. Sleep latency (the time required to fall asleep) was reduced when hops was added to the valerian formulation.

No adverse events were reported for any of the patients in the 3 groups, which underlined the safety of the products used in this trial. Safety laboratories data at baseline and at the end of the treatment period were within the normal physiological range. In combination with valerian, hops reduced sleep latency significantly.<sup>50</sup>

Sleep improvements with a hops-valerian combination (Ze 91019) are also associated with improved quality of life. In a recent randomized, placebo controlled trial, the treatment appeared safe and did not produce rebound insomnia upon discontinuation during the study.<sup>51</sup>

### Hops “Bitters” for Digestive Complaints

The *British Herbal Pharmacopoeia*<sup>52</sup> notes the use of hops as a “bitter,” while the monograph from WHO provides details associated with this action, i.e., treatment of dyspepsia and lack of appetite.<sup>53</sup> In Japan, hops is used for activation of gastric func-



tion. However, there are actually few reports about the effect of hops on gastric function. In a rat model it was shown that intra-oral but not intra-gastric administration increased gastric secretion.<sup>54</sup>

In North America, Belgium, and England, hops has been used to aromatize liquors, which serve well as aperitifs and digestifs due to their reputation for increasing appetite as well as digestion. These liquors were quite popular in the United States in the last century.

Preparation of these so-called hop bitters is a delicate business, as too little hops may taste good but possess nothing of the beneficial effects of hops. Adding a greater amount of hops may be effective, but the taste of concentrated hops is not considered pleasant by many.

### Estrogenic Activity Associated with Hops

Circumstantial evidence over many years, including menstrual disturbances reported to be common among female hops-pickers, linked hops with potential estrogenic activity.<sup>16</sup> In 1953, Koch and Heim found estrogenic activity without being able to elucidate a corresponding substance.<sup>55</sup> When commercial hops extracts, essential oil, alpha- and beta- bitter acids, hops resins, and fractions thereof were examined using the uterine weight assay in immature female mice, no estrogenic activity was detected.<sup>15</sup> Further studies to confirm this activity experimentally were inconclusive or contradictory due to methodology of inadequate sensitivity.

The estrogenic principle in hops extract is 8-prenylnaringenin (8-PN)<sup>56</sup> with 10% of the binding activity of 17-beta-estradiol, while structurally related hops flavonoids had more than 100 times lesser potency.<sup>57</sup> However, the effects of whole extracts are much smaller, and the direction of activity is unclear. While whole hops extract (50% ethanol) in one *in vitro* study stimulated cell proliferation in estrogen-dependent T47D breast cancer cells,<sup>58</sup> hops extract in another *in vitro* study inhibited serum-stimulated growth of T47D cells.<sup>59</sup> In an *in*

**Table 3: Reduction of Sleep Latency by Hops and Valerian (median values)**

	N	Baseline	N	End of treatment	Difference
Hops and valerian	10	56.5 min	9	12.0 min	44.5 min
Valerian	10	45.9 min	10	23.8 min	22.1 min
Placebo	10	64.2 min	8	69.7 min	5.5 min

Adapted from Koetter et al. (2007)<sup>50</sup>

**Table 4: Summary of Indications for Hops in Well-Regarded Monographs**

Reference	Hop Strobile Indications
German Commission E Monographs	Mood disturbances such as restlessness, anxiety, and sleep disturbances
British Herbal Pharmacopoeia	Action: Sedative, bitter
ESCOP Monographs	Tenseness, restlessness, and sleep disorders
WHO Monographs Vol 3	Uses described in pharmacopeias and well established documents: As a sedative for the treatment of nervous tension and insomnia. Treatment of dyspepsia and lack of appetite  Uses described in traditional medicine: Treatment of abdominal cramps, anemia, bacterial infections, dermatitis, diarrhea, dysmenorrhea, leukorrhea, migraine, and edema. As an analgesic, anthelmintic, antipyretic, aphrodisiac, carminative, depurative, digestant, diuretic, diaphoretic, and tonic.
HMPC Community Herbal Monographs	Traditional herbal medicinal product for relief of mild symptoms of mental stress and to aid sleep

*vivo* study with ovariectomized adult rats, the primary outcome measure, uterus weight gain, indicated that hops did not have an estrogenic effect on the uterus, and none of the secondary outcome measures were positive, confirming the safety of hops.<sup>60</sup>

It bears emphasis that the estrogenic principle in hops (8-PN) is formed spontaneously from the chalcone desmethylxanthohumol. Hence, it is not typically present in relevant concentrations in most hops extracts, e.g., either in beer or in medications. The concentrations of 8-PN are generally too low in such preparations to produce a measurable effect in humans.<sup>61</sup> While 8-PN may be formed in the intestine,<sup>62</sup> absorption should be reduced significantly by intestinal and hepatic metabolism.<sup>63</sup> From the long-established use of hops extracts, one can safely assume that drinking a beer or taking hops as a sleep aid is without any known toxicological problems. The components of potential toxicological concern are present in only minor quantities in the typical extracts consumed in beer or as sleep medication.<sup>64</sup>

Numerous studies have been conducted to investigate the effects of 8-PN. These trials were recently thoroughly reviewed.<sup>65</sup> One potential use of 8-PN could be an alternative option for reducing hot flashes in menopausal women.<sup>66</sup> In an animal model, it reversed the ovariectomy-induced rise in skin temperature.<sup>67</sup>

The development of 8-PN-enriched hops extracts for the relief of menopausal symptoms (MenoHop<sup>®</sup> from Biodynamics, Ostend, Belgium) is fairly recent. A randomized, double-blind, placebo-controlled study over 12 weeks with 67 menopausal women showed a significant reduction in menopausal discomforts and complaints assessed by the Kupperman index and by a simplified patients' questionnaire in the treatment group after 6 weeks ( $p = 0.023$ ) compared to placebo, but not after 12 weeks ( $p = 0.086$ ).<sup>68</sup> Furthermore, no dose-response relationship could be established. A higher dose appeared less active.

Vaginal application of a gel with hops manufactured by Polichem SA, Lugano, Switzerland (Brand names: Gynomunal<sup>®</sup>, Germany; Esvegyne<sup>®</sup>, Italy) was tested in an open, non-controlled study with 100 postmenopausal women for 30 days. The results showed a marked effect on vaginal dryness and associated symptoms. Dryness, itching, burning, dyspareunia, inflammation, and rashes improved. The study and an additional pilot study by the same group confirmed a good safety profile for the intended use. The study was not designed to distinguish between the effects of hops and other ingredients like hyaluronic acid, liposomes, and vitamin E, which were all components of the gel.<sup>69</sup>

In a very recent randomized, double-blind, placebo-controlled, cross-over pilot study, time-specific estimates of treatment efficacy indicate significant reductions for Kupperman index ( $p = 0.02$ ) and visual analog scale ( $p = 0.03$ ) and marginally significant reduction of menopause rating scale ( $p = 0.06$ ) after 16 weeks.<sup>70</sup> Whereas the first treatment period of the cross-over study resulted in similar reductions in menopausal discomforts in both groups, results from the second period suggest superiority of the standardized hops extract (MenoHop) over placebo.

### Other Potential Medicinal Uses of Hops

Considerable work has been done investigating the antibiotic,



antiseptic, and tuberculocidal properties of hops and its constituents.

Hop bitter acids have proven to be especially

effective against gram-positive bacteria. They work best at low pH in not dissociated form.<sup>71-75</sup> In comparison to phenol, alpha-acids (humulone) and beta-acids (lupulone) are about 200 times and 700 times more potent, respectively. Against gram-negative bacteria, the same substances are without considerable effect, and yeast and molds are minimally inhibited.<sup>24</sup>

Lupulone was tested as a treatment for tuberculosis, as it has the highest *in vitro* effect against *Mycobacterium tuberculosis* of all the hops constituents.<sup>72</sup> Enders (1950) reduced tubercular infection in mice treated with lupulone.<sup>76</sup> However, Chin (1949) did not see this effect in his investigations.<sup>77</sup> When given to men, preliminary results were promising, although the treatment was associated with gastrointestinal disturbances.<sup>76</sup> In a clinical trial, treatment was impaired by side effects of the single substance given in high doses.<sup>78,79</sup>

Statistics in England from the first half of the last century showed that mortality from tuberculosis in brewery workers was 30% of the average.<sup>76,80</sup> In Bavaria, in the same period, the incidence rate of tuberculosis was 4 times lower in brewery workers than in other professions. However, the result could have been due to general better health of these workers.<sup>81</sup> With the advent of potent antibacterial substances in the second half of the last century, research relating to hops constituents for tuberculosis did not progress further.

The main prenylflavonoid in hops, xanthohumol, has a high scavenging capacity against peroxy radicals, which are among the most commonly reactive oxygen species in the body. Using both hydrophilic and lipophilic oxygen radical absorbance capacity tests, xanthohumol is more potent than vitamin C and vitamin E.<sup>82</sup> Due to its strong antioxidant activity, a number of potential health benefits are attributed to the substance. Mostly in *in vitro* tests it has shown antiproliferative,<sup>83</sup> anticarcinogenic,<sup>84</sup> antigenotoxic,<sup>64</sup> anti-inflammatory effects,<sup>84</sup> and decrease of plasma glucose, lipid levels, and weight of white adipose tissue in diabetic mice.<sup>85</sup> Recent research has begun testing xanthohumol against certain viruses<sup>86</sup> and the malaria protozoa (*Plasmodium falciparum*).<sup>87,88</sup> Special enriched xanthohumol extracts have been developed for health benefits in xanthohumol-enriched beers.<sup>89</sup>

Hop derived compounds<sup>90</sup> have also shown potential benefits in treatment of diabetes.<sup>91,92,93</sup> Following the discovery that isohumulones reduce insulin resistance, a double-blind, placebo-controlled pilot study showed that isohumulones (isomerized hop extract purchased from English Hop Products Co. Ltd, Kent, UK) significantly decreased blood glucose and



Hops *Humulus lupulus*. Photo ©2010 Steven Foster



Hops *Humulus lupulus*. Photo ©2010 Steven Foster





Lupulin glands on Hops *Humulus lupulus*.  
Photo ©2010 Hopsteiner

the 2 ingredients. Daily supplementation with 300 mg rho iso-alpha acids and 1500 mg proanthocyanidins, in addition to lifestyle modification including dietary alteration, reduced serum triglyceride, triglyceride:HDL ratio, and fasting insulin significantly more than diet and lifestyle modification alone in patients with features of metabolic syndrome.<sup>101</sup>

## Conclusion

With increased understanding of the medicinal properties of hops, its use beyond beer is increasing. Scientific and clinical findings point to the possibility of hops' becoming even more widely used in the future—both in medicine as well as in nutrition. New uses as food for health are just as conceivable as the processing of individual hops components in pure form for use as dietary supplements and medicines. HG

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hemoglobin A1c levels after 8 weeks. Twenty volunteers with mild type 2 diabetes were included in this study. Ten men and 10 women (ages 45-65 years) were randomized, receiving either placebo or a capsule containing 100 mg of isohumulones twice a day for 12 weeks. Results after 8 weeks showed a significant decrease for blood glucose, HbA1c, systolic blood pressure, GPT, GOT and gamma-GPT versus baseline. In the placebo group, only blood glucose levels improved versus baseline.<sup>94</sup>

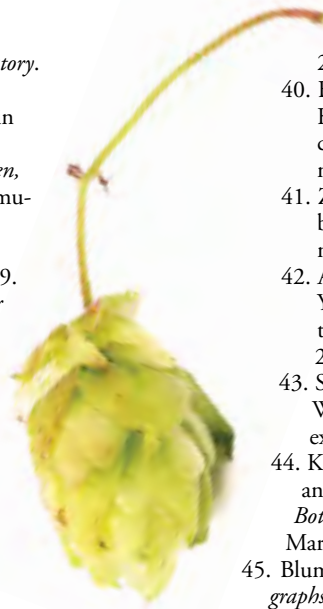
In a follow-up study with 94 subjects, ingestion of isohumulones (isomerized hop extract obtained from Botanix Limited, Kent, UK) had beneficial effects in diabetes and obesity. The volunteers with prediabetes received either placebo, 16 mg, 32 mg, or 48 mg of isohumulones for 12 weeks. After treatment, fasting blood glucose was decreased in the 32 mg and 48 mg groups after 4 weeks but did not change in the placebo group. HbA1c was also significantly decreased after 4 weeks in the 16 mg group and after 8 weeks in the 32 mg and 48 mg groups. Body mass index was significantly decreased in the 48 mg group compared with the placebo group at 12 weeks. The decrease in total fat area was also significantly greater in the 48 mg group than in the placebo group at 12 weeks.<sup>95</sup>

Other recent developments include research on modified hops extracts, which have undergone isomerization and hydrogenation. These so-called rho iso-alpha acids have anti-inflammatory potential. In a screening of natural products, hop-derived substances called MgRIAA obtained from Metagenics (Gig Harbor, WA), commercial hop materials from Betatech Hops Products (Washington DC), an experimental extract from BetaTech, and META060 supplied by Hopsteiner (New York, NY) were found to be among the most active in terms of anti-inflammatory potential.<sup>96,97</sup> These rho iso-alpha acids ameliorated joint damage as evidenced by significant reduction of the arthritis index and histology score in a murine model of collagen-induced arthritis.<sup>98</sup> Bone and cartilage degradation were reduced by META060.<sup>99</sup> Additionally, clinical research on a proprietary blend of rho iso-alpha acids, rosemary, and oleanolic acid (Kaprex<sup>®</sup>, Metagenics Inc.) demonstrated significant relief for people diagnosed with osteoarthritis, rheumatoid arthritis, or fibromyalgia.<sup>100</sup> And rho iso-alpha acids from hops and proanthocyanidins from *Acacia nilotica* (Fabaceae), both supplied by Metagenics, Inc., have been shown to modulate insulin signaling *in vitro*. In a 12-week, double-blind, placebo controlled trial, completed by 91 individuals, effects on serum glucose, insulin, and lipids were investigated with the combination of

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## Medicinal Plants Discussed at the 15<sup>th</sup> Meeting of CITES

The Fifteenth Conference of the Parties (CoP15) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) took place March 13-25, 2010, in Doha, Qatar.<sup>1</sup> CITES is an international agreement among 175 countries, established to protect internationally traded species of plants and animals from becoming endangered, overharvested, or extinct.<sup>2</sup>

An animal or plant whose survival in the wild has been determined to be impacted by international trade and that meets specific biological criteria can be included in one of the 3 Appendices under CITES. Appendix I includes species in danger of extinction that are, or could be, affected by trade; Appendix II includes species that are not in danger of extinction but could become so without strict trade regulation; and Appendix III includes species that any CITES Party (a member country that is a signatory to the CITES Convention) wishes to regulate or restrict use of within its own jurisdiction and needs the assistance of other parties to do so.<sup>3</sup> The CITES Parties meet every 3 years to add, transfer, or remove species from the CITES Appendices and to discuss implementation issues.

