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

<table>
<thead>
<tr>
<th>Leaves</th>
<th>Oval, lobed, finely serrated leaves</th>
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<tbody>
<tr>
<td>Flowers</td>
<td>White flowers, numerous stamens with red anthers, arranged in groups of five to ten at the apex of small branches</td>
</tr>
<tr>
<td>Fruit</td>
<td>Dark red berries</td>
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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 hyperoside; flavonoids (particularly flavone-C); triterpene acids such asursolic acid, oleanolic acid, and crataegolic acid; and phenolic acids such as caffeic acid, chlorogenic acid, and related phenolic carboxylic 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 consumption.3

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

intracellular cAMP. Increased cAMP leads to increased coronary blood flow, vasodilation, and positive inotropic effects. Preliminary research suggests that hawthorn also has antiarrhythmic activity.

**Therapeutic Actions**

Analgesic, astringent, antibacterial, antihyperlipidemic (lowers serum cholesterol), anti-inflammatory, antioxidant (especially the flower buds and leaves), antispasmodic, antiviral, cardiotonic, 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, hyperlipidemia, 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...

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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.
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 extract\textsuperscript{10}.

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 1442\textsuperscript{11}.

Some clinical research suggests hawthorn, combined with magnesium and California poppy\textsuperscript{12}, may be helpful for mild to moderate anxiety disorders\textsuperscript{13}.

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 effect\textsuperscript{14}.

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.

\textsuperscript{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

\textsuperscript{11} Zapfe jun G. Clinical efficacy of crataegus extract WS 1442 in congestive heart failure NYHA class II. Phytomedicine 2001; 8:262-6.

\textsuperscript{12} 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


\textsuperscript{14} 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

\textsuperscript{12} Sympathyl, not available in the United States

\textsuperscript{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

and enhancing LDL-receptor activity. Hawthorn also seems to have antioxidant activity\textsuperscript{15}.

One animal study suggested that hawthorn might have hypoglycemic activity in individuals with diabetes\textsuperscript{16}.

**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.\textsuperscript{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.\textsuperscript{18} Simultaneous use of hawthorn with conventional cardiovascular drug therapy such as digoxin might potentiate\textsuperscript{19} or interfere with the treatment of these conditions. It may require a digoxin dose reduction.\textsuperscript{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 *Aconitum nobile*, pleurisy root *Asclepias tuberosa*, squill bulb *Urginea indica*, and strophanthus *Strophanthus gratus* seeds.

\textsuperscript{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
\textsuperscript{19} To enhance or increase the effect of (a drug)

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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.