

BUCKTHORN

Rhamnus frangula L.

Family

Lamiaceae.

Parts Used

Bark.

Description

Buckthorn is a tall deciduous shrub that is native throughout Europe, Northern Africa and parts of Asia. It has also been introduced and naturalised in other countries, including North America. It is also known as Alder Buckthorn or Black Alder to distinguish it from the Common Buckthorn which has more highly potent cathartic berries. Buckthorn is a member of the Rhamnaceae family. This tree-like shrub favours moist soil - growing in woodlands, hedgerows and open shrub and reaching up to

6 metres tall. Alder Buckthorn has large green, smooth-edged ovate leaves, arranged in opposite groupings on the stem and displaying feathered veins. It has small greenish-yellow star shaped flowers that bloom on shoots in early summer. The flowers turn into berry-like fruits that change from green to red and eventually black as they fully ripen during Autumn. The bark is used medicinally and the leaves and berries are used as a plant dye.

Traditional Use

Buckthorn has been used in traditional European medicine as a laxative and cathartic and also as a general tonic. Much of the early writings on buckthorn do not clearly distinguish between different species and probably also refer to common buckthorn and English buckthorn. All the buckthorns share similar laxative actions on digestion to varying degrees of potency.



The name alder buckthorn refers to the habit of the plant to grow alongside Alder trees. The dried bark was stored for some time to render it less violent in its cathartic action and thus the fresh bark was avoided. The berries were made into lozenges and sold as an aperient. Country people boiled the bark in ale to help with liver conditions such as jaundice.¹ The leaves are well favoured by goats, the flowers popular with bees and the berries enjoyed by birds. The charcoal from the wood is highly regarded for its use in gunpowder due to its even burn rate.

Constituents

Antraquinone aglycones (alizarin, emodin, franguloside), monoglucosides (frangulin A and B), physcion and chrysophanol (glycosidic and aglycone forms), resin, tannin.

Actions

Laxative, digestive stimulant, cathartic, antiviral, antifungal, anticancer.

Pharmacological Activity

Gastrointestinal Activity

Buckthorn bark belongs to the stimulant laxatives. Emodin-9-anthrone is the most important metabolite, which is produced by the bacteria of the large intestine and results in increased colonic motility and a reduced transit time. The absorption of water and electrolytes into the colonic epithelial cells is also inhibited and increased leakiness of the tight junctions and stimulation of secretion of water and electrolytes into the lumen of the colon (secretagogue effect), results in enhanced concentrations of fluid and electrolytes in the lumen of the colon.²

Human studies are limited to those that examine Buckthorn in combination with other herbs. The proprietary extract Laxariston, containing Buckthorn, Senna, Rhubarb and Achillea and the bulking agent, methyl cellulose has been examined in two clinical trials. It is worth noting that 50% of the active ingredients in this product are derived from Buckthorn and this herb was considered an active agent in the efficacy of the product.

The herbal product Laxariston was evaluated in the treatment of constipation. The study involved

61 inpatients with mainly arthritic illness and to 33 outpatients mainly post abdominal surgery – all of whom were suffering from constipation. Patients reported complaints that were classified as acute, chronic or functional constipation. The time until disappearance of complaints was evaluated as follows: 0 to 2 days: very good efficacy; 3 to 14 days: good efficacy; 15 to 28 days: satisfactory efficacy; more than 28 days: insufficient efficacy. Laxariston had a very good efficacy in 71 patients (77.2%), a good efficacy in 19 patients (20.7%) and a satisfactory efficacy in 2 patients (2.1%). In the group with acute complaints, the efficacy was very good in 77.4% and good in 22.6%. In the group with chronic complaints, the efficacy was very good in 35%, good in 55% and satisfactory in 10%. In the group with functional complaints, the efficacy was very good in 97.6% and good in 2.4%. The tolerance of the preparation was good in all these patients.³