There were 8 plants discussed at CoP15 that have various medicinal uses: four were added to Appendix II,\* two were withdrawn for further study, one was removed from Appendix II, and one will be the focus of further discussion. However, although some of these species have medicinal applications, it should be noted that none were being considered for listing in the CITES Appendices due to concerns of overharvest for medicinal use. With the exception of *Aniba rosaeodora* (Lauraceae) and *Bulnesia sarmientoi* (Zygophyllaceae), the main reason these species were being considered for listing in CITES is due to over-collection for the international ornamental trade.

Two medicinal plants considered at the CoP15 were *Adenia firingalavensis* (Passifloraceae) and *A. subsessilifolia*. The bark of *A. firingalavensis*, a liana endemic to Madagascar, is used to treat scabies,<sup>4</sup> and the stems of *A. subsessilifolia* are sometimes ground into a powder used to treat wounds.<sup>5</sup> However, these medicinal uses appear to be highly localized. The more pressing concerns

for these species are that they both grow slowly, regenerate poorly (*A. subsessilifolia* has a regeneration rate of only 35%), and have been classified as vulnerable (using the International Union for the Conservation of Nature [IUCN] Red List criteria). Both species are impacted by habitat destruction, and both species are collected from the wild to be sold as houseplants or landscaping material in international trade.<sup>4,5</sup> However, these 2 species were not ultimately added to Appendix II. Both proposals were withdrawn for further study because the plants' distributions in the proposal (species' population sizes, vulnerable status, harvest volumes, etc.). However, the Parties have pledged to work with Madagascar to continue gathering and refining information on these and other Malagasy endemics in order to determine whether listing might be warranted at the next CoP.

Agarwood (species of *Aquilaria*, *Gonystylus*, and *Gyrinops* [Thymelaeaceae]) is another important medicinal plant that was the focus of discussion at this meeting.<sup>6</sup> Agar oil derived from the heartwood of agarwood is used in incense and medicine. Trees show few outward signs that their heartwood contains agarwood resin. Mature trees are more likely to contain it, but it is estimated that only 10% of trees actually do. Because of this, trees are often felled indiscriminately. Harvesting agarwood is fatal to the tree and targets mature trees, which are vital as seed trees for regeneration and habitat for wildlife. High demand, high prices, and an influx of non-local collectors contribute to the practice of indiscriminate felling. Various agarwood species are listed in CITES Appendix II and are found in many Southeast Asian countries, including Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, and Vietnam. At

\*An Appendix II listing in CITES requires Parties to make sure that a minimum of 2 requirements are met: (1) that exports of the species are not detrimental to the survival of the species in the wild, and (2) that the specimens being exported are obtained according to local, national, and international laws. In this way, CITES and its member countries play critical roles in ensuring that international trade of exploitable plants and animals are both legal and sustainable.

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this meeting, the Parties agreed to foster ongoing work with range countries to encourage trade in resin or wood from cultivated or plantation trees and to seek funds for a workshop on the management of wild and plantation-sourced agarwood.

*Aniba rosaeodora*, Brazilian rosewood, internationally traded as the source of an essential oil, was added to Appendix II. The listing of this species includes logs, sawn wood, veneer sheets, plywood, and essential oil, but not finished products packaged and ready for retail trade.<sup>7</sup> Brazilian rosewood occurs in the tropical rainforest in the Amazon Basin of Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela. Although Brazilian rosewood has been harvested since the early 1900s, today it is harvested only in Brazil. Due to the over-harvest of trees throughout its range, the species is categorized as “endangered” by the IUCN Red List of Threatened Species. Over 95% of Brazilian rosewood oil exports are to the United States and Western Europe, with the United States as the principal importer.<sup>8</sup> Brazilian rosewood oil is used primarily in high-end perfumes, as well as in personal care products (e.g., skin, cosmetic products), and as a flavor component for beverages and foods.<sup>9</sup> Although there are synthetic substitutes and cheaper plant alternatives of linalool (the main constituent of rosewood oil) such as Chinese Ho (*Cinnamomum camphora*, Lauraceae), the natural Brazilian rosewood oil is considered to be of higher quality. Brazilian rosewood oil may have therapeutic properties as an anesthetic and an antimicrobial agent that may lead to the development of new products.<sup>10</sup> The oil is also used in aromatherapy, though there is growing awareness among some in the industry of the ecological concerns of harvesting Brazilian rosewood trees for their oil.

*Bulnesia sarmientoi*, which occurs in Argentina, Bolivia, Brazil, and Paraguay, was also added to Appendix II. *Bulnesia sarmientoi*, also known as holy wood and *palo santo*, has traditionally been used as a blood cleanser, sudorific (induces perspiration), and diuretic; it also has uses for rheumatism, rheumatoid arthritis, gout, and venereal disease. An infusion of leaves is used to eliminate impurities, relieve stress and depression, control blood pressure, and prevent atherosclerosis and colds.<sup>11</sup> In laboratory testing, the fluid extract and tincture have recently been used as a diagnostic reagent in some blood tests. However, the primary reason for the CITES listing is the demand for its hard durable wood, which is used in flooring, high-end furniture, and various other timber products.<sup>11</sup> Additionally, the pleasant smelling rose-like essential oil, known as lignum vitae and Paraguay lignum vitae, is widely used in the perfume industry.<sup>10,11</sup> The Appendix-II listing includes logs, sawn wood, veneer sheets, plywood, powder, and extracts. Finished products packaged and ready for retail trade are exempted from CITES controls under this listing.

*Euphorbia misera*, a succulent native to the United States and Mexico, has been listed in Appendix II of CITES since 1975, but a decision was made to remove it.<sup>12</sup> Though the shrub is used medicinally in Mexico (often as a tea to treat stomach pain, dysentery, and venereal disease), the species’ medicinal use is highly localized and not common outside the Seri Indian population (native to the Sonoran coast and the islands of Tiburón and San Esteban, Baja California). It therefore does not pose a threat to wild populations. In addition, the species is traded domestically within the United States as an ornamental plant, but these are cultivated specimens and wild populations are not thought to be impacted by such trade. For these reasons, the United States and Mexico proposed success-

fully to remove it from the Appendices.

*Operculicarya hyphaenoides* (Anacardiaceae), a shrub or small tree native to southwest Madagascar, was added to Appendix II because it is traded internationally as an ornamental for its bonsai-like appearance. This species is currently classified as endangered by IUCN and is threatened by human-caused fires and over-harvest.<sup>13</sup> Locally, the bark is made into an herbal tea used to help women recover their strength after childbirth. *O. pachypus*, a related shrub that is also native to southwest Madagascar and traded for its bonsai-like appearance, was similarly added to Appendix II. The species is classified by the IUCN as critically endangered. Its bark is traditionally used to make an herbal tea to treat diarrhea in children.<sup>14</sup>

Another important plant decision adopted at CoP15 was the exemption of finished products of *Euphorbia antisiphilitica* (Euphorbiaceae), e.g., candelilla wax, packaged and ready for retail trade. All such exports will soon be exempt from CITES regulations.

All of the above changes became effective under CITES as of June 23, 2010. More information about CITES is available at [www.cites.org](http://www.cites.org), and information on other species discussed at the meeting is available at [www.uscites.gov](http://www.uscites.gov). The next regular meeting of the Conference of the Parties (CoP16) is tentatively scheduled to be held in 2013 in Thailand. HG

—Patricia S. De Angelis, PhD, Patricia Ford,  
and Kelly E. Lindner

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## Botanical Research at “Psychedelic Science in the 21<sup>st</sup> Century”

By Brad Burge

From April 15-19, 2010, over 1,200 scientists, ethnobotanists, physicians, therapists, anthropologists, artists, and citizens from more than 20 countries convened in San Jose, California, to discuss the current state of research into psychedelic (“mind-manifesting”) substances, including many psychoactive botanicals. The largest conference in the United States to focus entirely on psychedelic science in 40 years, “Psychedelic Science in the 21<sup>st</sup> Century” was presented by the Multidisciplinary Association for Psychedelic Studies (MAPS) in collaboration with the Heffter Research Institute, the Council on Spiritual Practices, and the Beckley Foundation. The conference included nearly 100 presentations, ranging from the psychopharmacology and clinical applications of psychedelic substances to anthropological studies of indigenous healing practices. Nearly 200 physicians and other medical practitioners received Continuing Medical Education (CME) or Continuing Education (CE) credits for their participation.

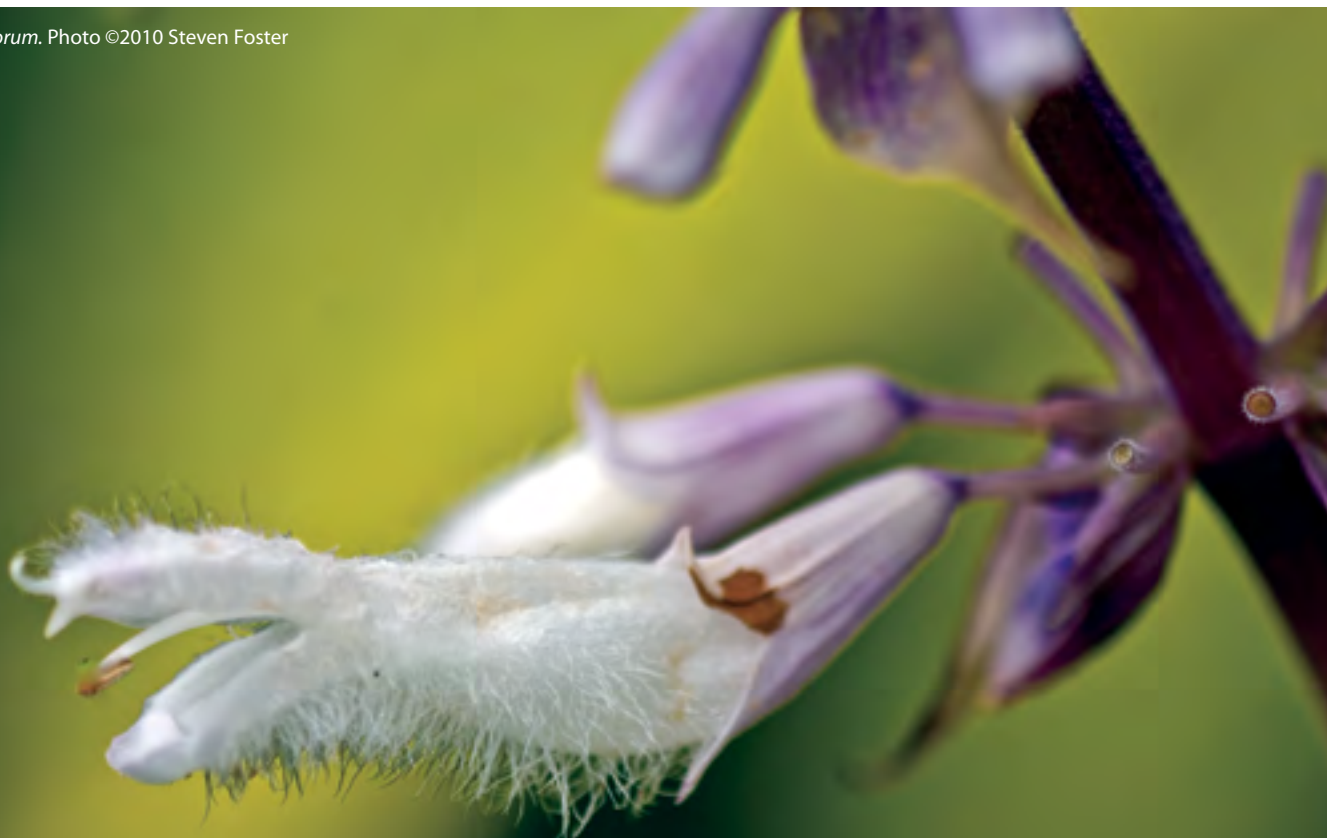
Although much of the conference centered on synthetic psychedelics such as MDMA and LSD, more than a third of the presentations discussed botanicals. *Salvia divinorum* (Lamiaceae) and *pituri* (a preparation of *Duboisia hopwoodii* [Solanaceae]) received only minor attention, while psychoactive fungi (e.g., *Psilocybe cubensis* [Strophariaceae] and *Amanita muscaria* [Pluteaceae]), *ayahuasca* (a preparation of *Banisteriopsis caapi* [Malpighiaceae] and *Psychotria viridis* [Rubiaceae]), and ibogaine (the primary alkaloid from *Tabernanthe iboga*, Apocynaceae) were the primary focus. While many presenters addressed the uses of psychedelics for specific psychiatric and biomedical conditions, others discussed their use as tools for basic research into the complex relationship between psychopharmacology and conscious experience. Linking them was

an enthusiasm for the return of psychedelics to mainstream scientific and medical research since its suppression 4 decades ago.

### Psilocybin Research

A significant portion of the conference addressed psychoactive fungi. The majority of these focused on psilocybin, a naturally-occurring psychedelic tryptamine found in hundreds of fungus species. Outstanding was a series of studies of psilocybin for relieving anxiety related to life-threatening cancer. These studies, one recently completed by Charles Grob, MD, and colleagues at the Harbor-UCLA Medical Center and another ongoing by Roland Griffiths, MD, and colleagues at Johns Hopkins University, both showed promising results. A third study is underway at New York

*Salvia divinorum*. Photo ©2010 Steven Foster



University, but it is too early for a presentation of the results. Christopher Wiegand, MD, and colleagues presented another major study exploring the safety and efficacy of psilocybin for the treatment of obsessive-compulsive disorder (OCD). The growing number and success of these and other studies suggest that (as long as funding is available) the mainstream availability of such treatments for anxiety, OCD, and even cluster headaches may become a reality in the next couple of decades.

