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A COMPREHENSIVE REVIEW: *SAMBUCUS NIGRA*. LINN

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ABSTRACT

The traditional systems of medicine together with folklore medicine continue to play a significant role in our health care system for the betterment of mankind. *Sambucus nigra*.Linn, frequently known as 'Sweet elder' belongs to family Caprifoliaceae. *Sambucus* species are being investigated for their potential benefits to health. It is one of the most attractive tree has been put to some useful purpose in Ayurveda, Homeopathic medicine and has become a cynosure of modern medicine. The plant is highly used traditionally in curing diverse disorders. Commonly it is used as astringent, antiviral and diuretic. Thus it holds a significant place because of its medicinal and other miscellaneous uses of economic values. This review particularly deals with the phytoconstituents, homeopathic importance of *Sambucus nigra*.Linn.

Keywords: *Sambucus nigar*, Homeopathic, Respiratory stimulant, antiviral, Chemical constituents**.**

INTRODUCTION

Sambucus nigra (Elder), belongs to family Caprifoliaceae (Adoxaceae) or honeysuckle family grows in Europe, Northern Africa, and Western - and Central Asia.. Sambucus nigra is also known as 'Sweet elder' as the fruit is a glossy dark purple to black berry 3–5 mm diameter, produced in drooping clusters in late autumn; they are an important food for many fruit-eating birds, notably blackcaps. The plant has been called 'the medicine chest of country'.

Synonyms

It is well known by other names such as common elder ,black lace, elderberry , sambucus , Sambucol, tree of doom, , black elder, European elder, European elderberry and European black elderberry, Pipe Tree, Bore Tree, Bour, Hylder, Hylantree. Eldrum,Ellhorn, Hollunder, Sureau, Woody elder, Tree of music.

Habitat & Morphology

It is capable of growing in a variety of conditions including both wet and dry fertile soils, primarily in sunny locations**.** *Sambucus nigra* is a deciduous tall shrub that grows to 4 m, and is native to North America. The European elder grows to approximately 10 m and has been naturalized to the United States. The tree has light brown/grey bark and narrow, dark green leaves. The bark, light grey when young, changes to a coarse grey outer bark with lengthwise furrowing. Clusters of white-cream flowers have a particular fragrance and develop into dark purple-black berries.

The leaves are arranged in opposite pairs, 10–30 cm long, pinnate with five to seven (rarely nine)

leaflets, the leaflets 5–12 cm long and 3–5 cm broad, with a serrated margin.

History of the name 'Elder'

The word 'Elder' is derived from the Anglo-Saxon word *aeld.* In Anglo-Saxon days the tree called Eldrun was found, which became Hyldor and Hyllantree in the fourteenth century. One of its names in modern German - Hollunder - comes from the same origin. In Low-Saxon, the name appears as Ellhorn. Eld meant 'fire,' the hollow stems of the young branches having been used for blowing up a fire: the soft pith pushes out easily and the tubes thus formed were used as pipes - hence it was often called Pipe-Tree, or Bore-tree and Bour-tree, the latter name remaining in Scotland and being traceable to the Anglo-Saxon form, Burtre. The generic name *Sambucus* was derived from the Greek word Sambuca, the Sackbut, an ancient musical instrument used by Romans, in the construction of which, it is speculated, the wood of this tree, was used because of its hardness. Nowadays Italian peasants construct a simple pipe, from the branches of this plant, known as sampogna.