Another study examined the effects of Laxariston in 73 women with gynaecological diseases and to 95 pregnant women suffering from constipation. On average, the women took the product for 47.2 days and the complaints disappeared in 5.3 days with a daily dose of 5.3g. Efficacy was very good in 41 patients, good in 20 patients and satisfactory in 11 patients. Six patients (8.2%) complained about adverse reactions (spasms, tenesmus, and nausea) whilst 21 patients (28.8%) reported about positive reactions like weight reduction, decrease of haemorrhoidal complaints, and decrease of flatulence. In the second group, 14 pregnant women were in the first trimester, 15 in the second one, and 66 women in the third trimester. On average Laxariston was administered for 61.4 days and the complaints disappeared in 3.9 days with a daily dose of 3.9g. Efficacy was very good in 55 patients, good in 31 patients, satisfactory in 7 patients and insufficient in 2 patients. Four patients (4.2%) complained about adverse reactions whilst 29 patients (30.5%) reported positive reactions. Twelve women in the second group were gynaecologically treated because of a threatening abortion. One of these women only miscarried. There was no data about the state of the newborns.⁴

A human study into the laxative action of Buckthorn bark was undertaken. The administration of an aqueous suspension of the pulverised bark (containing 12mg anthranoids (glucofrangulin and

frangulin) displayed a laxative effect in humans after 6 to 24 hours.^{5,6}

A study on isolated rat colon suggest that the laxative properties of aloin and 1,8-dihydroxyanthraquinone may depend, at least in part, on increased prostaglandin synthesis by the intestinal tissue.⁷

Frangula bark predominantly contains the anthranoids as anthraquinones. Therefore it is supposed that the influence of frangula bark on fluid absorption and on secretion processes is lower than the influence of other anthranoid-containing herbal substances. Data of a direct clinical comparison of the effects are missing.⁸

The different constituents of Buckthorn bark were evaluated for their laxative effect and compared to a standard senna leaves extract in mice. Glucofrangulin and frangulin only showed a laxative effect after oral administration and the effect was nearly 4 to 5 times stronger than the effect of the senna extract.⁹

The administration of a methanolic extract of frangula bark in mice resulted in a dose dependent decrease of the intestinal transit time. After oral administration of 50mg/kg body weight defaecation after four hours took place in 20% of the mice, after oral administration of 100mg/kg body weight in 40%.¹⁰

Another study found that the methanolic extract of frangula bark had a laxative effect in mice after oral administration.¹¹

Anti-inflammatory Activities

The anti-inflammatory activities of the isolated anthraquinone, frangulin B, of Buckthorn was assessed. Analysis of the inhibitory effects on the chemical mediators released from mast cells, neutrophils, macrophages, and microglial cells was undertaken. Frangulin B showed potent inhibitory effects on tumor necrosis factor formation in microglial cell lines.¹²

Antibacterial and Antiviral Activities

The effects of emodin on inhibition of growth versus DNA damage events in *Helicobacter pylori* from patients who had peptic ulcer disease was examined. Emodin was shown to cause a dose-dependent growth inhibition and induced dose-dependent DNA damage in *H. pylori*.¹³

The virucidal effects of extracts from *Rheum officinale*, *Aloe barbadensis*, *Rhamnus frangula*, *Rhamnus purshianus*, and *Cassia angustifolia* were examined against herpes simplex virus type 1. All the plant extracts were shown to inactivate the virus. The active components in these plants were identified as anthraquinones. The extract of *Rhamnus frangula* was completely virucidal after 15 min incubation with herpes simplex virus type 1. Electron microscopic examination of anthraquinone-treated herpes simplex virus demonstrated that the viral envelopes were partially disrupted.¹⁴

Antifungal Activities

An alcoholic extract of frangula bark (500mg dried bark) completely prevented the germination of spores from *Aspergillus fumigatus*, *Penicillium digitatum* and *Fusarium oxysporum* in the agar dilution test.¹⁵