While clinical studies of psilocybin stole the show, conference attendees also learned about research into its basic pharmacology and cognitive effects. For example, Robin Carhart-Harris, PhD, revealed the preliminary results of an fMRI study of the effects of intravenous psilocybin on brain activation and blood flow. Other presentations discussed the effects of psilocybin on hippocampal neurogenesis and learning in mouse models and the mechanisms underlying psilocybin's cognitive effects.

## Ayahuasca Research

Even the conference organizers were surprised at the amount of research into the use of ayahuasca as a sacrament in contemporary Brazilian religious movements, a possible treatment for drug addiction in Western medical contexts, and a potential tool for improving overall psychospiritual health. The volume of this research prompted MAPS to organize an entire track of presentations centered on the pharmacological, religious, medical, and social aspects of ayahuasca use.

Ayahuasca is a botanical decoction traditionally used in ritual settings by indigenous Amazonian and Andean communities. It contains a number of psychoactive compounds including the psychedelic alkaloid *N,N*-dimethyltryptamine (DMT) and several monoamine oxidase-inhibiting harmines (MAOIs). The recent worldwide surge of interest in ayahuasca from ethnobotanists, the media, and medical practitioners has led to a proliferation of research into the possible addition of ayahuasca to the Western pharmacopeia—and much of this research was presented for the first time at the conference.

Ayahuasca is only beginning to attract the attention of biochemists and psychopharmacologists. Jordi Riba, PhD, and colleagues' study of the pharmacology of ayahuasca in healthy volunteers is among those at the forefront of this trend. Riba's investigation of the effects of ayahuasca using such techniques as blood monitoring and electroencephalography (EEG) caused particular excitement among attendees, especially since the vast majority of current ayahuasca research is being done by anthropologists and clinical practitioners. Also notable was a presentation by Nicholas Cozzi, PhD, of recently published research into endogenous DMT, suggesting how research on ayahuasca and similar substances has something to teach us about basic neurophysiology.

Anthropological studies of ayahuasca use in non-Western and indigenous contexts focus primarily on the Brazilian syncretic religions based on the ritual use of ayahuasca, and *vegetalismo*, an indigenous shamanic practice in the Peruvian Amazon. For example, Paulo Barbosa, PhD, discussed a longitudinal study of the effects of ayahuasca rituals in 2 Brazilian churches (Santo Daime and the União do Vegetal) suggesting that ritual ayahuasca use is correlated with improved overall physical and psychological health. Others addressed the specific components of indigenous ayahuasca use such as singing and sexuality.

Much of the research explored ayahuasca as a treatment for drug

addiction, including alcoholism. One highlight was an observational study of Peruvian and Brazilian ayahuasca therapy centers by Beatriz Caiuby Labate, PhD, Brian Anderson, and colleagues. They suggested that the effectiveness of these programs derives from their careful combination of traditional and contemporary healing practices. The importance of hybrid and integrative approaches to addiction treatment was a common thread in the ayahuasca track, suggesting that research on ayahuasca and other psychoactive botanical substances could prompt reconsiderations of the very nature of medical and psychiatric practice.

## Ibogaine Research

Ibogaine is a powerful naturally-occurring psychoactive alkaloid found in the African iboga plant traditionally used as a sacrament in West African Bwiti religious ceremonies. Despite its prohibited status in the United States, it has recently received much attention from ethnobotanists and alternative medicine practitioners as a powerful "addiction interrupter" for severe and intractable drug (especially opiate) dependence. [Editor's note: A brief history of the attempts to study ibogaine for its potential benefits in drug addiction is given in the obituary of Howard Lotsof on page 74 of this issue.]

Basic research into the pharmacology of ibogaine is just now emerging to complement the proliferation of case reports of the risks and efficacy of ibogaine treatment. All of the research and therapies discussed at the conference agreed that no drug—especially ibogaine—can be expected to work miracles. Rather, effective treatment requires therapists to consider addiction in both physical and psychological terms and to create therapeutic environments that give patients the cognitive and emotional tools necessary for sustained recovery.

Of particular interest were presentations about Pangea Biomedics, an ibogaine treatment center in Playas de Tijuana, Mexico. Clinic director Clare Wilkins highlighted the importance of integrated therapy (combining biochemical, psychological, and spiritual approaches) for the Pangea program. Tom Kingsley Brown, PhD, presented the protocol of a MAPS-sponsored longitudinal study of addiction and quality of life in patients treated at the clinic and discussed the advantages—such as cost, treatment length, and expected outcome—that ibogaine treatment may have over addiction replacement therapies such as methadone and naloxone.

## Conclusion

What may be a new paradigm in medical science was palpable at "Psychedelic Science in the 21<sup>st</sup> Century," and it is a certainty that there will be more gatherings like it in the future. Despite the incredible amount of information shared and connections made during the 4-day conference, it was clear by the end that psychedelic science is still in its infancy. Decades of prohibition and cultural suspicion of these substances appear to be shifting toward a more accepting and (some would argue) objective approach to research on psychoactive substances, particularly those from botanicals. HG

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***Handbook of Essential Oils: Science, Technology and Applications*** by K. Hüsniü Can Başer and Gerhard Buchbauer. Boca Raton, FL: CRC Press; 2010. Hardcover; 975 pages. ISBN: 978-1-4200-6315-8. \$229.95.

This imposing and impressive multi-author tome reviews the intricacies and scientific challenges of essential oils, those ethereal molecules produced by odiferous plants that form the most structurally diverse class of natural products from plants. The book additionally examines the controversial and frequently misunderstood branch of herbal phytotherapy based upon their use.

The editors have assembled an impressive array of authorities, addressing various topics of interest in 21 chapters that cross numerous disciplines. In early chapters, the reader learns a bit of the history of essential oils and their plant sources, indicating an early fascination by our forebears in these scented liquids and how to squeeze them from citrus peels or distill them from “secretory idioblasts” or glandular trichomes in leaves, flowers, bark, or pine needles. The reader discovers that a given species is not only capable of producing myriad chemotypes with different odors and chemical composition, but also that a single plant may demonstrate phytochemical polymorphism in its production of essential oils in different structures. These processes are subject to environmental influences but depend, above all, on the plant’s genetic endowment, thus allowing for the selective breeding or vegetative propagation of plants with better smells and more interesting therapeutic potential.

Chapter 5, written by Charles Sell and focusing on chemistry, is filled with interesting facts, ranging from ancient concepts that essential oils captured the quintessential life force or spirit of plants to their biosynthetic genesis. He subsequently documents the potency of essential oils. Where someone may be impressed by a 1% yield of an alkaloid in a medicinal plant, terpenoid components above a concentration as little as 0.05% may be distinctly active physiologically.

Essential oil safety is covered in a relatively short chapter, although it is reas-

suring in noting that oils derived from food plants generally have a comfortable presumption of low toxicity. Readers particularly concerned with this subject would be wise to consult a dedicated text.<sup>1</sup> Metabolism, mostly hepatic, via oxidation, reduction, and hydrolysis, is well described.

Gerhard Buchbauer’s chapter on biological activity is a highlight, containing valuable documentation and references on the mechanisms of potential essential oil activity to combat cancer, kill viruses, reduce inflammation, increase skin penetration by other pharmacological agents, reduce lipid peroxidation in foods, and act as general anti-oxidants that potentially may be useful in various diseases of aging.

The chapter on central nervous system effects by Eva Heuberger and a group of Brazilian scientists does an able job of tackling the very difficult topic of terpenoid psychopharmacology, previously addressed by others.<sup>2,3,4</sup> Much of this material is not for the faint of heart—trying to assess the pertinence of minor changes contingent negative variation and other neurophysiological tests. Ultimately, there are few hard and fast conclusions. The subjective experience one individual derives from a specific scent exposure may contrast quite markedly from another. One person’s elated memory of childhood summer visits to grandmother’s cottage on Nantucket elicited by lavender scent may be hard to reconcile with another’s bored sedation by the same olfactory stimulus. Past experience and current set and setting figure prominently in the resulting mind states after exposure. Both animal and human clinical data are included. Some evidence is quite compelling: the ability of ambient citrus scent to allow hospitalized patients in Japan to discontinue antidepressant medication<sup>5</sup> is one striking example of the potential therapeutic power of essential oils.

Bob Harris’ entry on phytotherapeutic uses will be of great interest to *HerbalGram* readers, providing a very accessible and nicely organized presentation of myriad uses for essential oils, including treatment of ticks and mites, their ability to inactivate enveloped viruses outside the cell, benefits for motion sickness (ginger, lavender,

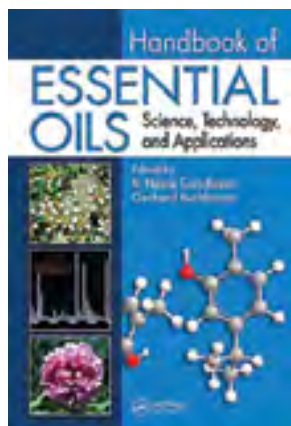
and mints) and menstrual cramps (fennel), and use of 1,8-cineole preparations to allow reduction of prednisone use in asthma.

The antimicrobial activities of terpenoids are handled with an introduction, in which thymol’s (an ingredient in Listerine®) activity is stated as 10-fold stronger than phenol. This is followed by an astounding 177 pages of tables documenting previous experimental work examining the effects of various agents.

Maria Lis-Balchin provides a masterful critical analysis of the scientific validity or lack thereof in previous aromatherapy publications. The failure of many previous experiments to demonstrate sufficient scientific rigor is discussed, along with the challenges inherent in attempting randomized clinical trials with such agents, due in no small part to difficulties in adequately blinding subjects to interventions with obvious distinctive organoleptic properties, and the ability to evoke strong emotions and regenerate long-lost memories and associations. While some may be disappointed that their treasured beliefs about the healing magic of essential oils may be deflated by such revelations, others will be heartened by appropriate credit given where due, such as in some well controlled studies with benefit of *Melissa officinalis* (Lamiaceae) on agitation in elderly people with dementia.

Two chapters on *in vivo* biotransformations (mostly extra-mammalian) of mono- and sesquiterpenoids will be of greatest interest to sub-specialists. Subsequent entries on industrial uses for perfumes, encapsulation and other methods of delivery, use in cuisine (replete with recipes), veterinary application, trade and storage and transport, European Union legislation, and allergenicity round out the volume nicely, and are filled with fun facts ready to cite at your next herbal social opportunity.

Some pros and cons: This is a monumental reference work, and as such, most will pick and choose their areas of greatest interest, with few reading cover to cover. As is frequently the case in edited texts, the writing styles and qualities are uneven at times. The few idiomatically-challenged entries are offset by the highly entertaining prose of the outstanding selections. The book is inconsistent in its presentation of plant species (lower or upper case, Italic or Roman), contains a fair number of typographical errors, and occasional missing references from the text or bibliogra-





phies. The alphabetization of the latter is imperfect.

The book's scope is very effective in covering major aspects of the field, but the discussion draws the line at mono- and sesquiterpenoids, not addressing diterpenoid and higher molecular weight entities. The index is reasonably composed, allowing most subjects of interest to be accessed quickly. The book contains extremely detailed tables with a wealth of information that would be extremely challenging to access elsewhere. I would have liked to see inclusion of a comprehensive listing of major essential oil plants and their range of terpenoid components, but much of this can be extracted by careful review of the contents or in other references.<sup>1,6</sup>

Finally, I saw no mention of a key research finding:  $\beta$ -caryophyllene, a sesquiterpenoid common to cannabis, black pepper and Peruvian balsam, that has recently been demonstrated as a potent and highly selective agonist of the CB<sub>2</sub> (cannabinoid) receptor,<sup>7</sup> suggesting its possible utility in a variety of inflammatory and pain conditions, as well as primary treatment of some cancer cell types. This highlights how much we have yet to learn about the peculiar phytochemistry of essential oils and the therapeutic possibilities of these fascinating and alluring scents.

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***Trick or Treatment?: Alternative Medicine on Trial*** by Simon Singh and Edzard Ernst. London, England: Bantam Press, 2008; Hardcover, 342 pages. ISBN: 9780593061299. \$29.00.

The catchy title of this volume is evocative of the playful, puerile Halloween address. It may suggest to some that patients who submit to practitioners of “alternative” medicine may be victims of fraud—whether deliberate or simply based on ignorance. The alternative aspect of “treatment” addresses the effectiveness and associated dangers of the different modalities that fall under its rubric, “used supposedly to heal patients.”

Professor Edzard Ernst, MD, has been acknowledged as “the world’s first professor of complementary medicine” at Exeter University in the United Kingdom; Simon Singh holds a PhD in particle physics. The authors Singh and Ernst dedicated their book to His Royal Highness The Prince of Wales, and they claim that they “are confident that [their book] offers an unparalleled level of rigour, authority, and independence,” their “only motive...to get to the truth.”

Unlike the volume by Fugh-Berman, *Alternative Medicine, What Works: A Comprehensive, Easy-to-Read Review of the Scientific Evidence, Pro and Con* (Lippincott Williams & Wilkins, 1997), which examined more than a dozen modalities, Singh and Ernst confine their detailed analyses to Acupuncture, Chiropractic Therapy, Homeopathy, and Herbal Medicine, relegating relatively minor modalities to an Appendix.

Chiropractic Therapy was founded by D.D. Palmer of Ontario, Canada towards the end of the 19<sup>th</sup> century (although the authors note that Hippocrates, the so-called father of medicine, is claimed to be responsible for “the first documented account of manipulating the spine for therapeutic reasons” around 400 BCE). Slight misalignments of

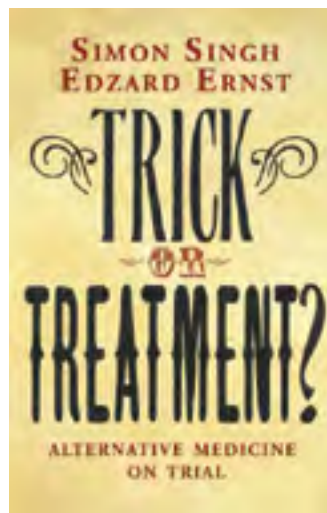
spinal vertebrae (subluxations) are claimed to interfere with the flow of so-called “innate intelligence,” a kind of “life force” or “vital energy.” These concepts are regarded by Singh and Ernst as mystical and as baffling as the concept of *ch'i* in Traditional Chinese Medicine (TCM).

