

Hawthorn

Crataegus laevigata, *Crataegus cuneata*;
Crataegus oxyacantha; *Crataegus*
monogyna; *Crataegus pinnatifida*

All of these species are recognized by the German, European, or the American pharmacopoeia.

Figure 1: Hawthorne Crataegus laevigata Photograph © Steven Foster. Reproduced under license



Taxonomic Notes

Family: *Rosaceae*

Common Names

Aubepine, bianco spino, crataegi flos, crataegi folium, crataegi folium cum flore, crataegi fructus, English hawthorn, epine blanche, epine de mai, haagdorn, hagedorn, harthorne, haw, hawthorn extract, hawthorn flower, hawthorn fruit, hawthorn leaf, hawthorn, hedgethorn, may, maybush, maythorn, mehlbeebaum, meidorn, nan shanzha, oneseed hawthorn, shanzha, weissdorn, whitehorn

Identifying Characteristics

Leaves	Oval, lobed, finely serrated leaves
Flowers	White flowers, numerous stamens with red anthers, arranged in groups of five to ten at the apex of small branches
Fruit	Dark red berries

Parts Used

The applicable parts of hawthorn are the leaf, fruit, and flower. Extracts of the leaf and flower are most commonly used therapeutically.

Cultivation

Hawthorn is a bush or small tree that includes approximately 280 species native to northern temperate zones in East Asia, Europe, and eastern North America. The fruit has been used as food and medicine in Europe for centuries. Hawthorn preparations are one of the most popularly prescribed botanical medicines in central Europe. Some German clinicians prefer hawthorn to digoxin in mild heart failure.

Collection

The flower-bearing branches with leaves are gathered in spring. The berries are harvested in fall.

Active Constituents

In the hawthorn leaf and flower, the active constituents considered most important for the therapeutic action are the flavonoids, such as vitexin, rutin, quercetin, and hyperoside, and oligomeric proanthocyanidins (OPCs) such as epicatechin and procyanidins, particularly procyanidin B-2. Some hawthorn products are standardized based on their flavonoid (2.2%) and OPC (18.75%) content.¹

Epicatechin and catechin are also present. Other active compounds include the cardiac glycoside vitexin; the flavonols rutin and hyperoside²; flavonoids (particularly flavone-C); triterpene acids such as ursolic acid, oleanolic acid, and crataegolic acid; and phenolic acids such as caffeic acid, chlorogenic acid, and related phenolcarboxylic acids.

Hawthorn acts on the myocardium by increasing the force of contraction and lengthening the refractory period, thus increasing coronary blood flow and cardiac output, and reducing oxygen consumption³.

The cardiotropic properties of hawthorn are attributed to increased membrane permeability for calcium⁴, and phosphodiesterase inhibition, thus increasing

¹ Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn *J Clin Pharmacol* 2002; 42:605-12.

² Upton R, ed. Hawthorn Leaf with Flower: Analytical, quality control, and therapeutic monograph. Santa Cruz, CA: American Herbal Pharmacopoeia; 1999:1-29.

³ Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn *J Clin Pharmacol* 2002; 42:605-12. Pittler MH, Schmidt K, Ernst E. Hawthorn extract for treating chronic heart failure: meta-analysis of randomized trials. *Am J Med* 2003 114:665-74 Schwinger RH, Pietsch M, Frank K, Brixius K. Crataegus special extract WS 1442 increases force of contraction in human myocardium cAMP-independently. *J Cardiovasc Pharmacol* 2000; 35:700-7.

intracellular cAMP⁵. Increased cAMP leads to increased coronary blood flow, vasodilation⁶, and positive inotropic effects⁷. Preliminary research suggests that hawthorn also has antiarrhythmic activity⁸.