Antifungal screening of the methanol extracts and the major constituents (alizarin and emodin), of *Rubia tinctorum* and *Rhamnus frangula* was undertaken. The herbs were compared with the antifungal activity of the anthraquinone-containing lichen *Caloplaca cerina* and its main secondary metabolite parietin. The methanol extracts were significantly active against a range of fungi tested. The *Rhamnus frangula* extract and constituent emodin showed inhibition against the following fungi: *Trichoderma viride* 63% and 31% respectively; *Doratomyces stemonitis* 45% and 41%; *Aspergillus niger* 41% and 41%; *Penicillium verrucosum* 25% and 18%; *Alternaria alternata* 39% and 56%; *Aueobasidium pullulans* 46% and 41%; *Mucor mucedo* 68% and 48%.¹⁶

Anticancer Activities

Anticancer research has been conducted on the active constituents of Buckthorn – including emodin and frangulin. Emodin was reported to inhibit human breast cancer cells, specifically by inhibiting the oncogene (HER-2/neu) tyrosine kinase activity and preferentially suppressing growth and inducing differentiation in overexpressing cancer cells. The authors concluded that the results suggest emodin could be used as a chemotherapeutic agent to target HER-2/neu overexpressing cancer cells.^{17,18}

The effect of emodin in human non-small cell lung cancer (NSCLC) cells was also examined in

another study. The overexpression of the HER-2/neu proto-oncogene has been observed in these NSCLC cells. Emodin was found to decrease tyrosine phosphorylation of HER-2/neu and preferentially suppressed proliferation of the cancer cells. Furthermore, the combination of emodin with chemotherapeutic agents synergistically enhanced the inhibition of lung cancer cell proliferation compared to when these agents were given singularly.¹⁹

The effect of emodin on the growth of HER-2/neu-overexpressing tumours in mice was examined. The study also examined whether emodin can sensitize tumours to paclitaxel, a commonly used chemotherapeutic agent for breast cancer patients. Emodin was found to enhance the effects of paclitaxel on growth and transformation of HER-2/neu-overexpressing human breast cancer cells and significantly inhibited tumour growth and prolonged survival of these mice.²⁰

Herbs containing anthraquinones were assessed for the growth inhibiting effect in Merkel cell carcinoma (MCC). Emodin and aloe-emodin inhibited proliferation of the adherent MCC cells, with a slight advantage of aloe-emodin over emodin. The chemotherapeutic agents, cis-platinol (abiplastin), doxorubicin (adriablastin), and 5-fluorouracil, and the tyrosine kinase inhibitor STI 571, all independently inhibited the proliferation of adherent MCC cells. The addition of aloe-emodin potentiated their inhibitory effect, especially when low concentrations of the anticancer compounds were used. The addition of emodin was not investigated.²¹

Indications

- Constipation (short to medium term use)
- Poor appetite, weak digestion
- Viral and fungal infection
- Possible use in some cancers

Energetics

Cold, bitter.

Use in Pregnancy

Buckthorn is generally contraindicated in pregnancy due to its action on the bowel and potential to trigger uterine contractions. Research into a Buckthorn based product, Laxariston, showed the herb to be safe, however no data was given on the infant's health post birth.²²

Contraindications

Long term use or large doses should be avoided. Laxatives in large doses can trigger griping pain and diarrhoea, leading to fluid loss. Buckthorn should be avoided in cases of intestinal obstruction, dehydration or inflammatory bowel disease. The bark contains active constituents that when metabolised can turn the urine red or orange, which is considered transitory and harmless.

Drug Interactions

Caution advised with corticosteroids (anti-inflammatory medicine), digoxin (cardiac glycoside), diuretics, warfarin (anticoagulant) and stimulant laxatives.

Administration and Dosage

Liquid Extract:	1:1
Alcohol:	25%
Weekly Dosage:	40 to 100mL

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