Regarding back pain, the authors conclude that, compared with conventional treatment, “each is just about as effective (or ineffective) as the other,” cautioning that “it would be unwise to visit a chiropractor for other than a problem related to your back.” A litany of cautions and dangers is provided, along with graphic case histories, including death due to vertebral arterial damage from manipulation of the neck.

Singh and Ernst next provide a detailed historical background of acupuncture, the origins of which are “shrouded in the mists of time,” most likely in China.

Several reviews of acupuncture research have been conducted, including a review by the Cochrane Collaboration, whose analyses are now recognized as systematic reviews. The Cochrane reviews “suggest that there is no significant evidence to show that acupuncture is an effective treatment for most of the conditions to which it has been applied.” However, Singh and Ernst have been “cautiously optimistic” about a few, including treatment for bedwetting, some types of pain, and nausea—primarily back pain and idiopathic headache. However, Singh and Ernst posit that “the quality and amount of evidence are not fully convincing,” and they impute any positive influence to a very likely placebo effect.

“The power of placebo” is also marshalled to explain any possible beneficial effect of homeopathy. Homeopathy, developed by Samuel Hahnemann in the late 18<sup>th</sup> century, treats symptoms by administering minute or non-existent (molecule-less) doses of a substance, which in large amounts produces the same disease symptoms in healthy individuals. Ernst, a former practicing homeopath, eschewed the modality in 1991, following the observation of no effect in a repeat of Hahn-



emann's experiment with cinchona bark (from *Cinchona officinalis*, Rubiaceae), the source of the antimalarial drug quinine, by the German pharmacologist Professor W.H. Hopff (an experiment that claimed to produce symptoms of malaria). Singh and Ernst cite a 1996 article in *US News and World Report*, underlining "the utter absurdity and profiteering that underpins the homeopathic industry": the flu medicine Oscillococinum® (produced by the French homeopathic giant Boiron), derived from the heart and liver of a solitary French duck, has been estimated to generate sales of more than \$20 million, despite being a "self-declared 100% sugar pill!"

The fourth modality examined is herbal medicine, the subject probably of greatest interest to readers of this review. The gist of the assessment is summarized in 2 tables representing, respectively, the efficacy and risks of herbal medicine. Table 1 lists 35 prominent herbs, roughly rated as "good," "medium," or "poor," based on the amount and quality of evidence supporting their particular therapeutic applications. Those rated as "poor" are recommended to be avoided, including chamomile (*Matricaria recutita*, Asteraceae), evening primrose (*Oenothera biennis*, Onagraceae), ginseng (*Panax ginseng*, Araliaceae), hops (*Humulus lupulus*, Moraceae), passionflower (*Passiflora incarnata*, Passifloraceae), and thyme (*Thymus vulgaris*, Lamiaceae), presumably as ineffective treatments for the listed complaints. Table 2 addresses 34 herbs.

St. John's wort (*Hypericum perforatum*, Clusiaceae), the flagship herb representing the Singh and Ernst judgments, is rated "good" for mild to moderate (but not severe) forms of major depression, based on a 2005 evaluation by the Cochrane Collaboration of 37 clinical trials. However, addressing the question of "the key active ingredient," these authors render a rather curious, confusing assessment. They claim that the constituents hyperforin and hypericin have been considered the key active ingredients but that they have not proven as effective as the plant itself when tested, and "it seems that the benefits of St. John's wort are due to a combination of chemicals, each one working to enhance the effect of the others." There is no clear evidence to support this latter hypothesis—much favored by herbalists—and it has been recognized for some time that neither hypericin nor hyperforin make an appreciable contribution to this plant's anti-depressant effect. A prepara-

tion virtually devoid of both compounds has been found to exert significant activity, comparable to hyperforin- and hypericin-containing extracts.

Feverfew (*Tanacetum parthenium*, Asteraceae) is given a "medium" evidence rating for preventing migraine "because there have been mixed results from trials—mainly positive, but partly negative." However, Singh and Ernst do not distinguish between tested preparations: all feverfew whole leaf treatments tested have produced positive results, and the only negative outcome involved a 90% aqueous ethanol extract obtained from a 21-day digestion of leaf, which almost certainly resulted in extensive degradation of the active principle(s). These authors properly point out trial deficiencies of small sample size and rather modest effect—common to many herbal studies—but in this case only relating to the initial feverfew trial with 17 subjects, also appropriately criticized on the basis of self-selection.

The following botanicals were graded as "good" by Ernst and Singh.

Curiously, ephedra, or ma huang (*Ephedra sinica*, Ephedraceae) is approved by the authors for weight loss. However, while the RAND Corporation expert panel of 2003 acknowledged significant short-term weight loss from ephedrine, especially when combined with caffeine, the herb has been banned as a dietary supplement by the US Food and Drug Administration due to a possible association between supplements and serious adverse events (myocardial infarction, cerebrovascular accidents, seizures, and a psychiatric case). Also, curiously, no safety concern regarding ephedra is registered in Table 2, despite widespread concern about its safety and bans against its use for both weight loss and enhancement of athletic performance.

Preparations from the 3 echinacea species commonly employed in therapy, namely *Echinacea angustifolia* (Asteraceae), *E. pallida*, and *E. purpurea*, are recommended for the treatment and prevention of the common cold. While echinacea is widely claimed to be beneficial as an early treatment for symptoms of the cold, there is mixed, and to some unpersuasive, evidence for a prophylactic role.

Garlic (*Allium sativum*, Alliaceae) is likewise firmly recommended for hypercholesterolemia, despite conflicting and only moderately positive results in support. Devil's claw (*Oplapanax horri-*

*dus*, Araliaceae) for musculoskeletal pain, ginkgo (*Ginkgo biloba*, Ginkgoaceae) for dementia and poor circulation in the leg, hawthorn (*Crataegus* spp., Rosaceae) for congestive heart failure, kava (*Piper methysticum*, Piperaceae) for anxiety, and red clover (*Trifolium pratense*, Fabaceae) for menopausal symptoms round out the blue-ribbon group, despite contradictory evidence for the latter.

Table 2, listing health risks, is dominated by precautions against bleeding, mostly based on speculation arising from *in vitro* observations, involving almost half (16) of the 34 herbs examined. This is followed by 6 indictments of herbs with the claimed potential to interact with heart medications and associated with reports of liver damage. This latter condition notably involves black cohosh (*Actaea racemosa*, Ranunculaceae, syn. *Cimicifuga racemosa*) (about 10 cases) and kava (80 cases). The other 2 herbs are valerian (*Valeriana officinalis*, Valerianaceae) and willow (*Salix* spp., Salicaceae), linked with isolated reports. Regarding bleeding, except for garlic and ginkgo, no clinical significance has so far been attached to other herbs containing components shown to possess anti-coagulant properties in non-clinical settings. Excessive operative bleeding has been associated only with garlic and, possibly, ginkgo, and preoperative use of dietary garlic has been associated with increased surgical blood loss. Ginkgo extract has been linked to spontaneous and increased bleeding when combined with anticoagulants and might be expected to increase the risk of operative hemorrhage.

Since all other cited herbal remedies are associated with serious adverse possibilities, it is more than passing perplexing to consider the reason for including, as presenting appreciable risks, artichoke (*Cynara scolymus*, Asteraceae) for high cholesterol (dyspepsia), which is not known to exert adverse effects apart from flatulence, and lavender (*Lavandula* spp., Lamiaceae), for "in rare cases (causing) hormonal side effects such as swelling of the breast tissue"—the latter being an apparently uncritical reference to several case reports of use of "lavender-scented" soaps and shampoos by young men.

Preceding the final heading of the last chapter is a segment entitled "Lettermanesque." The authors list "top ten culprits in the promotion of unproven and disproven medicine," although not in order of

demerit: celebrities, medical researchers, universities, alternative gurus, the media (twice), doctors, alternative medicine societies, governments and regulators, and the World Health Organization.

The book's overall verdict is that "alternative medicine . . . seems to consist of treatments that are untested or unproven, or disproven, or unsafe, or placebo, or only marginally beneficial." "The truth . . . is that there is no such thing as alternative science, just as there is no alternative biology, alternative anatomy, alternative testing, or alternative evidence," and "any provably safe and effective alternative medicine . . . becomes a conventional medicine."

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**Chinese Nutrition Therapy: Dietetics in Traditional Chinese Medicine**, 2<sup>nd</sup> edition by Joerg Kastner. New York, NY: Thieme Medical Publishers, 2009. Paperback; 292 pages. ISBN-13: 978-3131309624. \$69.95.

Traditional Chinese Medicine (TCM) is one of the oldest systems of medicine in the world. As with other ancient traditional medical systems, health is viewed in a holistic way, incorporating health of the body, mind, and spirit within the cosmology and philosophy underlying the Chinese culture. Proper nutrition is viewed by the Chinese not only as sustenance for life, but also as a therapeutic option for the treatment of various maladies. This system includes an enormous repertoire of herbs and fungi, among other products, which possess important medicinal value.

*Chinese Nutrition Therapy*, 2<sup>nd</sup> edition was written by Joerg Kastner, MD, a physician and licensed acupuncturist in Wessling, Germany. He was trained as a conventional physician with a specialization in internal medicine and has been involved in TCM and acupuncture since 1987.

The book consists of 7 sections. The first section introduces the reader to the main concepts of TCM, such as the duality and complementary interactions of *yin* and *yang*, the energy concept of *chi*, the 5 phases (sometimes referred to as "elements": wood, air, fire, water, and metal), and the 5 basic substances: life force or *qi*, congenital essence or *jing*, blood or *xue*, spirit or *shen*,

and bodily fluids or *jin ye*—all of which can be intricately related to the principal causes of a diverse array of diseases. This section further states the methodology of Chinese nutritional therapy and focuses on the energetic properties of foods, as well as their flavors (usually in terms of the 5 flavors: salty, sweet, acrid, bitter, and sour) and thermal nature (hot, cool, or neutral), with regard to how they correspond with various organ networks of the human body. Each flavor, for instance, is related to a particular network of diverse organs in the body, such as sweet to spleen and stomach, and sour to the liver and gall bladder. Also mentioned are cooking procedures and meal preparation, in accordance to the 5 phases previously mentioned.

Section 2 deals with the recommendations of Chinese dietetics, especially with the planning of meals according to the season of the year, a practice once common in the past but apparently all but forgotten now in Western culinary culture. Proper nutrition throughout the human life cycle is also included. The book notes that during cold weather, a diet containing acrid spices such as bay laurel (*Laurus nobilis*, Lauraceae), would theoretically provide particularly good nourishment and help conserve heat in the body. Conversely, during the warm summer months, dishes are recommended that contain ingredients considered to have "cooling" properties, such as broccoli (*Brassica oleracea* var. *italica*, Brassicaceae).

Section 3 mentions the practical applications of Chinese dietetics and provides guidelines for giving advice to patients regarding proper nutrition for the treatment of a wide array of health conditions, including respiratory ailments and digestive upsets. For example, a patient showing cold symptoms, including a cough with phlegm, would be advised to eat food that would loosen phlegm, such as watercress (*Rorippa nasturtium-aquaticum*, Brassicaceae), radish (*Raphanus sativum*, Brassicaceae), and celery root (*Apium graveolens*, Apiaceae). Recommended herbal teas for this condition would include peppermint (*Mentha x piperita*, Lamiaceae) and lemon (*Citrus x limon*, Rutaceae).

Section 4 classifies diverse foods, includ-

ing fruits, grains, vegetables, spices, and meats, according to Chinese dietetics, mentioning their taste, thermal quality, and possible contraindications in the treatment of various disease states. Cabbage (*Brassica oleracea* var. *capitata*, Brassicaceae) is considered to possess a sweet flavor and to act upon the large intestine and stomach organ network. Its main effect is to promote digestion and alleviate acute pain in the gastrointestinal tract. The therapeutic indications for this plant include stomach and spleen disharmony and stagnations, as well as ulcers of the stomach and small intestine (duodenum). In the latter case, both TCM and Western medicine agree with this application.

Section 5 gives clinical examples of the application of Chinese nutritional therapy in the treatment of specific diseases (or as a TCM practitioner would perhaps state, "patterns of disharmony"). In this section, the clinical applications of Chinese nutrition therapy are provided for various conditions including respiratory and gastrointestinal disorders, obesity and weight loss, physical and emotional fatigue (stress), cardiovascular problems, gynecological issues, and more.

Section 6 is about Chinese dietetics applied according to a particular phase and its corresponding organ network. For example, chili pepper (*Capsicum* spp., Solanaceae) is considered to be a warming herb, classified as being subject to the earth phase and related to the spleen, pancreas, and stomach organ network. Its main function is to "move blood" (promote circulation) and *qi* (energy) throughout the body. Therefore, it can be used for a number of ailments including respiratory, arthritic, and gastrointestinal problems.

Section 7 is a brief but comprehensive glossary that defines common terms used in TCM and dietetics, with their English equivalents.

The book is well written and offers practical examples of the application of TCM, not only for the treatment but also for the prevention of various afflictions related to lifestyle and inadequate eating habits. Dr. Kastner vividly captures the essence of TCM and its application in nutritional



therapy in a sensible and accurate manner, something that is not common among some Western physicians. Perhaps one of the most salient features of this work is that it reminds that various herbs, fungi, and certain foods of animal origin have more than just culinary importance; they also possess a therapeutic value. The 2<sup>nd</sup> edition of *Chinese Nutrition Therapy* will be a welcome addition to the libraries of nutritional consultants and dietitians, herbalists, naturopathic doctors, physicians, and nurses who are involved in giving nutritional advice to their patients and who may wish to access a source of information from a TCM perspective.

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***Complementary and Alternative Medicine***, 2<sup>nd</sup> edition by Steven B. Kayne. London, England: Pharmaceutical Press, 2009. Paperback; 624 pages. ISBN: 978-0-085369-763-3. \$59.00.

