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FILE: ■ Agave (*Agave americana*)

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RE: Systematic Review of Agave

Hackman DA, Giese N, Markowitz JS, et al. Agave (*Agave americana*): an evidence-based systematic review by the Natural Standard Research Collaboration. *J Herbal Pharmacother.* November 2006;6(2):101-122.

Agave (*Agave* spp.) plants are common succulents found in the American southwest, Mexico, central and tropical South America, the Mediterranean, and some regions of India. More than 200 species of agave have been identified. Agave plants are used for textile production and consumed as food and fermented beverages, such as pulque and tequila. The most important economic use of agave is the production of tequila in Mexico. This Natural Standard Review presents the results of an evidence-based, systematic review of the scientific literature, expert opinion, folkloric precedent, history, pharmacology, interactions, adverse effects, toxicology, and dosing of agave.

The reviewers conducted electronic searches in nine major databases, performed hand searches of 20 journals not indexed in the databases and bibliographies from 50 secondary references, and consulted researchers for access to additional references and research. All literature relating to human use and mechanisms of action was collected. Data extraction and analysis was performed by trained health care professionals using standardized instruments, and reviews were prepared by research or clinical faculty at major academic centers.

Human use and safety

According to the authors, there is insufficient scientific evidence to support the use of agave for bacterial infections, constipation, diabetes, hair restoration, indigestion, jaundice, and parasites or as a diuretic, nutritional supplement, or source of steroids. No clinical studies meeting the criteria for inclusion in an evidence table were found. Agave is likely safe when consumed in amounts usually found in foods and beverages, but likely unsafe when used during pregnancy due to possible contraceptive effects.

Dosing, toxicology, precautions, and interactions

There is insufficient data to recommend oral or topical doses for adults or children, according to the authors. Contact with agave stems and sap can cause skin irritation and dermatitis. Some agave species contain saponins that damage or destroy blood cells. A clinical study reported increased blood sugar and homocysteine levels and decreased insulin sensitivity when healthy adults consumed 30 ml of tequila daily for 30 days, suggesting the potential for drug interactions. Agave contains a variety of steroids that may compound the effects of prescription steroid drugs. Increased rates of liver cirrhosis are found in regions of Mexico where tequila consumption is high. Women who are trying to become pregnant should avoid agave because some species contain anordin and dinordin, which are steroids with contraceptive effects.

Mechanism of action

Agave leaves contain steroid hormone precursors and steroidal saponins. Crude extracts of *Agave americana* contain two compounds that are similar to the neurotransmitter, acetylcholine. Concentrated agave sap has antibacterial activity, and extracts from tropical agave plants have anti-inflammatory effects.

The consumption of pulque (fermented juice) from agave sap dates back to 200 AD, and various cultures have used agave for fiber and food for at least two centuries. In spite of this long history, little is known about the health effects of agave when consumed or applied topically.

—Heather S. Oliff, PhD

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