History of the plant

The old traditions, say the Elder became the emblem of sorrow and death**,** An old custom among gypsies forbade them using the wood to kindle their camp fires and gleaners of firewood formerly would look carefully through the faggots lest a stick of Elder should have found its way into the bundle, perhaps because the Holy Cross was believed to have been fashioned out of a giant elder tree, though probably the superstitious awe of harming the Elder descended from old heathen myths of northern Europe. In most countries, especially in Denmark, the Elder was intimately connected with magic. In its branches was supposed to dwell adryad, Hylde-Moer, the Elder-tree Mother, who lived in the tree and watched over it. The Russians believe that Elder-trees drive away evil spirits, and the Bohemians go to it with a spell to take away fever. The Sicilians think that sticks of its wood will kill serpents and drive away robbers, and the Serbs introduce a stick of Elder into their wedding ceremonies to bring good luck. A cross made of Elder and fastened to cowhouses and stables was supposed to keep all evil from the animals.' The use of the Elder for funeral purposes was an old English custom. Green Elder branches were also buried in a grave to protect the dead from witches and evil spirits, The pith of the branches when cut in round, flat shapes, is dipped in oil, lighted, and then put to float in a glass of water; its light on Christmas Eve is thought to reveal to the owner all the witches and sorcerers in the neighborhood.

Myths

It was thought the Elder could not be hit by lightning, and so should be planted near the house. In the sixteenth century it was believed that the leaves of the elder should be hung on doors and windows to prevent witches from entering the house. A twig of Elder carried close to the body, was thought to give good health and luck. The dried flowers, berries, leaves, or roots of ELDER are used for Protection and to ward off both natural and unnatural illness.

Habitat and growth

Sambucus nigra is a perennial shrub, reproduces by seeds and vegetatively. Most shrubs produce copious amounts of fruit and viable seed every year. S. nigra usually flowers in its third or fourth year, rarely in its second. Flowering is generally in June and July. The flowers have a strong odour. This may deter some visitors, but attracts others. Beetles, particularly longhorn

beetles and flies, pollinate the flowers. Most fertilization is due to pollen from different flowers or inflorescences albeit from the same individual. Fruits ripen in August or September. First reproduction is observed in four year-old bushes.

Chemical Constituents

Fruits/berries :
flavonoids quercetin, choline, betulin and rutin, anthocyanins (cyanidin-3-glucoside and cyantdin-3-sambubioside) ; hemagglutinin protein Sambucus nigra agglutinin III (SNA-Ill)/ cyanogenic glycosides including sambunigrin, sterols (sitosterol, stigmasterol, and campesterol); triterpenes (α- and β- amyrin palmitates, oleanolic acid, and ursolic acid); alkanes (mainly n-nonacosane and n-hentriacontane); fatty acids (stearic, oleic, linoleic, etc.) viburnic acid, and vitamins A and C and the fresh ripe fruits also contain Tyrosin. The fruits contain about 0.01% essential oil composed of 34 identified components. Other ingredients include minerals in small amounts and carbohydrates such as pectin and up to 7.5% glucose and fructose.

Structure of Sambunigrin

Fatty acids in fresh fruits:
Methyl Palmitooleale, Ethyl oleate, Ethyl linolate, Ethyl myristate, Methyl palmitate, Ethyl palmitate, Ethyl palmitooleate, Methyl linolate, Methyl linolenate, Ethyl linolenate, Methyl oletate, Linalool.

Organic acids:
Citric acid, malic acid, viburnic acid

Leaves: Alkaloid Sambucine, a purgative resin and the glucoside Sambunigrin, hydrocyanic acid. They also contain cane sugar, invertin, a considerable quantity of potassium nitrate and a crystalline substance, Eldrin.

Bark :
Phytohaemagglutinins**,** Viburnic acid identical with Valeric acid, Soft resin, traces of a volatile oil, albumen, resin, fat, wax, chlorophyll, tannic acid, grape sugar, gum, extractive, starch, pectin and various alkaline and earthy salts. (According to an analysis by Kramer in 1881.)

