CRAMP BARK

Viburnum opulus L.

Family

Adoxaceae (formerly Caprifoliaceae)

Parts Used

Stem bark

Description

Cramp bark is a deciduous shrub or small tree reaching heights of 5 to 12 feet. It features multiple stems branching from the same root and bears broadly three-lobed leaves with crenate-toothed edges and glandular petioles. The plant produces white or reddish-white flowers in rayed, stalked clusters, with larger sterile flowers on the margins and smaller fertile flowers inside. The fruit is oval, red, very sour, ripens late, and remains on the bush after the leaves have fallen.[1]

Cramp bark is commonly found growing in low, fertile lands, woodlands, and field edges throughout northern regions of the United States and Canada, flowering in June. The flowers are followed by red, very sour berries resembling low cranberries, which persist through the winter.[1] Cramp bark is also native to Europe, north Africa, and north and central Asia.[2]

The bark of cramp bark is harvested in spring and summer during the plant's flowering period. It features a green-brown outer surface and a green-yellow to red-brown inner surface.[3] The bark possesses a distinctive odour and a mildly astringent and bitter taste.[1]

The American variety of *Viburnum opulus*, native to the northern and eastern United States, is commonly referred to as the "Cranberry Bush" or "High Bush Cranberry".[4] Other common names include guelder rose, European guelder, European

cranberry bush, cranberry tree, water elder, rose elder, rose ebru, cherry-wood, snowball tree, and Gilaburu.[3,4,5]

In Slavic cultures, particularly in Ukraine, cramp bark is called Kalyna and holds cultural significance. Once upon a time, Kalyna was associated with the birth of the Universe, the fiery trinity: the Sun, Moon, and Star. Its red berries symbolise native land, blood, immortality, and maiden's beauty. In Slavic mythology, the Kalyna Bridge connects the world of the living with the world of the dead. Kalyna is the national symbol of Ukraine, in which the image of Kalyna has been revered since ancient times.[6]

Traditional Use

According to *The Eclectic Materia Medica*, cramp bark was commonly employed as a uterine sedative and tonic, particularly useful in cases with a predisposition to miscarriage or as a partus preparator. It was considered to have strong antispasmodic properties, making it especially effective for "cramps or cramp-like contractions of the hollow viscera and voluntary musculature". It was used to alleviate uterine irritation and spasmodic uterine pain, and it was highly regarded for treating "difficult, spasmodic, or neuralgic dysmenorrhea" (painful menstrual cramps). Additionally, it was applied in skeletal muscle cramps, especially in the calf of the leg, spasmodic contraction of the bladder, and some mild forms of convulsions.[7]

The *Kings American Dispensary* also describes cramp bark as a powerful antispasmodic, particularly effective in relieving cramps in women, especially during pregnancy. It states that it was highly advantageous for individuals susceptible to contractions during pregnancy or labour and could prevent such episodes entirely if taken daily during the last two months of pregnancy. It was applied as a remedy to help prevent miscarriages and prepare the body for labour.[1]

In the past, extracts of the bark and leaves of cramp bark were used by North American Indians as a diuretic and for eye disorders.[4] The Iroquois used cramp bark for emesis, to treat fever, and as a gastrointestinal and pulmonary aid. A decoction of the branches was taken as a gynaecological aid, and they used a decoction of the roots as heart medicine. The Micmac treated swollen glands and mumps with cramp bark, while the Ojibwa used it to relieve stomach cramps.[8]

In her book *A Modern Herbal*, Maud Grieve states that cramp bark "has been employed with benefit in all nervous complaints and debility, and used with success in cramps and spasms of all kinds, in convulsions, fits, and lockjaw, as well as in palpitation, heart disease, and rheumatism".[9]

Traditional uses of cramp bark by Karelians and Russians are documented in ethnographic literature. Various parts of the plant, including the fruit, bark, and leaves, were used to treat a range of ailments. Fruit juice and decoctions were used for earache, headache, scrofula (mycobacterial cervical lymphadenitis), and stomach ache. A bark decoction was specifically used to treat scrofula, while fresh leaves were applied to wounds and furuncles. Leaf decoctions were also used to treat fever, colds, internal diseases, and earache.[10]

Constituents

Scopoletin and viopudial are active constituents identified contributing to the antispasmodic action of cramp bark.[4,11]

Chemical composition analysis of cramp bark ethanolic and water extracts has shown a diverse range of phenolic compounds. Key components include neochlorogenic acids, procyanidin B1 and B2, procyanidin trimer I and II, (+)-catechins, (-)-epicatechins, and procyanidin C1. Additionally, chlorogenic acids and cryptochlorogenic acids were present. Other important compounds identified include, cinchonain I and IIx, and viburtinoside derivative.[2]

While all parts of cramp bark - flowers, bark, and fruits - contain antioxidants, the bark consistently shows the highest levels across categories of phenolics, flavonoids, and proanthocyanidins.[12] One study found that the total proanthocyanidin content in the cramp bark bark was highest in the water fraction (127.29 mg/g), followed by the acetate fraction (73.04 mg/g) and the phenolic extract (71.85 mg/g).[13]

Actions

Antispasmodic, antioxidant, vasorelaxant, hypotensive, uterine tonic, partus preparatory, anti-abortive.[4,7,8,11,12,14,15]

Pharmacological Activity

Much of the research on cramp bark preparations is limited to animal or lab studies, so conclusions about its effects on humans is based on traditional use. The experimental findings that follow provide some supporting evidence to complement the traditional medicinal uses of cramp bark.