Complementary and alternative medicine (CAM) is widely seen in all disciplines of today's healthcare. Whether you are a pharmacist educating patients about potential adverse interactions between nutritional supplements and prescription medications or a primary care physician seeing a patient interested in alternative treatments for anxiety disorder, basic knowledge of CAM is important to the healthcare professional. With a gradual increase in interest and awareness within both the medical community and general population, fundamental and in-depth knowledge of alternative medicine is crucial but often difficult to obtain. *Complementary and Alternative Medicine*, 2<sup>nd</sup> edition provides a comprehensive and succinct introduction to all aspects of the topic. For each different type of therapy and diagnostic method, Dr. Kayne explores the history, underlying theory, evidence of efficacy and safety, and practice concerns.

In this second edition, Dr. Kayne reorga-

nized his book and includes 3 new important chapters, written with the collaboration of highly qualified experts on the topics of integrative medicine, pharmacovigilance, and marketing of CAM products in the United States. Many sections have been updated with new data and evidence-based guidelines, as well as legal issues associated with each different therapy method.

In Part 1, Dr. Kayne defines different terms used in the field, such as complementary, alternative, traditional, and holistic medicine. He describes how visits with CAM practitioners involve an extensive history-taking process that uses easily understandable, patient-friendly terminology. The patients take a more conscious and participatory role in the entire visit, including the decision-making process. He emphasizes that the main difference in CAM is a whole-person approach, with the focus on prevention and an individualized plan of management, whereas conventional medicine is a disease-centered approach with symptom-specific treatment options.

In a newly added section, Iris Bell, MD, PhD, discusses the concept of integrative medicine, a patient-centered, whole-person care approach provided by mainstream healthcare providers who use both conventional and CAM modalities to treat conventionally diagnosed conditions. Dr. Bell emphasizes that the ultimate goal of integrative medicine is not merely to resolve a disease process or render the absence of disease but to promote a complete physical, mental, and social well-being for the patient. She also raises valid concerns and controversies regarding current integrative treatment modalities, the most important being the safety concerns of the consumable products. Dr. Bell discusses concerns regarding under-regulation of supplement and herbal products used in integrative medicine, as well as other concerns such as adverse side effects, interactions with

other prescription medications, frequently unknown pharmacokinetics, frequently unknown pharmacodynamics, and inconsistent quality control.

The rest of Part 1 addresses the growth in demand for CAM and the products

used in the United States. CAM is taking a larger part of US healthcare spending with a 9.7% annual increase in CAM-related product sales, exceeding \$29.97 billion in 2006. CAM topics have also increased in scientific literature and National Institutes of Health (NIH) research funding, although criticism remains regarding CAM's inability to meet evidence standards acceptable within orthodox medicine. Dr. Kayne discusses several roadblocks in alternative medicine research that have resulted in scant evidence-based data in the field as compared with conventional medicine. Main reasons include lack of financial support and research skills, difficulty in research design, variable quality of research, and quality control of the products used, as well as the practitioner's use of therapy based on anecdotal evidence.

In Part 2, the author examines homeopathy, anthroposophy, medical herbalism, aromatherapy, and flower remedy therapy. He discusses the background philosophy, unique approach, preparation methods, medicines used, and most commonly treated conditions for each specific modality. He includes in-depth safety concerns, evidence-based results regarding efficacy, and resource lists for further information on each of the therapies.

Traditional medicine, which includes Chinese medicine (Chinese herbal medicine, acupuncture, dietary therapy, and martial arts therapy) and Indian Ayurvedic medicine, are discussed separately in Part 3. Each chapter covers basic theory and history of the modalities, including descriptions of the unique diagnostic and treatment methods. Both Traditional Chinese Medicine (TCM) and Indian Ayurvedic medicine use natural products and herbs as a major part of the treatment plan. Pertinent to this is a discussion of the increasing concerns of bioavailability and sustainability of the raw materials for these natural products, as well as safety concerns.

Part 4 explores various other therapies, including naturopathy, nutritional therapy, nutraceuticals, and other diagnostic therapies (e.g., iridology and kinesiography). In addition, manual therapies discussed in this section include chiropractic, reflexology, rolfing, and osteopathic manipulation. Mind-body therapies such as yoga, music therapy, and relaxation therapy are also covered in this section.

I recommend this book to all healthcare professionals, as well as to students in



related healthcare fields who have had no prior exposure to the subject. Although this book may not be a practical reference guide for practitioners using CAM to treat patients in a clinical setting, it is an excellent source for acquiring a fundamental understanding of the subject. More suited for a basic or introductory course in CAM, this book is one I wish I had a chance to read during my medical school education. Academic centers should consider adding Kayne's book as required reading as demand for open-minded, non-judgmental, well-educated, and compassionate integrative practitioners continues to grow.

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*Integrative Oncology* by Donald Abrams and Andrew Weil (eds). New York, NY: Oxford University Press, 2009; Hardcover, 581 pages. ISBN-13: 978-0-19-530944-7. \$35.00. Available in ABC's online store.

*Integrative Oncology* provides a comprehensive overview of this multidisciplinary field and demonstrates the diversity of healing modalities available in integrative cancer care. While the field of integrative oncology has been limited by a paucity of widely accepted evidence-based therapies, this book contains an extensive review of the volumes of research that have been published and may be clinically relevant for the integrative oncology practitioner. This book is visually well organized for quick reference, while it also maintains a natural flow for those who wish to read it cover to cover. For the healthcare practitioner or layperson who wants to gain a greater appreciation for the growing body of scientific evidence supporting the use of integrative healing modalities in oncology care, this text is a great resource.

Readers will be empowered to consider the important role of integrative oncology in cancer prevention and adjunctive treatment, with topics ranging from a review of the epidemiology of cancer prevention to the current evidence-base for integrating the use of nutritional therapy and botanical medicine into cancer care. Cancer preventive topics include the impact of diet, lifestyle, and physical activity for reducing

risk. The scientific rationale for nutritional intervention in cancer care is reviewed, and a general summary of nutritional recommendations based upon current research is included for reference. An extensive review of the current research in botanical medicine for cancer prevention and adjunctive treatment includes research regarding medicinal mushrooms, curcumin (from turmeric [*Curcuma longa*, Zingiberaceae]), green tea (*Camellia sinensis*, Theaceae), plant enzymes, and flavonoids. A short but useful section is included on the use of botanicals for mitigating side effects of conventional cancer therapy. The statistics for most of the research is presented qualitatively, but confidence intervals or p values were unfortunately omitted from most of the tabled summaries. This information can be cross-referenced, however, as all references for research presented is available.

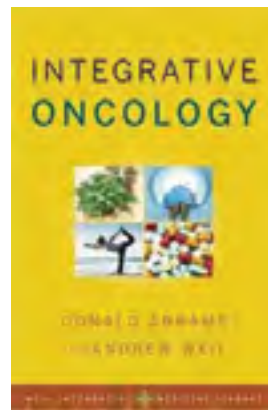
Controversial topics in integrative oncology are discussed in the context of evaluating risk versus benefit. For example, a chapter devoted to "the antioxidant debate" describes the evidence both in support of and cautioning against the use of antioxidants in cancer care. While the authors conclude that the use of high doses of antioxidants is contraindicated during radiation therapy, the evidence is made available for the reader to dig deeper into this issue, if so desired. Another chapter describing potential mechanisms of herb-chemotherapy interactions provides a good foundation for predicting potential interactions between many herbs and chemotherapeutics. A good review of alternative therapies purported to cure cancer in the absence of conventional oncology treatment provides an excellent reference for the integrative clinician whose patients may inquire about such therapies. (An interesting chapter covering cannabinoids and cancer discusses the historical context of traditional medicinal use of cannabis, as well as the pharmacology and clinical application of cannabinoids in cancer care.) The discussion of controversial topics in this text gives readers the opportunity to improve their understanding of these issues and formulate their own clinical opinions.

*Integrative Oncology* also provides a rich

source of mind-body medicine modalities available for enhancing care of the patient with cancer. The roles of mind-body medicine, spirituality, and energy medicine in oncology care are discussed at length. For those more interested in evidence-based therapies, the chapter that covers mind-body medicine also includes a literature review of the current mind-body medicine research in the oncology setting.

A few chapters are devoted to specific aspects of managing patients in integrative oncology, including symptom management, palliative care, mitigating toxicity, and radiation therapy. A closer look at the integrative management of specific cancers is limited to 3 cancer types: breast cancer, prostate cancer, and colon cancer. For the reader interested in learning more about integrative oncology patient management, this book lays a good foundation, and it also includes references and resources for further study. This book is not a comprehensive resource for the healthcare practitioner seeking cancer-type and treatment-specific guidance for individual therapeutic recommendations. It does include some evidence-based therapies for managing symptoms and toxicities commonly encountered in the oncology setting such as nausea, constipation/diarrhea, fatigue, and peripheral neuropathy, which the reader may find clinically useful.

Also included are chapters describing international systems of healthcare: Traditional Chinese Medicine (TCM), Ayurveda, homeopathy, and anthroposophic medicine. These sections are both meant to introduce the reader to each of these traditional systems of healthcare as well as show how these healing systems can be integrated into conventional cancer care. For example, in China, physicians regularly weave TCM into conventional oncology treatment, and early clinical research shows improvements in clinical outcomes and patients' quality of life. One unfortunate omission is the lack of a chapter describing the role of naturopathic medicine in integrative oncology. While a number of licensed naturopathic physicians who specialize in integrative oncology were contributing authors to this text, there is no section that helps the interested reader



understand how naturopathic medicine can contribute to integrative cancer care. For a book that is so thorough in its review of the many diverse modalities available in integrative oncology, omitting a discussion of the field of naturopathic medicine creates a blind spot for the reader expecting to learn about all of the systems of healthcare that may be integrated into oncology care.

*Integrative Oncology* weaves together a patient-centered, holistic approach to cancer care with the scientific rationale behind integrative therapies used in the oncology setting. For the reader who desires a comprehensive, evidence-based review of the evolving interdisciplinary field of inte-

grative oncology, this book is an excellent resource.

—Debi Walker, ND  
**Adjunct Professor of Biological Sciences**  
**Sierra Nevada College**  
 Incline Village, NV

***Stockley's Herbal Medicines Interactions*** by Elizabeth Williamson, Samuel Driver, and Karen Baxter (eds). Chicago, IL: Pharmaceutical Press; 2009. Hardcover; 423 pages. ISBN 978-0-85369-760-2. \$89.95. Available in ABC's online store.

The editors and their staff (comprised of British pharmacists who are experts in

the study of drug interactions) produced this first edition to address herbal interactions with conventional drugs from a clinical perspective. Co-editor Elizabeth Williamson was relied on for her herbal medicine expertise, as chair of the Expert Advisory Group for Herbal and Complementary Medicines for the British Pharmacopoeia Commission. The other contributors appear well-qualified to assess the interactions data from a pharmaceutical perspective.

My first impression involved the inappropriateness of the cover title. The title page provides a subtitle for clarification: "A guide to the interactions of herbal

## New Book Profiles

***Ethnobotany of Pohnpei: Plants, People, and Island Culture.*** Michael Balick (ed). Honolulu, HI: University of Hawaii Press; 2009. Paperback, 585 pages. ISBN: 978-0-8248-3293-3. \$28.00.

This book explores the plants, people, and traditional culture of Pohnpei, one of the 4 island members of the Federated States of Micronesia. Pohnpei is home to various unique plant species, many of which are described and pictured in this book. The book further presents the findings of a comprehensive ethnobotanical study and stresses the importance of preserving the culture, habitat, and biodiversity of Pohnpei.

***Mental Health Naturally: The Family Guide to Holistic Care for a Healthy Mind and Body.*** Kathi Kemper. Elk Grove Village, IL: American Academy of Pediatrics; 2010. Paperback, 621 pages. ISBN: 978-1-58110-310-6. \$21.95.

This book emphasizes the importance of exercise, sleep, communication, and nutrition in combating common mental and physical ailments, including stress, Attention-Deficit Disorder, anxiety, and depression. Natural and alternative remedies for these and other conditions are also explored, such as dietary supplements, herbs, homeopathy, massage, and acupuncture.

***Organic Manifesto: How Organic Farming Can Heal Our Planet, Feed the World, and Keep Us Safe.*** Maria Rodale. New York, NY: Rodale Books; 2010. Hardcover, 208 pages. ISBN: 978-1-60529-485-8. \$23.99.

This book explores the benefits of

eating organic foods, rather than foods grown and processed with synthetic chemicals. The author, Maria Rodale, is a third-generation advocate for organic farming; she states that the large-scale use of agrichemicals in farming does more damage to the environment than the burning of fossil fuels or the loss of rainforests. Organic farming can contribute to solving the climate crisis, as well as provide general health benefits, she writes.

***Singing to the Plants: A Guide to Mestizo Shamanism in the Upper Amazon.*** Stephan Beyer. Albuquerque, NM: University of New Mexico Press; 2009. Hardcover, 530 pages. ISBN: 978-0-8263-4729-9. \$45.00.

Mestizos are the Spanish-speaking descendants of Hispanic colonizers and the indigenous people of the Upper Amazon. This book provides a glimpse of shamanism practiced by mestizos in this area, including *ayahuasca* healing ceremonies, spiritual relationships with healing plants, the use of psychoactive plants, and the use of plants for healing, magic, and sorcery.

***The H.E.R.B.A.L. Guide: Dietary Supplement Resources for the Clinician.*** Robert Alan Bonakdar (ed). Baltimore, MD: Wolters Kluwer Health and Lippincott Williams & Wilkins; 2010. Paperback, 424 pages. ISBN: 978-0781782685. \$59.95.

This book is intended to help clinicians integrate herbal and dietary supplements into the treatment of common conditions. Key issues such as labeling, dosing, regulation, interactions and reactions, efficacy, and clinical trials are

explored. Also included are case studies of common conditions matched with a quick reference guide to natural medicines for specific disorders.

***The North American Guide to Common Poisonous Plants and Mushrooms: How to Identify More than 300 Toxic Plants and Mushrooms Found in Homes, Gardens, and Open Spaces.*** Nancy Turner and Patrick von Aderkas. Portland, OR: Timber Press; 2010. Hardcover, 373 pages. ISBN: 978-0881929294. \$29.95.