Flowers :
Essential oil which is composed primarily of free fatty acids , alkanes, with palmitic and linolenic acids, triterpenes, including α-amyrin and β-amyrin, ursolic acid, 30β-hydroxyursolic acid, and oleanolic acid, sterols, flavonoids, flavone glycosides, and phenolic acids, including quercetin, kaempferol, isoquercitrin, rutin, and chlorogenic acid, pectin, sugar. (Leung's Encyclopedia of Natural Ingredients)

Taxonomic Position of Sambucus nigra. Linn

• Kingdom	**Plantae** – plantes, Planta, Vegetal, plants
Subkingdom	**Viridaeplantae** – green plants
Infrakingdom	**Streptophyta** – land plants
• Division	**Tracheophyta** – vascular plants, tracheophytes
Subdivision	**Spermatophytina** – spermatophytes, seed plants
Infradivision	**Angiospermae** – flowering plants, angiosperms
• Class	**Magnoliopsida**
Superorder	**Asteranae**

• Order	**Dipsacales**
• Family	**Adoxaceae**
• Genus	**Sambucus L**. – elderberry
• Species	**Sambucus nigra L**. – European black elder, European elderberry, European black elderberry, elder, elderberry, common elderberry, black elderberry
Subspecies	**Sambucus nigra ssp. cerulea (Raf.) R. Bolli** – blue elder, blue elderberry, elderberry

Medicinal Uses:

In folk medicine, elder berries have been used for their diaphoretic, laxative and diuretic properties and to treat various illnesses such as stomach ache, sinus congestion, constipation, diarrhea, sore throat, common cold, and rheumatism. The flowers are said to have diaphoretic, anti-catarrhal, expectorant, circulatory stimulant, diuretic, and topical anti-inflammatory actions. Some of these properties seem justified since elderberry fruits contain tannins and viburnic acid, both known to have a positive effect on diarrhea, nasal congestion, and to improve respiration. Leaves and inner bark have also been used for their purgative, emetic, diuretic, laxative, topical emollient, expectorant, and diaphoretic action.

Food and Beverages:
In many aspects elderberries compare quite well with better known small fruit crops such as raspberry, cranberry, strawberry, blueberry, or even grape. They can be used to prepare jam, jelly, pie, salad dressing, sauce, snack, juice, soft drink, cordial, wine, port, and beer. A very stable food colorant can be extracted from the berries and used in the food industry. Fresh and dried berries can be found in breakfast cereals, yogurt, and ice cream. To a lesser extent, elderberry flower can also serve to prepare fritters, wine, beer, and liquors. Elder extracts are found useful as flavouring agents in alcoholic beverages. Fruits found their use in preparation of elderberry wine.

Antiviral effects:
In vitro studies have shown that elderberry extracts exert activity against the influenza virus A (including H1N1) and B and the herpes simplex virus. Inhibitory effects on the infectivity of the HIV virus have been noted during laboratory studies.

Diabetes / Glucose/insulin metabolism:
In vitro research, refutes earlier study, and reports stimulation of glucose metabolism and promotion of insulin secretion from beta cell.

Animal data:
A stimulatory effect on insulin secretion by the polyphenolic content of elderberry fruit has been shown in diabetic rats. In vitro studies using rat abdominal muscle showed increased insulin secretion in response to flower extracts.

Clinical data:
Although traditionally used for diabetes, clinical trials are lacking..

HIV
Sambucol was studied for the potential to inhibit the infectivity of HIV isolates in CD4-I- cell lines, peripheral blood lymphocytes, and laboratory HIV strains. The elderberry extract at two different dilutions was pre-incubated with HIV virus prior to addition of the cells. A significant reduction was observed in the infectivity of all HIV strains. In patient isolates treated with the extract, no HIV antigen was

detected at either five or nine day's post-incubation.

Anecdotal evidence (six case studies) reports a combination of elderberry extract and a thymus extract resulted in a reduction in viral load in people with HIV.

Liver damage:
Compound sambuculin A and a mixture of alpha- and beta-amyrin palmitate demonstrated hepatoprotective properties against carbon tetrachloride-induced liver damage.

Diuretic and laxative properties:
Elder flowers are considered to have diuretic and laxative properties; however, the specific compounds responsible for these activities have not been well established.