Uterine Relaxant Activity

In 1943, researchers found that the volatile oil in *Viburnum opulus* bark contains bioactive compounds with strong sedative effects on uterine muscle tissue. This volatile oil, composed of acids, esters, phenols, and possibly aldehydes or ketones, showed significant pharmacological activity.[16]

In 1967, an *in vitro* study explored the uterine relaxant properties of cramp bark, finding that aqueous bark extracts could effectively relax rat uterine tissue stimulated with estrone and barium chloride. The researchers observed that the relaxation mechanism did not appear to involve sympathetic nervous system stimulation, but rather the extract constituents directly affected the uterine muscle itself.[17] Scopoletin was identified as the bioactive compound partially responsible for this effect.[11]

In 1972, a second active compound contributing to the antispasmodic activity of cramp bark was identified as viopudial. This non-alkaloidal compound exhibited potent antispasmodic effects *in vitro*.[4]

Antioxidant Activity

The bark extract of cramp bark surpasses both the fruit and flower in antioxidant potential to scavenge free radicals.[3] In a study comparing the antioxidant capacity of various parts of cramp bark, the bark extract showed the highest Oxygen Radical Absorbance Capacity (ORAC) value of 108.17 mM trolox equivalents (TE)/100g dry weight. In contrast, the flowers and fruits of the plant displayed lower ORAC values of 61.82 mM TE/100g and 10.93 mM TE/100g dry weight, respectively.[12]

In a separate experimental research study, the water extracts of cramp bark branches and fruits demonstrated effective DPPH radical scavenging activity, comparing favourably to the reference synthetic antioxidant, butylated hydroxytoluene.[14] Similarly, a water extract of cramp bark branch demonstrated significant antioxidant activity as indicated by its high Ferric Reducing Antioxidant Power (FRAP) values, which is attributed to the rich phenolic content.[15]

Vasorelaxant Activity

In an experimental study, researchers investigated how extracts from various medicinal tree barks interact with KCNQ5, a voltage-gated potassium channel that influences muscle relaxation. They discovered that extracts from cramp bark activated KCNQ5, facilitating ion passage at lower electrical charges, akin to the drug retigabine, an anticonvulsant that activates similar channels. These findings provide a scientific basis for the historical use of these bark extracts in traditional medicine for promoting vascular health and managing muscle spasms. The compounds that influence KCNQ5 modulation are the condensed tannins found in cramp bark. They were quantified as (+)-catechin equivalents using the vanillin assay, revealing a concentration of 3850 ± 660 µg/mL.[8]

Antimicrobial Activity

An *in vitro* study indicated that extracts from cramp bark could potentially serve as a dietary supplement to combat staphylococcal infections. Acetonic, ethanolic, and water extracts from the fruits and bark of cramp bark were shown to significantly inhibit sortase A activity and staphylococcal protein A expression. They also altered the lipid composition of *Staphylococcus aureus* cell membranes, reduced biofilm formation, and showed no toxicity to human fibroblast cells. However, further research using animal models and human studies is necessary to validate these findings.[2]

Indications

- Painful cramping associated with menstruation and labour pains
- Spasms and cramps in various systems, including the digestive system, bronchial system (such as in asthma), and skeletal muscles, particularly in the back and legs
- As a relaxant on uterine muscles, useful for spasmodic and congestive uterine conditions such as uterine fibroids, endometriosis, adenomyosis or pelvic inflammatory disease pain
- Spasmodic contractions of the bladder, which can occur in urinary tract diseases such as irritable bladder or urinary tract infections
- To augment antihypertensive prescriptions by acting as a vasorelaxant
- Threatened miscarriage

Energetics

Dry, bitter, astringent, sweet, warm, relaxing

Use in Pregnancy

There is insufficient reliable information available on the use of the hydroethanolic extract of cramp bark in pregnancy. Avoid using.

Contraindications and Cautions

Caution is advised where there is known allergy or hypersensitivity reactions to the Adoxaceae family (formerly Caprifoliaceae).

Drug Interactions

Pharmacokinetic - In an *in vitro* study, cramp bark was shown to significantly inhibit human cytochrome P450 enzymes CYP1A2 and CYP2C19, with IC50 values of approximately 1 µg/mL. Caution is warranted when combining cramp bark with medications metabolised by CYP1A2 and CYP2C19, as this could potentially alter drug effectiveness or increase toxicity. Further human pharmacokinetic studies are needed to fully understand its impact on drug interactions and safety.[18]

Pharmacodynamic - Exercise caution in coadministration with antihypertensive medications, as preliminary *in vitro* research has indicated that cramp bark has hypotensive effects due to peripheral vasodilation caused by the relaxation of arterial smooth muscle.[4,8]

Administration and Dosage

Liquid Extract:	1:1
Alcohol:	30%
Weekly Dosage:	5 to 80mL

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