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File: ■ Devil's Claw (*Harpagophytum procumbens*, Pedaliaceae)
■ Inflammation
■ Pain

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RE: Devil's Claw Has Positive Effects on Pain and Inflammation

Gxaba N, Manganyi MC. The fight against infection and pain: Devil's claw (*Harpagophytum procumbens*) a rich source of anti-Inflammatory activity: 2011-2022. *Molecules*. June 6, 2022;27(11):3637. doi:10.3390/molecules27113637.

Although inflammation is a natural defense mechanism to facilitate healing, consistent inflammation can lead to several diseases including rheumatoid arthritis, asthma, atherosclerosis, and osteoarthritis. Pain can accompany inflammation. The most common treatment for pain is non-steroidal anti-inflammatory drugs; however, these can be costly and have adverse effects including progressive heart failure, gastrointestinal lesions, and renal and liver failure. This has led researchers and physicians to search for safe and affordable natural alternatives to treat pain and inflammation. Studies have indicated that devil's claw (*Harpagophytum procumbens*, Pedaliaceae) root has anti-inflammatory, antibacterial, antifungal, antiviral, and anticancer effects. The authors propose a comprehensive systematic summary of studies published between 2011 and 2022 regarding the anti-inflammatory properties, bioactive compounds, and safety profiles of devil's claw for treating degenerative, painful rheumatic conditions.

The authors utilized Google Scholar, Scopus, Web of Science, PubMed, and ScienceDirect with the keywords devil's claw, *Harpagophytum procumbens*, clinical studies, biological activities, safety, and in vivo. Trials were included that were peer reviewed between 2011 and 2022, published in English, and had full text available. Excluded trials were not peer-reviewed, were conference or poster abstracts, or did not have full text available. The authors found 1,117 articles using the keywords; however, it was not explicitly stated how many articles were included in the analysis. In the reference page, 112 articles were listed.

Traditionally, the tubers of devil's claw were used medicinally for several health conditions, including urinary tract infections, sores, fever, dyspepsia, blood diseases, postpartum pain, sprains, ulcers, cough, constipation, diarrhea, and venereal infections. It was used topically and internally.

Phytochemical studies have indicated that the constituents iridoid glycosides, phenolic glycosides, harpagoquinones, amino acids, phenolic acids, flavonoids, phytosterols, and carbohydrates reduce inflammation. Iridoid glycosides have been researched and found to have anti-inflammatory and analgesic properties. Of the iridoid glycosides,

harpagoside has shown the strongest antioxidant activity, and harpagide, harpagoside, and 8-p-coumaroylharpagide, as well as the phenolic glycoside, acteoside, were the main bioactive constituents inhibiting inflammation and alleviating pain. Phenolic glycosides have been used for inflammatory diseases. Acteoside was found to have strong anti-inflammatory effects; the other phenolic glycosides have antioxidant or antimicrobial activities.

One trial indicated that an ethanol extract reduced cyclooxygenase-2 (COX-2) mRNA quantity, while another showed that tumor necrosis factor α (TNF-α) and interleukin 6 were suppressed. Harpagoside and harpagide have demonstrated effective anti-inflammatory and immune-modulatory activity. Evidence also implied that harpagoside and harpagide affect COX-2, leading to potential anti-inflammatory and analgesic effects. In a trial with patients who had knee pain, reduction in leg fat mass and knee thermograms was found. A different study found that the expression of cannabinoid receptor 2 receptor was enhanced but not in osteoarthritic tissue.

External herbal applications had a positive effect for treating neck and shoulder sport-related pain; some participants reported a boost in strength, mobility, and working abilities. It was indicated to be more effective at a lower dose; however, the trial size was small. In a study with millimeter wave therapy, it was found that the hypersensitivity response improved in the group with devil's claw and could be used to treat acute postoperative pain and chronic neuropathic pain. In study with a two other herbs, the formula was found to have anti-inflammatory and anti-angiogenic potential.

In studies with specific diseases, it was found that devil's claw root or harpagoside compound had anti-inflammatory, antiarthritic, antirheumatic, and pain-relieving effects for rheumatoid arthritis. It was found to have an anti-Alzheimer effect and could be used to manage clinical symptoms and inflamed tissues. For osteoporosis, the roots, plant material, and harpagoside compound had anti-inflammatory and anti-osteoporotic activity for patients with osteoporosis. In patients with diabetes, devil's claw root had anti-inflammatory and antirheumatic effects; with obesity, it suppressed appetite. Lastly, the roots of devil's claw had anti-inflammatory effects on patients with psoriasis.

A toxicology study with murine peritoneal macrophages and 3-(4,5-dimethyl-thiazol-2-yl)-2,5-diphenyl tetrazolium bromide found that devil's claw is toxic at 1 mg/mL concentration. There was a mild decline in locomotive effects at 1 and 3 g/kg doses, and blood glucose concertation was lowered. It was stated to be unsafe when given to horses at 5 mg/kg and 10 mg/kg concentrations; however, there were no clinical side effects indicated. At 600 mg/kg concentrations, it was found that devil's claw has a necrotic effect for the kidney, liver, and lungs of fetuses of pregnant mice.

The authors conclude devil's claw has shown anti-cholesterolemic, antioxidant, anti-inflammatory, and pain killing effects. Although it has shown toxic effects at high doses, the low dose has shown positive effects. The authors suggest more research on devil's claw due to its promising effects and because its research has declined since 2000. The authors declare no conflicts of interest.

—Dani Hoots

Referenced article can be accessed at https://www.mdpi.com/1420-3049/27/11/3637.