

Alıç Bitkisinin (*Crataegus Monogyna*) Kardiyovasküler Etkileri

Başar ALTINTERİM

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Özet: *Crataegus monogyna* bitkisinin flavonoidleri ve prosiyanidinleri üzerinden standardize olan farmasötik ürünleri kalp yetmezliği tedavisinde önerilmektedir. Bitkinin tıbbi olarak kullanılan kısımları genellikle yaprak ve çiçekli dallarıdır veya alternatif olarak meyvasıdır. Bu bitki genellikle hem düşük hem de yüksek kan basıncını düzenlemeye yardımcı eder, ayrıca vücuttaki depolanmış yağları ve kolesterolü parçalar.

Anahtar Kelimeler: Alıç, kardiyovasküler etki, kalp, *Crataegus monogyna*.

Cardiovascular effects of Hawthorn (*Crataegus monogyna*)

Abstract: Hawthorn (*Crataegus monogyna*) and derived pharmaceuticals are rich in polyphenols and already prescribed to treat moderate heart failure. The plant parts used medicinally are usually sprigs with both leaves and flowers or alternatively the fruit. This herb may help to regulate both high and low blood pressure, in addition to slowly breaking down cholesterol and fat deposits in the body.

Key Words: Hawthorn, cardiovascular effect, heart *Crataegus monogyna*.

INTRODUCTION

Hawthorn is often regarded as one of the commonly used herbs for cardiovascular health. It is a versatile antioxidant, which could increase conversion rates in the liver of LDL or "bad" cholesterol into HDL or "good" cholesterol. High blood pressure, fat build up in the arteries and heart pain called angina can be improved by the use of this herb. Hawthorn has a dilatory effect on the coronary arteries (the vessels that supply blood to the heart), thus improving blood and oxygen supply to the heart muscle. It also strengthens cardiac inotropic effect and efficiently (Null, 2005)

The medicinal properties of hawthorn (*Crataegus spp.*, a genus comprising approximately 300 species) have been utilized by many cultures for a variety of therapeutic purposes for many centuries. Hawthorn uses have included the treatment of digestive ailments, dyspnea, kidney stones and cardiovascular disorders. Today, hawthorn is used primarily for various cardiovascular conditions. The cardiovascular effects are believed to be the result of positive inotropic activity, ability to increase the integrity of the blood vessel wall and improve coronary blood flow and positive effects on oxygen utilization. Flavonoids are postulated to account for these effects (Scott and Elmer, 2002).

Currently, there are more than 20 species of *Crataegus* in Turkey, including *Crataegus monogyna* Jacq., *Crataegus pentagyna* Willd., *Crataegus azarolus* L., *Crataegus orientalis* M. Bieb., *Crataegus rhipidophylla gaud.* and *Crataegus laevigata* (Poir) DC. Although Turkey has numerous *Crataegus* species and many geographical areas with diverse wild growing *Crataegus* accessions, hawthorn is still an underutilized crop in Turkey (Serçe et al. 2010).

Hawthorn extracts have historically been derived from the flowers, leaves and fruits of the plant.

However, most of the data supporting the cardiac activity of hawthorn are based on evaluation of the dried flowering tops of the plants (specifically from *Crataegus monogyna* or *Crataegus laevigata*) (Rietbrock et al., 2001).

Hawthorn extract is among the most popular herbal medicinal products in the US (Blumenthal 2001; Breevort 1998) and in Europe, where it is marketed in some countries as a registered medicine (Ernst 2001).

The American Heart Association cites heart disease as the number one killer of American adults (Anonymous, 2008) and further commented that for the year 2005, 80,700,000 Americans suffered from some form of cardiovascular disease. The inotropic properties of *Crataegus* may theoretically cause concern, as the use of inotropes in the treatment of heart failure has been strongly linked to increased mortality rates (Felker and O Connor, 2001).

The radioprotective effect of hawthorn (*Crataegus microphylla*) fruit extract was investigated in cultured blood lymphocytes from human volunteers. These data suggest that it may be possible to use Hawthorn extracts in personnel exposed to radiation in order to protect lymphocytes from radiation effects.

The preventive effect of hawthorn (*Crataegus microphylla*) fruit extract was investigated in mouse bone marrow cells against genotoxicity induced by cyclophosphamide. Hawthorn contains high amounts of phenolic compounds; the HPLC analysis showed that it contained chlorogenic acid, epicatechin and hyperoside. It is obvious that hawthorn, particularly flavonoids constituents with antioxidative activity, reduced the oxidative stress and genotoxicity induced by cyclophosphamide in mouse bone marrow cells. (Hosseinimehr et al., 2009).