Therapeutic Actions

Analgesic, astringent, antibacterial, antihyperlipidemic (lowers serum cholesterol), anti-inflammatory, antioxidant (especially the flower buds and leaves), antispasmodic, antiviral, cardiogenic, diuretic, sedative, spasmolytic, and vasodilator

Medicinal Uses

Hawthorn is used orally for cardiovascular conditions such as congestive heart failure, coronary circulation problems, and arrhythmias. It is also used to increase cardiac output reduced by hypertension or pulmonary disease, to support hypotension and hypertension, atherosclerosis, hyperlipidemia⁹, and Buerger's disease. Hawthorn is also used as a sedative, antispasmodic, astringent, and diuretic. It is also used for gastrointestinal conditions such as indigestion, enteritis, epigastric distension, diarrhea, and abdominal pain. Hawthorn fruit may also be effective orally for tapeworm infections, acute bacillary dysentery, and amenorrhea.

Topically, hawthorn leaf is used as a poultice for boils, sores, and ulcers. Hawthorn fruit liquid preparations are used as washes for sores, itching, and frostbite.

Research has shown benefits with congestive heart failure (CHF). In several studies, taking a specific standardized leaf and flower extract orally appeared to improve ejection fraction, exercise tolerance, and reduce subjective symptoms associated with New York Heart Association stage II heart failure. Maximum effect is usually seen

⁴ Schwinger RH, Pietsch M, Frank K, Brixius K. Crataegus special extract WS 1442 increases force of contraction in human myocardium cAMP-independently. *J Cardiovasc Pharmacol* 2000; 35:700-7.

⁵ cAMP is cyclic AMP, a secondary regulatory messenger molecule

⁶ Dilation of a blood vessel, as by the action of a nerve or drug. Also called phlebarteriectasia

⁷ Schwinger RH, Pietsch M, Frank K, Brixius K. Crataegus special extract WS 1442 increases force of contraction in human myocardium cAMP-independently. *J Cardiovasc Pharmacol* 2000; 35:700-7. Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn *J Clin Pharmacol* 2002; 42:605-12.

⁸ Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn. *J Clin Pharmacol* 2002; 42:605-12.

⁹ An excess of fats or lipids in the blood. Also called hyperlipemia

after 6-12 weeks of treatment with 240-600-mg per day of a standardized hawthorn extract¹⁰.

A hawthorn extract improved exercise tolerance and reduced subjective symptoms associated with New York Heart Association stage III heart failure when combined with pre-existing diuretic therapy. Maximum effect was seen after 16 weeks of combined diuretic therapy and 1800-mg per day standardized hawthorn extract WS 1442¹¹.

Some clinical research suggests hawthorn, combined with magnesium and California poppy¹², may be helpful for mild to moderate anxiety disorders¹³.

Preliminary research has shown a hypotensive action. Hawthorn seems to cause peripheral vasodilation and to induce endothelium-dependent arterial relaxation. The proantocyanidin constituents appear to be responsible for this effect¹⁴.

Preliminary research also suggests that hawthorn can lower serum cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides. It seems to lower accumulation of lipids in the liver and aorta. Hawthorn fruit extract may lower cholesterol by increasing bile acid excretion, reducing cholesterol synthesis by the liver,

¹⁰ Schmidt U, Kuhn U, Ploch M, Hubner WD. Efficacy of the Hawthorne (Crataegus) Preparation LI 132 in 78 patients with chronic congestive heart failure defined as NYHA functional class II. *Phytomedicine* 1994; 1:17-24

Zapfe jun G. Clinical efficacy of crataegus extract WS 1442 in congestive heart failure NYHA class II. *Phytomedicine* 2001; 8:262-6.

Tauchert M. Efficacy and safety of crataegus extract WS 1442 in comparison with placebo in patients with chronic stable New York Heart Association class-III heart failure. *Am Heart J* 2002; 143:910-5

Pittler MH, Schmidt K, Ernst E. Hawthorn extract for treating chronic heart failure: meta-analysis of randomized trials. *Am J Med* 2003 114:665-74.

¹¹ Tauchert M. Efficacy and safety of crataegus extract WS 1442 in comparison with placebo in patients with chronic stable New York Heart Association class-III heart failure. *Am Heart J* 2002; 143:910-5

¹² Sympathyl, not available in the United States

¹³ Hanus M, Lafon J, Mathieu M. Double-blind, randomised, placebo-controlled study to evaluate the efficacy and safety of a fixed combination containing two plant extracts (Crataegus oxyacantha and Eschscholtzia californica) and magnesium in mild-to-moderate anxiety disorders. *Curr Med Res Opin* 2004; 20:63-71

¹⁴ Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn. *J Clin Pharmacol* 2002; 42:605-12.

and enhancing LDL-receptor activity. Hawthorn also seems to have antioxidant activity¹⁵.