Anticancer effects:
Elder also find its use in treatment of cancer. Induction of quinine reductase and cyclo-oxygenase-2 has been suggested to be responsible for anticancer effects in vitro. Stimulate the immune system by increasing white blood cells, anti-inflammatory substances, and cytokines which may give it anti-cancer properties.

Antioxidant activity;
Antioxidant activity of elderberry extracts has been evaluated and is estimated to be similar to that of black raspberries, blackberries, and other dark-fleshed small fruit Elderberries contain flavonoids (flavone, flavonone, isoflavone derivatives and anthocyanins), which are reported to possess antioxidant activity and to protect against oxidative stressors, such as hydrogen peroxide, 2-amidinopropane, dihydrochloride (AAPH), ferrous sulfate, and ascorbic acid**.**

Antiproliferative effects:
S. nigra agglutinin has been reported to inhibit nuclear protein transport in neuroblastoma cells, suggesting a functional significance of sialation.

Anti-inflammatory effects;
S. nigra is reported to modulate the inflammatory cytokines IL-1 and TNF-alpha3,36; increase human basophil secretion of IL-4, IL-13, and histamine9; alter function of human neutrophils37, and inhibit macrophage release of proinflammatory cytokines and nuclear transcription factor kB and phosphatidylinositol 3-kinase.

Vascular effects:
The multi-ingredient product OptiBerry IH141 has been shown to possess antiangiogenic properties via inhibition of H2O2 and TNF-alpha-induced Vascular Endothelial Growth Factor.1 In another study, elderberry extracts were associated with significantly impaired angiogenesis in human dermal microvascular endothelial cells.

Conditions Associated with Oxidative Stress:
Numerous disease states are characterized by oxidative stress, including cardiovascular disease, cancer, neurodegenerative disease, peripheral vascular disease, autoimmune diseases, and multiple sclerosis. The ability of elderberry extract to provide antioxidant protection via inhibition of LDL oxidation and scavenging of free radicals makes it a potentially valuable tool in the treatment of disease resulting from oxidative stress. 'Elderberry's ability to incorporate into endothelial cells and potentially improve endothelial function may also indicate a role in prevention of vascular disease of various kinds.

Homeopathic Uses:
Respiratory Disorders
Useful in treatment of Dry coryza of infants, snuffles, oedematous swellings, coughs, colds, flu, bacterial infections and tonsillitis. Chest oppressed with pressure in stomach, and nausea Hoarseness with tenacious mucus in larynx. Paroxysmal, suffocative cough, coming on about midnight, with crying and dyspnoea. Spasmodic croup or laryngotracheobronchitis, nose dry and obstructed. Loose choking cough.

Facial and Skin ailments;

Treats Red, burning spots on cheeks, Bloated and swollen, general dropsy, heat and perspiration of skin.

Abdominal Ailments:
Colic, with nausea and flatulence; frequent watery, slimy stools.

Fever:
Used for Treatment of Fever ailments such as dry heat while sleeping. Dreads uncovering. Profuse sweat over entire body during waking hours. Dry, deep cough precedes the fever paroxysm**.** Herbal tea from S. nigra flowers is used against fever and scarlatina.

Urinary Disorders:
Profuse urine with dry heat of skin. Frequent micturition, with scanty urine. Acute nephritis; dropsical symptoms, with vomiting**.**

Extremities:
Oedematous swelling in legs, insteps, and feet. Feet icy cold. Debilitating night-sweats.

Arthritis;
Diuretic and anti-inflammatory activity of elderberries helps explain its use in rheumatic and arthritic conditions**.**

Natural Colorant:
The bark, leaves and berries can all be used for dying. For Indigo/Blue Colour fruits are used.. The bark gives a black dye, a decoction of the leaves with alum yields a green dye, whilst the berries with alum, dye purple or, if salt is added to the mixture, produce a lilac color.

Herbal Shampoos and Cosmetics
Moisturizing Herbal Shampoos also include Elder extract as their ingredient. Distilled Elderflower water was used as a highly valued emollient lotion, to cleanse the skin, keeping it young and free of freckles and blemishes.