The polyphenolic content of two cell suspension lines (red and yellow) initiated from the ovarian wall of *Crataegus monogyna* flower and their antioxidative potencies and human LDL oxidation were compared to those of red fresh and dry fruits, flower buds and flowering tops. Maximal phenolics and proanthocyanidins contents were found in red suspension extracts displaying high antioxidative effects. In contrast, yellow cell extracts were always the poorest in both phenolics and activity. Flower buds and flowering tops have significant phenolic yields and effects. Both fresh and dried fruits are less active. The amounts in some major phenolic compounds were determined in all tested samples: again, the most antioxidant samples were richer, the red cell line showing particularly high amounts in epicatechin and chlorogenic acid, whilst dried flower buds contained mainly hyperoside and chlorogenic acid (Froehlichera et al., 2009).

THE MECHANISMS of ACTION

Recent studies have focused benefits of aromatic and medicinal plants on the health, which have antioxidant, antimicrobial and mutagen properties.

Active ingredients: Hawthorn's usable part contain vitamin c, flavonoids: quercetin, hyperoside, rutin, flavonoglycosyls, vitexin-4⁻-rhamnoside, glycosides; oligomeric procyanidins (OPC) epicatechol; anthocyanidins and proanthocyanidins (biflavans); saponins and tannins; cratetegin; other chemical constituents: a)cardiotonic amines: phenylethylamine, tyramine, isobutylamine, o-methoxy-phenylethylamine; b)choline and acetylcholine; c)purine derivatives: adenosine, adenine, guanine, caffeic acid; d)amygdalin; e)pectins; f)triterpene acids: ursolic acid, oleonic acid, crategolic acid have been found to have powerful antioxidant properties (Barnes et al., 1996; Hoffman, 2006).

The phytochemical composition of hawthorn is similar to hawthorn berries. Berries are rich in hyperoside, while leaves contain higher levels of vitexin-2-rhamnoside. Kingston detected significant levels of vitexin-2-rhamnoside in flowers (Kingston, 2007).

Negative chronotropic effects and antiarrhythmic effects of crude hawthorn extracts on cultured cardiomyocytes were noted by Long et al. (Kris-Etherton, 2002).

Hawthorn extract inhibits myocardial Na⁺,K⁺-ATPase and exerts a positive inotropic effect and relaxes the coronary artery. It blocks the repolarizing potassium current in the ventricular muscle and so prolongs the refractory period, thus exerting an anti-arrhythmic effect (Holzl 1988).

Vasorelaxant effects on vascular smooth muscles previously artificially contracted by catecholamines. Raised catecholamine levels are present in the blood stream during heart failure. (Vierling et al., 2003).

The antioxidant activity of *Crataegus* preparations contributes significantly to its therapeutic profile. Gou et al. noted that of 28 fruit pulps tested, the hawthorn pulp (Chinese hawthorn) produced the highest measure of antioxidant activity. (Guo, 2003)

Although the Commission E no longer recognizes this use, hawthorn berry preparations have been shown to relieve angina, a condition resulting from insufficient blood flow to the heart muscle. In one study demonstrated the efficiency of a combined extract of hawthorn berry, leaf and flower in the treatment of patients with stable angina pectoris (Hanack and Bruckel, 1983).

Hawthorn extract is a useful alternative to current anticoagulant, according to a study conducted at the Department of Pharmacology, Anadolu University, in Turkey. In the study, published in the December 2010 "Thrombosis Research," doses of 41 and 61 mg per kg body weight were effective for preventing blood clots in lab mice within 24 hours. Effectiveness wore off by 48 hours for the 200 mg dose and 72 hours for the 300 mg dose, however. The researchers concluded that hawthorn is an effective blood thinner with a low side effect profile (Arslan et al., 2010).

CONCLUSION

Hawthorns help in alleviating irritation and swelling of the blood vessels and are effective in reducing the intensity of bad fats and cholesterol in the blood. Hawthorn is useful in treating circulatory problems, varicose veins (a condition of swollen veins) as well as more grave conditions like atherosclerosis (an arterial disease), weakness of the heart and angina or chest pains. Hawthorn has even been used as part of a holistic approach to helping the body heal itself in cases of congestive heart failure and circulatory disorders.

Taking Hawthorne and medicines used to treat or prevent blood clots together may cause your blood to be too thin, making you bleed or bruise more easily.

Hawthorne is indicated for irritable, nervous heart conditions, heart conditions related to a heart failure.

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