Numerous poisonous plants and mushrooms are found within the environment, and the best way to avoid mistaking them for something edible or non-toxic is through identification. Written by noted ethnobotanist Nancy Turner, PhD, and Patrick von Aderkas, this resource aims to help parents, pet owners, gardeners, and others avoid accidental poisonings.

***What the Drug Companies Won't Tell You and Your Doctor Doesn't Know: The Alternative Treatments That May Change Your Life—and the Prescriptions That Could Harm You.*** Michael Murray. New York, NY: Atria Books; 2009. Hardcover; 339 pages. ISBN: 978-1-4165-4933-8. \$25.00.

This book provides information on ways to improve quality of life and health with diet, exercise, lifestyle, and natural remedies, while encouraging decreased reliance on pharmaceuticals. Author Michael Murray, ND, who has over 30 years experience in natural medicine, also explores the connections between the Food and Drug Administration (FDA) and pharmaceutical companies.

medicines, dietary supplements and nutraceuticals with conventional medicines.” Though the book is enhanced by its broad perspective, the inclusion of nonbotanical health agents such as acidophilus, chitosan, chondroitin, coenzyme Q<sub>10</sub>, creatine, glucosamine, and melatonin under the title “herbal medicines” is unfortunate. We are far past the time when agents derived from animals should be considered under this heading. Other items covered include berberine, caffeine, beta-carotene, lycopene, and resveratrol, which could be described better as plant-derived isolates, in contrast to complex herbal medicines. Due to widespread media perpetuation of such confusion, it is especially important in a science-based text that such distinctions are patently acknowledged.

Coming from their work on the well-respected and clinically-based *Stockley's Drug Interactions*, the editors and staff acknowledge that most of the experimental evidence for herbal-drug interactions does not meet the standards necessary to establish their clinical relevance. Nonetheless, a growing body of data indicates that pertinent evidence should be scrutinized to help health practitioners avoid foreseeable risks and be appropriately alerted to concerns. Based on their relative popularity, some herbs are included even when data are unavailable on pharmacokinetic or pharmacodynamic interactions, e.g., *avens* (*Geum urbanum*, Rosaceae) and pumpkin (*Cucurbita pepo*, Cucurbitaceae).

Consequently, the inclusion of over 150 common herbs and nutraceuticals does not reflect the number with documented interactions. Some chemical categories of agents that can be found in a wide variety of plants are discussed as separate items, i.e., flavonoids, isoflavones, and natural coumarins. The index serves as a useful resource to identify specific compounds from these groups along with herbs and a listing of the associated drugs with which they individually interact, and vice versa.

The herbs are arranged alphabetically in the text according to their common

names, with the scientific and pharmacopial nomenclature also provided. Short summaries on constituents, uses/indications, the impact on drug pharmacokinetics, and an interaction overview are given for each. Since no separate heading is designated for the therapeutic part of the plant, sometimes this important information fails to be recorded. When interactions are identified for a natural medicinal agent, they are presented as separate sections (“monographs”) on single drugs or groups of drugs, occasionally along with other monographs for foods, herbal medicines, and supplements. Clinical evidence is given when the interactions are documented in humans. Experimental evidence from animal and *in vitro* studies is used to describe the mechanism of interaction as well as theoretical interactions. The authors explain that the sparsity of clinical interaction research for botanicals requires including this speculative approach. All interaction data are referenced.

The relative importance of the listed interactions is addressed, based on the weight of evidence and severity of outcome, suggesting appropriate actions such as substituting safer alternative agents. The potential seriousness of the listed interactions is designated according to a simple rating system using 5 symbols to indicate a clinical course: (1) avoiding due to potential life-threatening outcome, (2) adjusting dosage and monitoring closely for significant hazards, (3) advising about potential hazards when evidence is poor, (4) giving guidance on possible adverse effects and monitoring when the outcome is doubtful, and (5) reassuring the patient when there is no clinically-significant risk.

Many, if not most, of the designations given for the listed interactions in the text are indicative of uncertainty (numbers 3 and 4). The judgements

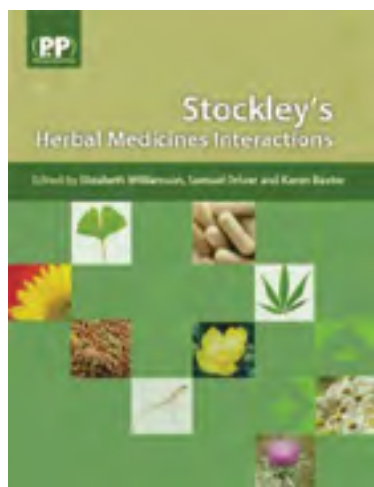
are based on objective data but also involve subjective assessment, so obviously not every ranking will meet with universal agreement. In light of the challenging subject matter, some assessments could have been enhanced by greater collabora-

tion with herbal medicine authorities. Since all degrees of actual or potential interactions are listed together under each herb, these symbols do provide a simple visual means of identifying their relevance.

This book provides a comparatively comprehensive and reliable source of information regarding pre-clinical and clinical research on mostly herbal medicinal agents. Under the heading of “General Considerations” at the beginning, the authors acknowledge the complexities and limitations of organizing and delivering information on this subject. Difficulties in drawing conclusions arise from variations in herbal preparations and dosage, types and qualities of evidence, and differences between individuals in regard to age, genetic and metabolic profiles, pathophysiology, etc. They have done a respectable job of keeping the information in a clinical context by establishing criteria for judging clinical relevance and identifying it with an easily grasped system of symbols.

I would recommend this book especially for those practitioners who are not experts in botanical prescribing and therefore need to rely heavily on others’ knowledge and judgements. The authors themselves recognize that the variety of preparations for any given botanical changes the degree of potential risk associated with a particular preparation, depending on its specific phytochemical content and concentration. The accuracy and value of this and similar books will undoubtedly increase in succeeding editions as better research data and knowledge continue to accrue. The necessary generalizations provided in this text are best utilized when adapted by practitioners according to the particular herbal preparation used and the individual patient under their care. Given its inherent limitations, this book can serve as an important resource to help sort through the varying shades of likelihood and uncertainty.

–Francis Brinker, ND  
Clinical Assistant Professor  
Department of Medicine  
University of Arizona  
Tucson, AZ





## Maury Silverman 1946–2010

Maury Morton Silverman, an herb and natural medicine enthusiast who often went to great lengths to inform others about herbal medicines, dietary supplements, and complementary and alternative medicine, passed away on January 30, 2010, from complications related to a heart attack.<sup>1</sup> Silverman intensely lobbied Congress for the passage of the Dietary Supplement

Health and Education Act of 1994 (DSHEA) in the early 1990s.

“Almost on a weekly basis, a brown manila envelope would show up in the mail, unsolicited, with a host of herbal and health freedom-related materials that Maury found on his weekly runs to the National Library of Medicine,” said Roy Upton, executive director of American Herbal Pharmacopoeia (AHP) and long-time friend of Silverman (e-mail, February 17, 2010). “Occasionally, photocopies of entire texts would show up from books he found and knew would be of interest to others. He would send these packages on his own dime to people he thought would use that information to revamp the dominant disease care system, which was a passion of his.”

Upton noted that this was in spite of Silverman’s almost constant personal financial struggles to keep a roof over his head: “He was committed to changing the disease care system into a healthcare system and seemed to work tirelessly, with little funding and little support from others, to help this manifest by providing informational support to others.”

“He understood that there were a lot of ways to heal besides allopathic medicine,” said Silverman’s sister Rhiana Levy (oral communication, May 25, 2010). “There are often a lot of problems with allopathic medicine, like side effects. Maury understood that a healer must heal the whole body.”

Silverman often provided information to members of Congress and industry organizations. During the lobbying period before DSHEA, he delivered literally thousands of pieces of information to Congress, and he also visited their offices weekly with information from organizations such as Citizens for Health and the National Nutritional Foods Association (NNFA), said Upton. He was known to have stopped a senator at an elevator in the Senate building and an agency director walking his dog through his neighborhood in order to discuss the value of natural healthcare, said Upton. He would even attend Congressional hearings that affected the natural healthcare movement and distribute the testimonies of presenting experts before they were made available through Congress.

“He was doing what he was doing for the right reasons, to make the world a better place for others and not for ego, finances, or fame,” said Upton.

Silverman was on the American Herbal Products Association’s (AHPA) payroll for a time, since he was so good at retrieving infor-

mation from the National Agricultural Library or the National Library of Medicine, said Steven Dentali, PhD, chief science officer of AHPA (e-mail, May 6, 2010). “He would show up in the AHPA office with an insatiable appetite for sharing and collecting of information, and free use of the copier.”

Also, according to Dr. Dentali, Silverman’s collection of natural healing books covered all aspects of the subject from the 1970s onward: “It was present in every room of his house in bookcases that lined every wall,” said Dr. Dentali. “I heard that he was sometimes forced to move due to building structural damage caused by the weight of his library.”

“Maury was probably one of the greatest contributors and resources of natural healthcare and foundational botanical knowledge on the planet,” said George Freibott IV, ND, Silverman’s friend of 25 years and president of the American Naturopathic Association (oral communication, June 1, 2010).

Dr. Freibott and Silverman had been working together with the American Naturopathic Association and the American Library for Health to create a global natural medicine e-library. With over 100,000 volumes of material, some dating back to the 14<sup>th</sup> century, this library should be available at [www.webnd.org/ilh](http://www.webnd.org/ilh) in the near future. A scanning facility will continue to scan in this valuable natural, alternative, and botanical information over the next few years.

“The combined library of the American Naturopathic Association and the American Library for Health will give an incredible asset of knowledge to natural healthcare researchers and advocates of nature,” said Dr. Freibott. “Its greatest assets are the many obscure botanical reports and studies compiled by Maury Silverman, in his private research that he collected for the many agencies he assisted in studying the natural alternative healing arts and sciences.”

“Maury was a true believer—single-minded, focused, and totally committed to natural health,” said American Botanical Council Founder and Executive Director Mark Blumenthal. “He worked almost tirelessly for the benefit of the natural health agenda, seldom thinking of himself, always putting the interests of others first, unfortunately, often to his own financial detriment. Like many others in the natural health community, I too have piles of photocopied books and manuscripts that Maury sent to me, unsolicited. With his passing, I’m sure that the copier at the National Library of Medicine will be able to take a much needed breath!”

Silverman is survived by sisters Miriam Komisarof, Rhiana Levy, and Marlene Kossoff, as well as 6 nieces and nephews. His brother Michael preceded him in death. HG

—Kelly E. Lindner

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1. Obituary: Maury M. Silverman. *Washington Post*. February 8, 2010. Available at: [www.legacy.com/obituaries/washingtonpost/obituary.aspx?n=maury-m-silverman&pid=139520335](http://www.legacy.com/obituaries/washingtonpost/obituary.aspx?n=maury-m-silverman&pid=139520335). Accessed February 15, 2010.





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### Stephen McNamara 1943–2010

Noted food and drug attorney Stephen Hull McNamara passed away from complications related to cancer on December 28, 2009, in Gaithersburg, Maryland. He was 66.<sup>1</sup>

A graduate of the University of Virginia School of Law, McNamara was a partner of Hyman, Phelps & McNamara, PC of Washington DC, specializing in the regulation of food, drugs, and cosmetics. He also worked for the Food and Drug Administration (FDA) in several positions for many years and was a strong supporter of consumers' access to and use of dietary supplements.

"Steve was a tireless and enthusiastic advocate for the dietary supplement and herbal products industry; he was loved and respected by all who knew him," said friend Holly Bayne of The Law Office of Holly Bayne, PC (e-mail, May 11, 2010). "He was instrumental in drafting legislation that became the Dietary Supplement Health and Education Act of 1994 (DSHEA), and he once told me that he thought FDA had unfairly targeted dietary supplements and herbal products."

McNamara's former partner Paul Hyman of Hyman, Phelps & McNamara said he believed McNamara was so passionate about dietary supplements because he enjoyed the company of many in the dietary supplement industry: "He seemed to especially like some of the more pronounced personalities in the crowd," said

Hyman (oral communication, May 17, 2010). "He also believed in freedom of choice and thought people should be allowed to make their own decisions about their health."

It was not unusual for McNamara to see both sides of a debate and decide his own place in it. He was an Irish Quaker who served in Vietnam from 1967–1969 as a chaplain's assistant. He believed it was the "patriotic" thing to do, said Hyman. During his time in Vietnam, he received the Bronze Star, the Purple Heart, and the Army Commendation Medal.<sup>1</sup>

According to Bayne, his favorite greeting was "peace."

"In his personal and professional life, Steve was a peacemaker. He generally didn't take sides but would try to bring matters to a reasonable conclusion," said Hyman. "He had his own opinions, but he wasn't someone who would get into an argument about politics."

Before joining the law firm, McNamara was the senior vice president and general counsel for the Cosmetic, Toiletry, and Fragrance Association, Inc. (now the Personal Care Products Council).<sup>1</sup> At the FDA, he held the positions of staff attorney, senior trial attorney, and associate chief counsel of food. He also served as the acting chief counsel for a year and received the FDA Award of Merit twice.

"Steve was passionate about living and life in general—and he was passionate about the law and loved his work as a food lawyer," said Bayne.

McNamara also enjoyed his Irish heritage and "loved all things Irish," said Hyman. "He loved Irish music and would try to attend concerts by visiting musicians such as The Wolfe Tones, The Clancy Brothers, and Tommy Makem."

One of McNamara's hobbies was photography. According to Hyman, he particularly enjoyed taking photographs of his travels and of his family, and he loved hiking, especially in the Grand Canyon.

McNamara was also devoted to his family. "He loved his family deeply," said Bayne. "When he would work on weekends, his loving wife Caroline of 43 years would come to the office with him so they could be together. She would read on the couch in his office, taking breaks with him to keep him company."

"Steve was one of the finest people I have ever known," said Loren Israelsen, executive director of the United Natural Products Alliance (e-mail to M. Blumenthal, July 9, 2010). "In the many years we worked together on DSHEA, I learned what it means to be a gentleman, a scholar and a friend. I went to visit Steve and his wife Caroline at their North Carolina cabin about a year ago. We sat on the porch listening to the coon hounds baying into the night sky. He knew he was ill, and you could sense his gratitude for moments like this. As I was leaving the next day, I buckled up into my rental car. He looked at me through the window and simply said, 'peace.' And that was Steve."