Weight Loss:
Elderberry may help you lose weight. Elderberry has been evaluated in combination with asparagus for weight reduction according to an observational study conducted by C. Chrubasik and associates from the Institute of Forensic Medicine, University of Freiburg, Germany. The study included 80 participants who consumed daily elderberry juice enriched with elderberry flower and berry powder extracts, as well as asparagus-based extracts. The authors found that this herbal formula significantly improved not only the weight, but the blood pressure, physical and emotional state of participants as well.

Other Uses:
Sambucus flowers and berries have been used as astringent, emetic, diaphoretic, phthisis, and flavouring purposes. Distilled elder flower water has been used in topical preparations as perfume. Sambucus is also to lower cholesterol, improve vision, boost the immune system, and improve heart health Elderberry juice was used to treat a flu epidemic in Panama in 1995.

Infusions of the fruit are said to be beneficial for nerve disorders, back pain, and have been used to reduce inflammation of the urinary tract and bladder.

The wood of old trees was used for making skewers for butchers, shoemakers' pegs, and various turned articles, such as tops for angling rods and needles for weaving nets, also for making combs, mathematical instruments and several different musical instruments, and the pith of the younger stems, used for electrical experiments and for making small toys.

Insect and vermin repellent:
Elder can also be used as insect repellant.

Hedging
Elder is a well- familiar hedge plant. The flexible branches can easily be trimmed and laid, thus offering protection against wind, whilst providing a wonderful wild-life habitat - especially for birds, who love the fruit. Country lore testifies to the popularity of Elder as hedging plant.

Drug Interactions:

Diuretics (water pills) -Elderberry may also act as a diuretic, so taking it along with a diuretic

could make that drug stronger and raise your risk of dehydration**.**

Diabetes medications -- Elderberry may lower blood sugar levels. If you are also taking drugs for diabetes, taking elderberry may increase your risk of developing hypoglycemia, or low blood sugar.

Chemotherapy -- Elderberry may interact with some chemotherapy drugs. If you are undergoing chemotherapy, ask your oncologist before taking any herb or supplement.

Laxatives -- Elderberry may act like a laxative and should not be taken at the same time as other laxatives.

Theophylline (TheoDur) -- Elderberry may reduce levels of theophylline, a drug taken for asthma and other respiratory conditions. That could make the drug not work as well.

Drugs that suppress the immune system -- Because elderberry may stimulate the immune system, it could interfere with medications taken to suppress the immune system. These medications include corticosteroids (prednisone) and medications used to treat autoimmune diseases. People with organ transplants should also avoid elderberry**.**

Side Effects and Toxicity:
Elderberry extracts are generally without side effects when taken in the suggested dosages. Berries should be cooked, as the consumption of uncooked berries or juice can result in vomiting and diarrhea. Certain constituents of the leaves, stems, flowers, and roots contain poisonous alkaloids. It has also been reported that small percentages of the general population have a type-1 allergy to Samiiuciis nigra as evidenced by positive-skin prick or RAST test.

CONCLUSION

Herbs have constantly been the principal form of medicine and Sambucus nigar.Linn is one of the vital multipurpose trees used for medicine, food and few other miscellaneous purposes. The crude extracts of diverse parts and pure isolates of Sambucus nigar was reported to acquire antidiabetic, antiviral, anti-inflammatory activities etc. It has been found to possess respiratory stimulant, emetic and diuretics properties. It is also remarkable to note that all parts of this tree are useful. This demonstrates that the tree is boon for indigenous peoples. The widespread uses of Sambucus nigar.Linn in traditional systems of medicine have resulted in their extensive chemical analysis for their bio-active principles. Hence the information collected was useful for a multidisciplinary team of botanists, ethnobotanists, pharmacologists, physiochemists,and medicinal experts for further pharmacological and therapeutical evaluation which can help in proving it to be a promising source in pharmaceutical as well as neutraceutical industry.

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