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SEA BUCKTHORN: FRUIT FOR THE FUTURE

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Abstract

Sea buckthorn is a hardy deciduous shrub from the Elaeagnaceae family. It is gaining recognition for its ecological and commercial value as it thrives in marginal soils and offers a rich nutritional profile. The berries are renowned for their therapeutic properties, used historically to treat various ailments, including skin conditions, digestive disorders, and respiratory issues. Being rich in vitamins (A, B, C, E), essential fatty acids and antioxidants, it supports immune function and overall health. Its rapid root system helps combat soil erosion and enhances habitat restoration. This resilient plant is also being explored for its potential role in preventing liver fibrosis and its applications in nutraceuticals. Its strong antioxidants maintain the equilibrium of animal and human health, paving the way for the development of nutraceuticals, functional meals, and plant-based medications.

Key words: Antioxidants, nutraceuticals, sea buckthorn, therapeutic

Introduction

Sea Buckthorn, also known as Siberian Pineapple or Leh Berry, is a newly emergent fruit crop found worldwide in temperate regions. It is a hardy shrub of the Elaeagnaceae family that is deciduous, dioecious, and typically spinescent. Its botanical name, Hippophae, meaning "shiny horse," comes from the fact that the ancient Greeks employed it as part of a diet for racehorses. Sea buckthorn's native range encompasses large areas of China, Mongolia, Russia, and the majority of Northern Europe. It is a rare and valuable plant that is grown all over the world right now. The plant grows naturally in temperate regions, mostly in woods on marginal and degraded soils.

Countries like China and Canada have significant area under man produced orchards of sea buckthorn. It is utilized as garden plant in European countries and Canadian prairies. The entire plant, including the fruits, leaves, stems, branches, roots, and thorns, has historically been used in medicine, as a nutritional supplement, to preserve soil and moisture, and to provide habitats for wildlife. For this reason, sea buckthorn is sometimes referred to as "Gold Mine," "Wonder Plant," or "Golden Bush."A plant of significant ecological and commercial value is sea buckthorn.

The International Sea Buckthorn Association (ISA) was founded in 1999 by China, India, Canada, and other nations to promote the benefits of sea buckthorn for human health, economic development, and environmental conservation. The medicinal benefits of sea buckthorn have become more widely known in recent years, and numerous nations are starting to acknowledge and establish a sea buckthorn business. As of December 2020, sea buckthorn was found in 52 countries across the globe.

Traditional uses

Sea buckthorn berries have been used to treat coughs and sputum as well as to enhance the digestive system's and blood circulation's performance. It was used to cure skin conditions, jaundice, asthma, digestive disorders, rheumatism, and as a laxative in Russia and the Indian Himalayan region. The berries were utilized by the natives of Central Asia (the Tajikistan and Afghan Pamirs) to heal skin conditions, digestive disorders, and hypertension. Berries are used to extract oil, which is used to treat a variety of conditions including gastritis, stomach ulcers, uterine erosion, and genital organ inflammation.

Additionally, infusions of dried berries were utilized to treat skin conditions. Sea buck thorn has long been used in Germany for the ecological restoration of degraded areas, mainly for afforestation of industrial and coal mining waste sites and soil erosion prevention. Sea buckthorn can be utilized in cirrhotic patients to investigate its impact on alterations in fibrotic parameters, hepatic function improvement, and potential applications as a therapeutic anti-fibrotic drug. Because of the vitamin A content and precursors' function in the evolution of liver fibrosis, it might aid in preventing the disease's advancement.

Soil and climate

In addition to withstanding harsh temperatures ranging from -43° to 40°C, it is thought to be drought resistant. However, irrigation is needed in regions receiving less than 400 mm (16") of rainfall annually. It can withstand pH ranges of 5.5 to 8.3, the shrub thrives on soils with a pH of 6 to 7. In the spring, when plants are blossoming and small fruits are starting to emerge, sea buckthorn is particularly vulnerable to severe soil moisture deficiencies. In order to produce a higher yield of higher-quality berries, sea buckthorn, like other crops, needs enough nutrients in the soil. Phosphorous fertilizer works wonders on it. The growth of nodules following Frankia inoculation is delayed by nitrogen fertilization, which can have a negative impact on root nodulation.

Due to its quick root system development, sea buckthorn is a great plant for reducing soil erosion, reclaiming land by fixing nitrogen and preserving other vital nutrients, improving wildlife habitat, and safeguarding farm stands.

Botany

It typically reaches a height of 1-6 m, while certain plants can reach up to 18 m. The lanceolate or linear leaves typically measure 3-8 cm in length and less than 7 mm in width. The leaves have a distinguishing silver-gray lower surface and a dark gray upper surface. A single apetalous flower with one ovary and one ovule typically makes up the female bud, whereas the male bud contains four to six apetalous blooms that release pollen that is dispersed by the wind. When planting sea buckthorn, weed management is crucial, particularly for fostering the growth of recently planted seedlings. The fruits have an 8 mm diameter and are spherical or oblate in shape.