McNamara is survived by his wife Caroline, his sister Ann McNamara Chase, his children Matthew McNamara and Deborah Hutchins, and 6 grandchildren. HG

—Kelly E. Lindner

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### Buckston Alexander Harrison 1958–2010

Buckston Harrison, founder and operator of Harrison's Herbal Products and Sheffield Herbs and Spices in Jamaica, died on March 22, 2010. He was 52 years old.

An ordinary man with extraordinary talents in the field of herbs and herbal supplements, Buckston was born on August 24, 1958, the son of Elvira Lucille Genus and Winston Harrison. He trained as an agriculturist and taught this science to primary schools in Hanover, Jamaica for a brief period.

I met Buckston early in 1980, when I had just established Jamaican Style Herbal Garden in Stony Hill as an attraction for local and international interest, packaging teas and spices for the tourist market. In his early teens, Buckston had suffered an accident that left part of his face severely scarred, and he was interested in trying an application of comfrey (*Symphytum officinale*, Boraginaceae) leaves to reduce the scarring. He obtained comfrey from my garden to propagate and use, and he kept me abreast of the results of the comfrey application. Within 2 years, the scars had cleared to reveal smooth skin. This was the beginning of his journey into the kingdom of herbs and of our relationship.

Buckston started his herbal business in 1984, packaging and selling dried comfrey leaves and selling the books *Jamaican Herbs* and Jethro Kloss' classic *Back to Eden*, which educated readers about the value of herbs. He started producing spices in containers, and he dried Jamaican herbs from a little farm that he established.

He met many visitors and persons of interest in his work. He was energetic, positive, and passionate about herbs, always sharing the delightful discoveries he made with stakeholders and friends in the industry. His products were in demand as he entered many farm shows and festivals island-wide, marketing and sharing his passion with the public.

Buckston assisted in setting up a Gaia Research Farm in the late 1980s. "I remember Buckston as an affable, thoughtful, and knowledgeable 'bush herbalist' who was very interested in building a cooperative network of small medicinal herb growers and wildcrafters in Western Jamaica so that proceeds from a biologically diverse and sustainable supply chain would, in turn, support school construction in some of Jamaica's small mountain villages," said Greg Cumberford, vice president of strategic initiatives at

Gaia Herbs, Inc. (e-mail to C. Cavaliere, April 29, 2010). "I will always remember his warmth, his intelligence, and his smile. His untimely death is a real loss for Jamaica's medicinal herbal community."

Buckston practiced as an indigenous healer, using herbs synergistically with the astrological signs of his clients, and he concocted his herbs as root tonics, spices, and skin and hair creams. Three years ago, he was asked to become a contributor/writer for the *Observer* newspaper, based in Kingston, Jamaica. His knowledge was often sought by his readers, both locally and internationally. "There was so much knowledge in this one man ... no matter what the topic was he had a contribution to make," remarked *Observer* editor Patricia Roxborough Wright.

Buckston was a member of the Wholistic Herbal Association, formed in 1993, which campaigned to have herbs, supplements, and herbal over-the-counter medicines included in the Food and Drug Act of 1964 so that they could be imported into Jamaica. (Prior to 2004, such products were denied entry into the island unless they were classified as "drugs.") The herbal communities of Jamaica have expressed their shock at Buckston's death. (He died of stab wounds, apparently by an intruder into his home.) As president of the Caribbean Herbal Business Association Jamaica Chapter, I am so proud of Buckston's labor in the field of ethnobotany. His charm placed him on the road to success, and he cared for people of all walks of life. He was widely loved.

"I first met Buckston Harrison in 2001 when I began work on the formation of the Caribbean Herbal Business Association," said Denzil Phillips, medicinal and aromatic plant agronomist (e-mail to C. Cavaliere, May 4, 2010). "I visited his home, clinic, and rambling garden several times outside Negril. Buckston was highly knowledgeable about his local herbs, but above all he was a man of great charm and integrity. He was gentle, and his patients always had huge respect. Jamaica and the region have lost a great herbalist."

Last year, Buckston and I attended an Herb Fest held at Montego Gardens in association with the Rasta Indigenous Village, during which I introduced him to the visiting keynote speaker, American Botanical Council (ABC) Founder and Executive Director Mark Blumenthal.

"I appreciated his strong passion for herbs and medicinal plants," said Blumenthal, upon learning of Buckston's death. "This news is so sad. It doesn't seem fair that a man who dedicated his life to helping others live more naturally and more gently on this Earth would have his own life taken from him in such a brutal manner. The people of Jamaica have lost a truly natural and national treasure."

Buckston is survived by his 2 sons Kenroy and Buxton Jnr, his 2 daughters Renee' and Simone, his father, his sisters Nadine and Dawn Harrison, and his brothers Andrew, Delroy, Donovan, and Danny Harrison. Peace profound, my friend and protégé—may your soul rest in peace. HG

—Diane Robertson, RPh  
President, Caribbean Herbal Business Assn.,  
Jamaica Chapter,  
Kingston, Jamaica



### Howard Lotsof 1943–2010

Howard Lotsof, a persevering advocate for the use of ibogaine in addiction treatment, died January 31, 2010, from liver cancer.<sup>1</sup>

Lotsof was addicted to heroin during the early years of his adulthood, but his life changed in 1962 when he ingested ibogaine, an extract from the West African shrub *iboga* (*Tabernanthe Iboga*, Apocynaceae).<sup>2,3</sup> While *iboga* has been used by indigenous African tribes during ceremonies and to treat fatigue and hunger for many years, Lotsof was the first known person to attest to its effects on drug addiction. About 36 hours after taking ibogaine, the psychoactive state it had induced began to wear off, and the heroin withdrawal symptoms Lotsof usually experienced were absent. While he once thought of heroin's high as euphoric, he now saw it as an emulation of death.

"I followed the tree up into the sky and I saw these clouds in the sky, and I realized for the first time in my life, I wasn't afraid," said Lotsof at a 2008 lecture.<sup>2</sup> "And that brought me to the understanding that at least certain drug addiction is fear and anxiety driven, and that fear and anxiety were gone for the first time in my life."

Lotsof then administered dosages of ibogaine to about 20 people, seven of whom were heroin addicts, and five of the 7 addicts reported that they did not use heroin for 6 months or longer.<sup>3</sup> These studies, however, were carried out in unconventional settings. Further research was prohibited, as the US Food and Drug Administration (FDA) labeled ibogaine as a Schedule I substance in the late 1960s, a time when many psychedelic and hallucinogenic drugs were banned by the government. Lotsof's passion for ibogaine continued, however, and he would eventually become its foremost advocate.

"He had a great medical and personal intuition, and his knowledge in addiction science was amazing," said Boaz Wachtel, a former Israeli Army medic who worked with Lotsof on several ibogaine research projects (e-mail, May 9, 2010). "He was a true

activist who dedicated his life for the promotion of a drug addiction interrupter."

Lotsof began encouraging researchers, public officials, and pharmaceutical companies to study ibogaine's potential as an addiction interrupter, and in 1982 he created the Dora Weiner Foundation, named for his grandmother, in order to work for the development of an ibogaine medicine.<sup>1</sup> But the foundation had difficulty obtaining funding for research, largely because the pharmaceutical industry was uninterested in developing the plant substance into a drug.

In 1986, Lotsof obtained patents on ibogaine for heroin, cocaine, amphetamine, alcohol, nicotine, and polysubstance abuse, after which he formed the private company NDA International.<sup>3</sup> He began working with international partners on laboratory studies, which showed efficacy in animals. From 1991 to mid-1993, NDA co-sponsored several non-medicalized human studies in the Netherlands and one in Panama, with 2 other addict treatment organizations.

Many addicts in these studies reported improvements in withdrawal, drug-seeking behaviors, and the length of time before relapse,<sup>3</sup> and it has been reported that about two-thirds of them stopped using drugs for 4 months to 4 years.<sup>1</sup> This was an improvement compared with conventional addiction treatment, after which addicts usually relapse within 6 months. In 1993, however, a female subject in one of NDA's Dutch studies died, and though ibogaine was not suspected to be the cause of death, NDA stopped its treatment programs in the Netherlands. According to Rick Doblin, PhD, founder and executive director of the Multidisciplinary Association for Psychedelic Studies (MAPS), who knew Lotsof for about 20 years, Lotsof sympathized with the family of the deceased woman and had great compassion for those who have died in treatment clinics. He thought these deaths could have been avoided if studies were conducted in more medicalized settings (oral communication, April 27, 2010).

The US National Institute on Drug Abuse (NIDA) had been developing Phase I and II clinical trial protocols for ibogaine but decided to end this project in 1995.<sup>3</sup> Exact causes for the cancellation remain unknown, but rumored reasons range from contract disagreements, fear of unproven neurotoxicity, the pharmaceutical industry's alleged lobby against it, and NIDA's supposed bias against the psychedelic aspects of ibogaine.

"That was the closest that ibogaine ever came to ever being studied [in the United States]," said Dr. Doblin. "Howard was heartbroken when that happened."

Because Lotsof still believed in ibogaine's positive results, he continued to push for research, said Wachtel. He produced research protocols, created safety guidelines, searched for funding, and joined with partners interested in ibogaine research and treatment facilities. One partner, Deborah Mash, PhD, received FDA approval for a Phase I study on ibogaine in 1993, but the research was never completed. While conducting controlled research on ibogaine remained difficult, Lotsof focused his attention on the independent ibogaine clinics in Europe, Mexico, and the Caribbean, which have been treating addicts for years.

"He dreamed that [ibogaine] would eventually pass the FDA and be used under clinical environment," said Wachtel. "It did not happen the way he expected, but [ibogaine] is used today mostly outside the USA with complete disregard to the FDA

status. As an ex-addict, Howard knew that the addicts had very few choices or medications to treat their addiction, and here there was a substance with such profound positive results that he probably said to himself, 'If I would not pursue [ibogaine] development, I would be sorry and feel guilty the rest of my life.'

While scientists in the United States appear to be tentatively re-opening the doors into the study of certain psychedelics and hallucinogens, clinical research on ibogaine remains at a standstill.<sup>4</sup> Despite a lack of evidence of recreational use or abuse, ibogaine continues to be classified as a Schedule I substance in the United States.

"I don't think [ibogaine] has too great of a risk profile," said Dr. Doblin. "And the treatment of addiction is a significant problem. The question is who will pay for the research? The addict is still, in our culture, the other. The way for us to respond to Howard's life and death is to continue to explore ibogaine and get new data."

According to Wachtel, attendees at an ibogaine conference held in 2009 formed a federation for ibogaine treatment providers, and they plan to elect a board and implement worldwide ibogaine safety standards.

"We are all following his footsteps," said Wachtel. "He leaves a legacy of compassion, of going after social/medical improvements with major personal cost, as a beam of light for people who seek hope in the face of life-long struggle with addiction. Many people owe their recovery and freedom from the slavery to drug addiction to Howard's discovery."

"I think Howard died somewhat disappointed," said Dr. Doblin. "But at the same time, he knew that he had started something that isn't going to disappear and will eventually become accepted." HG

—Lindsay Stafford

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## Re: Do Lunar Phases Influence Plant Chemistry?

To the Editor,

Thank you for the excellent article of Ian B. Cole and M. J. Balick published in *HerbalGram* 85. This contribution opens interesting perspectives, both at the level of fundamental research and at the level of practical applications for obtaining improved raw material quality.

Since we started working on the field of tree chronobiology linked to lunar rhythms, it has been possible to observe significant relationships for different aspects of tree life and wood properties. Here is a short overview:

- The germination and initial growth of some tropical trees show a decided rhythmic character. Speed of germination, percent of germination, average height, and maximum height after 4 months are systematically related to the timing of sowing in relation to the moon phase.<sup>1,2</sup>
- The drying behavior (water loss/shrinkage) and the final density of wood systematically and coherently vary in function of the tree felling date, if analyzed in relation to the season and to the position of the moon.<sup>3,4</sup> The observed fluctuations are yet more complex than mentioned in forestry traditions existing all over the world.
- An interdisciplinary reworking of previously published, long-term tree-physiological research results (variations of tree diameters obtained by extensometry) has enabled researchers to consider an unexpected aspect: the synodic

(time required for the moon to complete a full phase, i.e., usually 29.53 days) moon-rhythm at a daily level (gravimetric tide-rhythm) could be established for trees held under constant conditions (darkness).<sup>5</sup>

- Data of trees measured in open conditions, reanalyzed recently with more sophisticated tools, brought spectacular confirmation of the role of lunar tides in tree physiology.<sup>6</sup> In the meantime, it had been possible to detect the same type of fluctuations by measuring with a high-sensitivity device the low-potential electric currents along the trees' stems, depending on the physiological phase of the trees.<sup>7</sup>

This information, and more, is summarized in my extensive review of 88 scientific publications related to this topic, published recently in a book on botany.<sup>8</sup>

—Ernst Zürcher, Dr. sc. nat., Forest Engineer ETHZ,  
Professor for Wood Science  
Bern University of Applied Sciences, Architecture, Wood  
and Civil Engineering

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Dear Editors,

Your cover article on Lunar Influence on Herbs in issue 85 consisted mainly of old superstitions and had no data or evidence on influence of the moon on herbs or any other plants.

Statements on effect of the moon on harvesting of wood products not only did not fit the title of the article but were outdated. Why do lumber companies around the world harvest non-stop through the seasons with no consideration of the moon—yet they have uniformity in quality of their products? Why do farmers with



large acreage plant non-stop over several weeks when the weather and soil conditions are good? They do not have differences in harvest from different sections of the farm based on the date of agricultural work.

I worked for 3 months for the Forest Service testing germination of seed. For each test we had “common seed” germinating as controls. Had there been differences in germination under different signs of the moon it would have shown up in the tests to alert us to the errors in our results. Over 3 months there was no significant deviation in germination except for quality of the seed we were testing. No influence on germination of seed from the moon. No difference in germination when conditions of heat, moisture, light, fertility, etc. were constant. Those are the things that influence germination and growth of plants. Those are the things that give seasonal variation in quality from plants—not signs of the moon.

