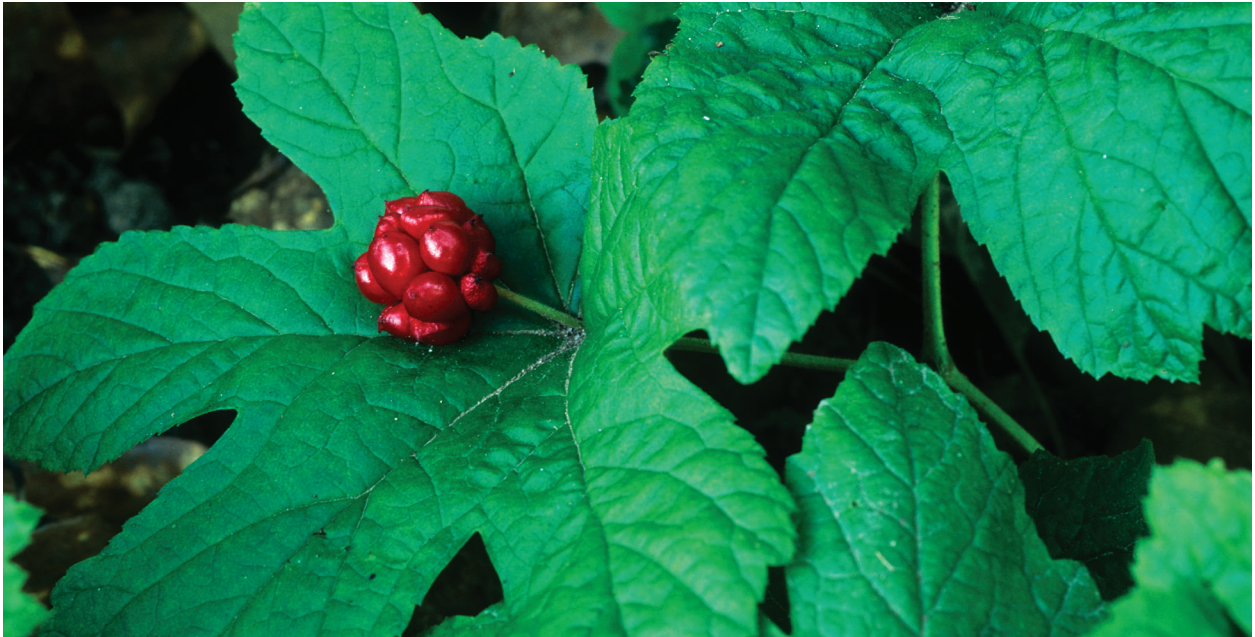


GOLDENSEAL

(*Hydrastis canadensis*)

An Overview of the Research
and Clinical Indications



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plant intelligence.[®]
PROFESSIONAL RESOURCES

This herb research review is intended to be used by authorized health care practitioners, clinicians, pharmacists, physicians, and any other professionally trained persons who may provide medical advice to patients or consumers. The information presented has been obtained from research of reference books, clinical and scientific published papers, and other published works. The lay reader is advised to consult a licensed health care practitioner regarding the information contained herein.

Goldenseal: An Overview of the Research and Clinical Indications

BACKGROUND AND USES

Goldenseal, also known as berberine, is a member of the buttercup or Ranunculaceae family. It is a low growing perennial plant with red fruit. Its root has a bright, deep yellow appearance. Goldenseal is native to and grows in the midwestern and eastern parts of the USA in woodlands, including the Ohio River Valley, West Virginia, the mountains of North and South Carolina, Kentucky, Tennessee, and north to New England and Upstate New York and parts of Quebec, Canada.

Goldenseal can be difficult to cultivate for production level quantities, and wildcrafting this botanical agent can be challenging. Harvesting the root by hand can leave a yellow stain on one's fingers and it has a distinctive, sharp, pungent smell when working with the freshly dug root. It was harvested almost to extinction in the mid to late 1800's in the Ohio River Valley where it was sold heavily in Cincinnati in amounts upwards of 200,000 pounds. Eclectic physicians learned about the plant from Native Americans who revered the plant for its medicinal, cultural, and practical uses. The deforestation of the North Eastern United States, along with demand and over harvesting, led to this plant's status as endangered in its natural range. The Eclectics used purified forms of the crude herb known in the commercial market as Hydrastine, Neutral Hydrastine, or Muriate of Hydrastin - preparations which were actually hydrochlorates of the alkaloid berberine. These preparations did not yield the same results as the concentrated whole plant extract and were soon abandoned.

ACTIVE CONSTITUENTS

A number of active constituents of Goldenseal have been identified. The root and rhizomes are highly concentrated in isoquinoline alkaloids or protoberberines, namely hydrastine, berberine, and canadine. Goldenseal has been reported to contain these alkaloids in the ranges of 1.5-4% hydrastine, 0.5-6% berberine, and 2-3% berberastine.¹

MECHANISM OF ACTION

For antimicrobial activity:

- inhibition of RNA and protein synthesis²,
- inhibition of the adherence of pathological bacteria to epithelial cells⁵

For antifungal and antiparasitic activity:

- inhibition of RNA and protein synthesis²

RESEARCH SUMMARY

Research evidence reports Goldenseal showed antimicrobial activity for both in vitro and animal research. This antimicrobial activity is thought to have action through inhibition of RNA and protein synthesis², and inhibiting the adherence of pathological bacteria to epithelial cells.⁵