One animal study suggested that hawthorn might have hypoglycemic activity in individuals with diabetes¹⁶.

Culinary Uses

The berries can be made into a cordial or jelly.

Precautions and Contraindications

Hawthorn is unsafe during pregnancy, as it has potential to cause uterine activity.¹⁷ Orally, hawthorn preparations can cause nausea, gastrointestinal complaints, fatigue, sweating, and a rash on the hands. Hawthorn can also cause palpitations, headache, dizziness, sleeplessness, agitation, and circulatory disturbances.¹⁸ Simultaneous use of hawthorn with conventional cardiovascular drug therapy such as digoxin might potentiate¹⁹ or interfere with the treatment of these conditions. It may require a digoxin dose reduction.²⁰ Similarly, its use with cardiac glycoside-containing herbs may increase the risk of cardiac glycoside toxicity. Cardiac glycoside-containing herbs include black hellebore *Helleborus niger*, Canadian hemp *Apocynum cannabinum*, digitalis leaf *Digitalis purpurea* or *Digitalis lanata*, hedge mustard *Sisymbrium officinale*, figwort *Scrophularia marilandica*, lily of the valley *Convallaria majalis* roots, motherwort *Leonurus cardiaca*, oleander *Nerium oleander* leaf, pheasant's eye *Adonis vernalis*, pleurisy root *Asclepias tuberosa*, squill bulb *Urginea indica*, and strophanthus *Strophanthus gratus* seeds.

¹⁵ Chang Q, Zuo Z, Harrison F, Chow MS. Hawthorn J Clin Pharmacol 2002; 42:605-12.

¹⁶ Jouad H, Lemhadri A, Maghrani M, et al. Hawthorn evokes a potent anti-hyperglycemic capacity in streptozotocin-induced diabetic rats. Journal of Herbal Pharmacotherapy 2003; 3:19-29

¹⁷ Newall CA, Anderson LA, Phillipson JD. *Herbal Medicine: A Guide for Healthcare Professionals*. London, UK: The Pharmaceutical Press, 1996

¹⁸ Tauchert M. Efficacy and safety of Crataegus extract WS 1442 in comparison with placebo in patients with chronic stable New York Heart Association class-III heart failure. Am Heart J 2002;143:910-915

¹⁹ To enhance or increase the effect of (a drug)

²⁰ McGuffin M, Hobbs C, Upton R, Goldberg A, eds. *American Herbal Products Association's Botanical Safety Handbook*. Boca Raton, FL: CRC Press, ; 1997. Tauchert M. Efficacy and safety of crataegus extract WS 1442 in comparison with placebo in patients with chronic stable New York Heart Association class-III heart failure. Am Heart J 2002;143:910-915

Avoid using hawthorn with other cardioactive herbs due to unpredictability of effects and adverse effects. Other cardioactive herbs include calamus *Acorus calamus*, cereus *Selenicereus grandiflorus*, cola *Cola acuminata*, coltsfoot *Tussilago farfara*, devil's claw *Harpagophytum procumbens*, European mistletoe *Viscum album*, fenugreek *Trigonella foenum-graecum*, fumitory *Fumaria officinalis*, ginger *Zingiber officinale*, ginseng *Panax quinquefolius*, white horehound *Marrubium vulgare*, maté *Ilex paraguariensis*, parsley *Petroselinum crispum*, quassia *Quassia amara*, scotch broom flower *Cytisus scoparius*, shepherd's purse *Capsella bursa-pastoris*, and wild carrot *Daucus carota*

Dosage and Administration

Prepare hawthorn leaf with flower as an infusion: Use ½-cup of boiling water over ½-oz dried herb, steeped for 10-15 minutes. Use 1-T, three to four times daily, during or after meals.