Usually, a few fruits are adhered to one another. The fruit has a ruffled surface and is orange-yellow or brownish-red in color. The pulp has a soft texture and is greasy. The sea buckthorn seed is obliquely oval, measuring around 4 mm in length and 2 mm in width. The seeds have a longitudinal groove in the middle and are lustrous and brown. In order to optimize yield and minimize annual swings, moderate trimming is necessary. Every year, the crown should be trimmed to remove any overlapping branches, and long branches should be cut off to promote the growth of lateral shoots.

Sea buckthorn berries

Sea buckthorn berries typically go through three stages of growth. A phase of rapidly increasing seed growth characterizes the first phase, which is followed by a brief transition period during which the rate of seed growth decreases. The third stage consists of the quick development of the berry pulp and the quick initial growth of the seed, which is followed by a decline in seed weight. Berries typically reach a final stage known as "berry maturation."

The sea buckthorn fruits in Finland and most other parts of the world, including Pakistan, usually ripen around the beginning of September. Berries that are fully ripe often weigh between 4 and 60 grams per hundred berries and have a range of colors, from yellow to orange to red.

Propagation

Sea buckthorn plant can be propagated by both sexual and asexual method of propagation. Plant is dioecious in nature *i.e* male and female flowers occurs on different plant. Therefore, asexual method of propagation is preferred.

Fruit from sea buckthorn is collected from late August to mid-winter and seed is extracted from it and shown in the field in the month of January or early February.

Pre-soaking of seeds in water for 48 hours enhances the germination of the seed. For the true to true type plants, it can be propagated by suckers, hardwood cutting and soft wood cutting. March is the ideal month for planting and sucker separation, just before bud break.

Post harvest handling

When overripe, sea buckthorn berries have a pungent, musky smell and a rotten flavor that can be detected even in the field. Washing could mask or intensify the smell. Berries must be picked at the right time, moved swiftly to the processing facility, and promptly chilled to a temperature of 4 to 6 degrees Celsius to stop the growth of bacteria in order to prevent this issue.

The berries should be frozen, ideally using separate fast freezing methods, if they are going to be kept for longer than a few days. The berries are defrosted and turned into products as needed, depending on demand. For long-term storage, juice extracted using centrifugal or pressing methods needs to be pasteurized and frozen and kept refrigerated.

As an alternative, fruit can be turned into sterilized or pasteurized finished goods and kept at room temperature. Even after sterilization, a product's shelf life is reduced, but it increases when kept chilled.

Different uses of sea buckthorn plant parts

S. No	Plant parts	Uses
1	Roots	Fuels, fixes atmospheric nitrogen (Frankia)
2	Bark	Pharmaceuticals and cosmetics
3	Leaves	Pharmaceuticals, cosmetics, Tea, Food, Animal and poultry feed
4	Fruits	
	Juice	Soft drink, Health drink, Beverages, Wine
	Oil	Pharmaceuticals and cosmetics
	Pomace	Animal feed, Food colours
	Seed oil	Pharmaceuticals and cosmetics
	Seed cake	Food and feed
5	Twigs	Fuel, Fence to fields, fiodder

Sea buckthorn is renowned for its rich nutritional profile and therapeutic potential. Its pharmaceutical values are attributed to its diverse bioactive compounds, including Vitamins (A, B, C, E), essential Fatty Acids (omega-3, -6, -7, and -9 fatty acids. Omega-7), antioxidants (flavonoids, carotenoids and polyphenols) and minerals (calcium, magnesium, potassium, and zinc). It also contains triterpenic acids like betulinic acid, which have been studied for their anti-inflammatory, antiviral, and anticancer properties.

From its leaves, fruits, and seeds, sea buckthorn exhibits a variety of pharmacological and therapeutic properties, including anti-inflammatory, anti-inflammatory, anti-stress, anti-atherogenic, cardioprotective, and wound healing. Because of its powerful antioxidant properties, sea buckthorn and its derivatives maintain the balance of both human and animal bodies through the action of their many useful constituents. It is possible to create plant drugs, functional foods, and nutraceuticals based on sea buckthorn to boost antioxidant levels and fortify the immune system, all of which can help organisms that are under constant stress be more resilient.

Conclusion

The primary sources of its nutritional and medicinal benefits are the berry and seed. Because of these advantages, sea buckthorn products—especially its oils—are in high demand for both cosmetic and therapeutic uses. The sea buckthorn industry in India is still in its infancy. However, sea buckthorn will be a major player in the nutraceutical sector due to recent growth in popularity and plantings.

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