Antimicrobial activity: Berberine sulfate demonstrated antimicrobial activity against Gram-positive and Gram-negative organisms *in vitro* through inhibition of RNA and protein synthesis.² In particular, berberine was also shown to be bactericidal against *Vibrio cholera* and against *Staphylococcus aureus*.² Other microorganisms that were inhibited by goldenseal include *Clostridium tetani*³, *Candida krusei*⁴, and *Streptococcus pyogenes*. Berberine inhibited the adherence of *S. pyogenes* to epithelial cells possibly by immobilizing fibronectin and hexadecane, and this disrupted a primary pathological process.⁵

Antifungal activity: Berberine exhibited antifungal activity against *Alternaria*, *Aspergillus flavus*, *A. fumigates*, *Candida albicans*, *Curvularia*, *Drechslera*, *Fusarium*, *Mucor*, and *Rhizopus oryzae*.⁶ Berberine sulfate possessed antifungal activity *in vitro* through inhibition of RNA and protein synthesis.²

Antiparasitic effects: Berberine sulfate demonstrated antimicrobial activity against protozoal organisms *in vitro* through inhibition of RNA and protein synthesis.² *In vitro*, a methanol extract of berberine demonstrated parasitocidal activity against *T. vaginalis*, *G. lamblia*, and *E. histolytica*.⁷ Subsequent research has shown berberine chloride to decrease parasitic load in animals.⁸

Cardiovascular effects: Berberine may possess partial agonist activity at platelet alpha-2 receptors.⁹ This may have particular effect in adrenaline-induced cardiac pathology and cardiomyopathy affected by undue stress and related physiological changes in response to stress (distress). A 12 patient study showed significant improvement in systemic and pulmonary vascular resistance, right atrial and left ventricular end-diastolic pressures, cardiac index, and left ventricular ejection fraction¹⁰

Digestive and Gastrointestinal effects: In 20 healthy subjects, the oral administration of 1.2g of berberine significantly delayed small intestinal transit time of a meglucamine diatrizoate and sorbitol test mixture.¹¹ Oral berberine sulfate (40-80mg/kg) significantly decreased the occurrence of diarrhea induced by ingestion of castor oil and *Cassia angustifolia* in mice.¹²

CLINICAL INDICATIONS, PRACTITIONER DOSING, CONTRAINDICATIONS AND TOXICITY

Clinical Indications

- Antibacterial
- Antifungal
- Antiparasitic
- Cardiovascular
- Digestive and gastrointestinal

Dosage range

General antimicrobial and related symptoms relief: The dosage range used in studies and clinical practice is varied. For liquid alcohol-based tincture or encapsulated tinctures, 200 – 250 mg bid – tid (2x – 3x/day) is a typical dosage.

Cardiovascular: Dosing strategy is typically 300 mg a day, evenly divided doses, either with or without food. For heart failure, higher dosing may be warranted, based on patient symptom severity; up to 2g daily for 8 weeks has been researched, in divided doses.¹³

Contraindications

Patients with known allergy/hypersensitivity to *Hydrastis canadensis* or any of its constituents, or to members of the buttercup or Ranunculaceae family, should avoid using this botanical agent.

Toxicity

Toxic doses of berberine may cause convulsions and irritation of the upper gastrointestinal tract when taken orally; however, the dose range for this toxicity is unclear.¹

CONCLUSIONS

The overall botanical medicine benefit profile for Goldenseal makes it a viable botanical agent for its antimicrobial activity, including antibacterial, antifungal and antiparasitic activity. There is also research to support its use for the cardiovascular system, including cardiomyopathy, heart failure and other cardiovascular pathologies.

It appears to be a safe herb for medicinal use when used within the established dosage guidelines and with regard for pertinent contraindications.

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ABOUT THE AUTHOR

Dr. Beverly Yates, Naturopathic Physician, graduated from the National College of Naturopathic Medicine in 1994. She is also a graduate of the Massachusetts Institute of Technology with a B. S. degree in Electrical Engineering. Dr. Yates served as the lead supervising doctor for the first ever fully accredited Naturopathic and Integrative medical residency in the state of California. Dr. Yates was a Featured Speaker for the California Naturopathic Doctors Association and the National College of Natural Medicine for their respective Integrative Medicine conferences on Cardiology, presenting continuing medical education (CME) on Women and Cardiovascular Disorders.

Dr. Yates serves as a National Media Representative for the American Association of Naturopathic Physicians, appearing as an expert in natural medicine on TV shows in select metropolitan areas. She is a member of several industry advisory boards, including the ***Scientific Advisory Board of Gaia Herbs Professional Solutions***. Recently, in response to Dr. Yates' contributions to community health, she provided testimony for the Tri-Caucus of the California legislature concerning the growing impact of obesity and diabetes in communities of color around the state and the country.

Sought after for her ability to provide concise, clear explanations about medical processes and natural medicine, Dr. Yates has appeared on numerous TV broadcast networks including ABC, CBS, CNN, CW, Fox, NBC, and PBS; her radio interviews include NPR, CNN Radio, and Sirius International Satellite; and her print interviews include Essence Magazine, Good Housekeeping Magazine and Women's World newspaper. She presents continuing medical education (CME) to physicians and other health professionals all over the country.

Dr. Yates is a nationally recognized author [book: Heart Health for Black Women: A Natural Approach to Healing and Preventing Heart Disease, Marlowe & Co., 2000] and contributing author [medical textbook: Maternal Newborn and Child Nursing: Family Centered Care, Prentice Hall, 2003].

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