Most of the references listed in the article appeared to be based on hearsay, not on tests or reports of experiments.

Getting multiple references that are not scientific or valid does not add validity to an inaccurate supposition. The information in the article was worthless and misleading—not worth printing or reading.

—C. Dwayne Ogzewalla, PhD  
Professor Emeritus  
University of Cincinnati, College of Pharmacy

### Authors' Response:

We deeply appreciate the feedback from Dr. Ogzewalla on our brief review article. Our intention in preparing this article was to survey the peer-reviewed literature as well as folkloric beliefs as a prelude to our own studies of the variation in compounds found in a swamp palm used for thatch, and observe whether or not such variation could be documented over the lunar cycle. This intention was clearly stated in the article. Our first results, which we now are repeating, on a species of palm used for thatch, seem to validate the hypothesis that lunar cycle—as determined by evaluating samples made from the daily harvest of palm leaves during a six-week period—seems to have an impact on plant chemistry. But until this work is repeated, we cannot be certain of the variation found in this individual species.

As specialists in ethnomedical and ethnobotanical practices, the occurrence of similar beliefs in so many disparate parts of the world—in this case the effects of moon phase on composition and durability of a variety of products—is fascinating and in our judgment worth testing. We have learned long ago to not be immediately dismissive of traditional beliefs—but rather use the tools of modern science to help separate “fact” from what is purely speculative or a folkloric, perhaps animistic, explanation for a specific phenomenon. While Dr. Ogzewalla did not observe the influence of outside forces on his own seedling experiments, we know, for example, that in the field of conventional drug discovery and clinical evaluation, there are many trials that yield negative results while others yield positive results. And to take the specific case of mood-enhancing pharmaceutical drugs, the fact that there are only a few positive trials with small increases above placebo in some formulations (vs. more numerous negative trials) has been effectively used as a case for governmental approval of these individual

therapies.

It is widely acknowledged that many factors—soil, moisture, cultivation practices, altitude and others—influence the chemistry of a botanical. Is it possible that there is a lunar influence on herbs? Can and should we test the traditional beliefs—often held by widely dispersed societies that have been observing their environments for millennia? Others may disagree, but we suspect that decades from now, this question will be viewed as having been worth studying at a variety of levels—e.g., variation in botanicals, timber, wine, food crops, etc.—and more conclusive results may even be available to the scientific and consumer communities to discuss and debate. We believe it is instructive to remember that not many decades ago, nutrition was dismissed as not being worth more than a relatively brief mention in a medical student's training. How far we have come.

—Ian B. Cole  
Research Associate  
Montgomery Botanical Center

—Michael J. Balick, PhD  
Vice President for Botanical Science  
Director and Philecology Curator of the Institute of  
Economic Botany  
New York Botanical Garden



Photo ©2010 Steven Foster

**August 29 - September 2: 58<sup>th</sup> International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research.** Berlin, Germany. Aiming to encourage the sharing of medical practices and resources among countries around the world, this conference focuses on the expanded possibilities of polyphenols in human health, nutrition, and the food industry. The congress begins with a pre-symposium on tannins and continues with workshops and lectures on topics such as cellular and mechanical mechanisms, natural products in drug discovery, regulatory affairs of herbal medicine products, and the biological and pharmacological activities of polyphenols. The event also includes parties, an organ recital, and a closing dinner at the Botanical Garden Berlin. More information is available at: [www.ga2010.de/](http://www.ga2010.de/).

**August 30 - September 3: SYMPLITALY 2010: 2<sup>nd</sup> International Symposium on Genus *Lilium*.** Pescia, Tuscany, Italy. Attendees at this event will have the opportunity to discuss a variety of topics concerning the genus *Lilium*, including botany, economics, genetics, breeding, propagation, physiology, agronomy, pathology, quality, and post-harvest management. The symposium includes informal discussions, as well as more formal panel sessions, and will also feature oral presentations, poster sessions, and flower market and technical tours in the Pescia area. More information is available at: [www.symplitaly2010.com](http://www.symplitaly2010.com).

**September 8-10: 5<sup>th</sup> CMDD Symposium on Marine Natural Products and Drug Discovery.** Pohang, Korea. With the title, "From Bench to Clinic I," this conference covers topics including neuronal diseases, diabetes, atherosclerosis, cancers, osteoporosis, infectious diseases, and preclinical-to-clinical translation. Scholars and practitioners of marine natural products and biomedicine from around the world will gather to exchange ideas and present on their recent and ongoing research. Additional activities include invited lectures, oral and poster presentations, and a gala dinner. More information is available at: [www.cmdds.or.kr](http://www.cmdds.or.kr).

**September 18-22: 2010 New Crops: Exploring Diversity, Preserving our Future.** Fort Collins, CO. This 22<sup>nd</sup> annual meeting of The Association for the Advancement of Industrial Crops

will feature a plenary session, symposium, and discussions on topics such as green metrics as a decision-making tool for industrial crops, industrial perspectives on bio-based products, converting biomass to solid or liquid bio-fuels, and contemporary approaches to improving crops for medicinal traits. Also offered are a variety of tours to locations such as the National Center for Genetic Resources Preservation, New Belgium, Fort Collins, and Coopersmith breweries, the National Renewable Energy Laboratory, and Cargill Corporation. More information is available at: [www.aaic.org/2010\\_meeting.htm](http://www.aaic.org/2010_meeting.htm).

**September 20-25: 11<sup>th</sup> Congress of the International Society of Ethnopharmacology.** Albacete, Spain. This event takes on several guiding themes that relate to ethnopharmacology, including biocultural diversity, Circum-Mediterranean ethnopharmacology/ethnobotany and its exchange with the Americas, traditional remedies to modern medicines, clinical studies, non-governmental organizations and their role in ethnopharmacology, history, and the interface of medicinal and food plants. Special activities include a tribute to the late ethnobotanist Nina Etkin and a screening of the documentary "The Living Garden." More information is available at: [www.ise2010.org](http://www.ise2010.org).

**September 24-26: Green Nations Gathering.** Rowe, MA. This event is the 19<sup>th</sup> annual gathering of Green Nations, communities of people who love and respect the Earth and honor the interdependent diversity needed for peaceful, sustainable life. The gathering includes special guest Rosemary Gladstar, a variety of featured teachers, Equinox Fire Circle, and a live case study with an herbalist panel. Attendees will view a slide presentation of North America's meadows, woodlands, and backyards in order to identify medicinal plants and weeds. Presentations and classes will discuss topics including: herbs for winter health, animal medicine, the art of fermenting, and clinical skills. More information is available at: [www.greennations.org/workshops.htm](http://www.greennations.org/workshops.htm).

**September 24-25: Smithsonian Botanical Symposium 2010: "Food For Thought: 21<sup>st</sup> Century Perspectives on Plants & People."** Washington, DC. Presented by the Smithsonian's National Museum of Natural History Department of Botany, this symposium focuses on the study of interactions between plants and

people and how this transformed throughout the 21<sup>st</sup> Century. Invited speakers will discuss a variety of topics, including molecular biology's role in clarifying crop domestication, and the ways people in various ecosystems interact with specific plants and landscapes. More information is available at: [www.botany.si.edu/sbs](http://www.botany.si.edu/sbs).

**September 29 - October 2: The Workshop and Conference: The Council for Responsible Nutrition's (CRN) Day of Science and Annual Symposium for the Dietary Supplement Industry.** Austin, TX. CRN's yearly event begins with a day dedicated to discussing critical aspects of future dietary supplement research. This workshop features a keynote address on a global perspective on the role of dietary supplements in dietary guidance, as well as discussions on biomarkers, science informing policy decisions, recent advances in nutrigenomics/nutrigenetics, and controversies over nanotechnology research and its applications in dietary supplements. Following this workshop is the 3-day conference, which gathers top industry professionals to discuss business, legislative, regulatory, and scientific issues. Attendees can choose one of 3 special events, including the CRN annual golf tournament, rafting the Colorado River, and a tour of the American Botanical Council's herb gardens. More information is available at: [www.crnusa.org/2010events](http://www.crnusa.org/2010events).

**September 30 - October 3: 2010 American Herbalist Guild National Symposium.** Austin, TX. This annual conference, titled "The New American Herbalism: Exploring the Roots and Branches of Our Herbal Heritage and Bringing Theory into Practice," will explore the roots of modern Western herbalism tradition and its many branches. The conference also aims to combine theory and practice with clinically focused classes on herbalism fundamentals, such as physical assessment, formulation, and clinical strategies. Attendees will have the opportunity to gain a deeper understanding of new clinical skills, botanical medicines for their practice, the business of botanical medicine, as well as gain a new inspiration for teaching. The conference's classes discuss topics ranging from health activism to Traditional Chinese Medicine to cannabis history and clinical uses. More information is available at: [http://americanherbalistsguild.com/symposium\\_2010](http://americanherbalistsguild.com/symposium_2010).



**October 4-10: 10<sup>th</sup> Latin American Botany Congress.** La Serena, Chile. Aiming to promote advances in botanical medicine in Latin America, this scientific congress features a symposium, paper presentations, workshops, round table discussions, and an excursion, all focused on the conservation and sustainable use of native Latin American flora. More information is available at: [www.botanica-alb.org/X\\_Congreso](http://www.botanica-alb.org/X_Congreso).

**October 10-13: 5<sup>th</sup> Biennial Symposium of Integrative Medicine Professionals in the Land of Enchantment (SIMPLE).** Albuquerque, NM. Attendees at this conference

will have the opportunity to access the latest original research in the field of complementary and alternative medicine (CAM), particularly in the areas of cardiology, pediatrics, oncology, and mental and women's health. The conference also explores the areas of preventative medicine, nutrition, wellness, spirituality, and stress management, while

also offering opportunities to experience art therapy, meditation, shamanic healing rituals, and movement therapies. Continuing education credits are available for physicians, nurses, acupuncturists, and chiropractors. More information is available at: [www.hsc.unm.edu/som/cme/2010/SIMPLE/SIMPLE.shtml](http://www.hsc.unm.edu/som/cme/2010/SIMPLE/SIMPLE.shtml).

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*Clinicians' and Educators' Desk Reference on the Licensed Complementary and Alternative Healthcare Professions* was recently published by the Academic Consortium for Complementary and Alternative Health Care (ACCAHC). This 124-page reference book provides detailed information on each of the featured licensed complementary and alternative medicine (CAM) professions, including acupuncture and Oriental medicine, chiropractic, massage therapy, direct-entry midwife, and naturopathic medicine. Each profession's section discusses subjects such as philosophy and mission, clinical care, regulation, education, accreditation, and research. The reference book also includes appendices on additional CAM modalities, including Ayurvedic medicine, yoga therapy, integrative medicine, homeopathy, holistic nursing, and holistic medicine. Written by a variety of expert authors identified by national CAM-related organizations, this publication can serve as a reference book for clinicians or can be used as a textbook and resource for educators and students. Available at: [www.accahc.org/index.php?option=com\\_content&view=article&id=42&Itemid=24](http://www.accahc.org/index.php?option=com_content&view=article&id=42&Itemid=24)

**WellnessTweets.com** is a new website that aggregates millions of health- and wellness-related "tweets" from the social networking site Twitter. Launched by the popular website altMD, WellnessTweets.com monitors CAM-related tweets on Twitter and displays the tweets deemed most relevant on its own site, organizing them by health condition and wellness specialty. This service aims to allow readers to efficiently and easily navigate what the world's "tweeters" are saying about dozens

of CAM topics, as well as to begin following certain tweeters who they think are discussing important or interesting subjects and ideas. Available at: [www.WellnessTweets.com](http://www.WellnessTweets.com).

**Wellwise.org**, a new website and nonprofit organization, was recently launched to provide readers with information on dietary supplements, the science surrounding supplements, and additional health strategies. Visitors to the website will find information on how supplements impact various health conditions, links to scientific research, video and audio interviews with supplement and nutrition experts, podcasts, and blogs written by a diverse array of authors, including scientists, food and nutrition writers, researchers, and doctors. Available at: [www.wellwise.org](http://www.wellwise.org).

**Drugs.com**, a website providing prescription medication information to millions of monthly visitors, has partnered with the US Food and Drug Administration (FDA) to host a new webpage featuring FDA consumer health information. The new collaborative page, a part of Drugs.com's larger site, includes links to articles, videos, and slideshows of FDA consumer, warning, and safety notices on drugs and food. Also available are articles on FDA-related topics like clinical trials and product recalls, as well as general health articles discussing subjects such as vitamins, eating for a healthy heart, and coping with memory loss. Additionally, Drugs.com's pages on specific medications now have a section providing links to relevant FDA information, such as safety guides for that type of drug and product recalls. The collaboration's content will also be available on

Drugs.com's mobile phone platform. Available at: [www.drugs.com/fda-consumer](http://www.drugs.com/fda-consumer).

**The Center for Scientific Review (CSR)** of the National Institutes of Health (NIH) recently published a new online video series that demonstrates how NIH grant applications are reviewed. These videos aim to assist new and established applicants with the sometimes-intimidating process of understanding and completing grant applications, so that they can improve their applications and have a better chance at receiving positive reviews. The first video, titled "NIH Peer Review Revealed," discusses the scientific and technical merit review process, features interviews with CSR administrators, and provides a glimpse of two "fictional but realistic" peer review panel meetings. The second video, "NIH Tips for Applicants," provides advice and insights for applicants from grant application reviewers, who discuss topics such as common mistakes to avoid, the most important points to convey in an application, how to seek outside review before submittal, and what to do with received criticisms. Available at: [www.cms.csr.nih.gov/ResourcesforApplicants/Inside-theNIHGrantReviewProcessVideo.htm](http://www.cms.csr.nih.gov/ResourcesforApplicants/Inside-theNIHGrantReviewProcessVideo.htm).

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

**American College of Healthcare Sciences, ACHS.edu** is the only accredited, fully online college offering degrees, diplomas, and career-training certificates in complementary alternative medicine. ACHS is committed to exceptional online education and is recognized as an industry leader in holistic health education worldwide. Visit [www.achs.edu](http://www.achs.edu), call (800) 487-8839, or stop by the College campus located at 5940 SW Hood Ave., Portland OR 97239.

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