

SEABUCKTHORN

SEABUCKTHORN (Hippophae Rhamnoides) is a hardy, deciduous shrub bearing small yellow to orange-red berries. This plant has been used for centuries in the traditional medicinal system of Asia and Europe mainly for its nutritional and medicinal value.

It possesses an exclusive composition of vitamins, nutrients and essential fatty acids usually found only separately in different plants and sources. SEABUCKTHORN grows widely in Europe, central Asia and temperate regions of South Asia, India and China, ranging in altitude of a minimum of 60 m asl to a maximum of 5200 m asl.

The Spiti valley has a fairly large concentration of SEABUCKTHORN, particularly along the river bed covering an area of more than 200 hectares, as per official figures. The 3 varieties of SEABUCKTHORN found in Spiti are rich in Carotenoids, xanthophylls, Phenolics and Flavonoids and have a higher content of essential oils.

SEABUCKTHORN was used in China for over 12 centuries where it was first used for traditional Chinese medicine strengthening stomach, blood circulation and respiration. SEABUCKTHORN is currently used in juice, sports drinks, jellies, ice cream, cosmetics and medicines.

SEABUCKTHORN is known as nature's most balanced fruit. This "Holy Fruit of the Himalayas" has been cherished by native Tibetans for centuries for its incredible nutritive qualities. The **SEABUCKTHORN** fruit is also known through out the world as **Sandthorn**, **Sandorn**, and **Siberian Pineapple**.

Seabuckthorn is rich in macronutrients and micronutrients. SEABUCKTHORN contains vitamins B1, B2, folic acid, C, E, beta-carotene (Pro-vitamin A), and K. It contains Carotenoids, Flavonoids, phenols, Terpenes and at least 20 mineral cofactors. SEABUCKTHORN also naturally contains 5-HT (serotonin), a neurotransmitter that helps regulate emotions. SEABUCKTHORN numerous health benefits include cardiovascular, immunity, anticancer, memory, growth, anti-inflammatory, and skin health. SEABUCKTHORN contains more than 60 antioxidants and high ORAC value.

Health Benefits of SEABUCKTHORN?

<u>Medicinal Properties</u>	<u>Health Benefits</u>
Omega 3,6,7 & 9	<ul style="list-style-type: none">• Supports healthy cardio vascular function• Sustains proper brain and nervous system function• Promotes healthy skin and hair• Supports healthy digestive system function• Promotes healthy Urogenital lining
Vitamins A, C & E – Antioxidant B Vitamins – General wellness D, K – Necessary vitamins	<ul style="list-style-type: none">• Benefits prostate and colon health• Contributes to proper brain & nervous system functioning• Enhances eye health for better vision• Relieves sore joints
Anti-oxidant network	<ul style="list-style-type: none">• Fights cell-damaging free radicals• Provides anti-aging benefits• Supports healthy cell reproduction• Healthy immune system functioning & cellular rejuvenation• Healthy skin and hair

Flavonoids	<ul style="list-style-type: none"> • Helps fight cell-damaging free radicals • Assists in the process of healthy cellular rejuvenation • Promotes healthy immune system function
Carotenoids	<ul style="list-style-type: none"> • Beta carotene – assists in slowing the aging process • Lycopene – maintains prostate and colon cell health • Zeaxanthin – supports eye health
Minerals	<ul style="list-style-type: none"> • Helps the body produce energy • Helps the body support growth • Supports cell reproduction and rejuvenation
Energy	<ul style="list-style-type: none"> • Enhances mental clarity and promotes stamina • Sustained natural energy (no stimulants)
Anti-inflammatory	<ul style="list-style-type: none"> • Assists in healthy inflammatory response • Supports healthy cardio-vascular system • Relieves sore joints

The fruit of SEABUCKTHORN is very rich in vitamin C (300-1600 mg/100 g), which is 4–100 times higher than any vegetable and fruit.

History & Legends

SEABUCKTHORN's history is as colorful as its berries and dates back many years crossing diverse cultures and countries.

There is a legendary story that links SEABUCKTHORN with Genghis Khan, the Mongol conqueror, who established one of the largest empires in the 13th century, stretching from China to Eastern Europe. It is said that he relied on three treasures - well-organized armies, strict discipline and SEABUCKTHORN. It was the regular consumption of SEABUCKTHORN that enabled the army of Genghis Khan to march on with inexhaustible and enormous energy.

Its Latin name 'Hippophae' literally translates into "shiny horse". According to ancient Greek legend, SEABUCKTHORN was used as the diet for race/ill horses to give them a shiny coat and superior health. Greek mythology also has it that the SEABUCKTHORN leaves were the preferred food of "Pegasus", the flying horse.

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References to medicinal use of SEABUCKTHORN were found in Ancient Greek texts and in classic Tibetan medicinal texts, including "the Rgyud Bzi" (The Four Books of Pharmacopoeia) dating back to the times of The Tang Dynasty (618-907 AD).

The Tibetan medical classic-the **rGyud Bzi** (The Four Books of Phannacopoeia), completed during the Tang Dynasty (618-907 AD), has 36 chapters, which had recorded the prescriptions for curing the diseases of blood circulation systems, skin wound, anti-inflammation and strengthen and coordinate the balance of functions among liver, stomach, spleen, kidney and heart.

Ecological Benefits

Nature has bestowed SEABUCKTHORN with a diverse array of attributes that are a boon to both man and his environment.

A hardy, deciduous shrub bearing yellow to orange berries, SEABUCKTHORN grows widely in Europe, central Asia and temperate regions of South Asia, India and China, ranging in altitude of a minimum of 60 m asl to a maximum of 5200 m asl.

SEABUCKTHORN has a highly developed root system and therefore presents an excellent biotic choice for soil conservation. By growing this hardy deciduous shrub along the valley of the Yellow river, China claims to have controlled 40% of the devastation caused during its flooding.

SEABUCKTHORN is also a highly efficient nitrogen-fixing plant and hence ideal for enhancing soil-fertility. It bears nitrogen-fixing Frankia bacteria in its root nodules, thus making it an ideal plant for mixed farming. An 8-10 year old SEABUCKTHORN forest can fix 18 Kg N/Ha/Yr and greatly increases the phosphate and organic matter in soil. It is hence known to have an immense impact on the productivity of all varieties of plants, trees and crops, which grow in its vicinity.

In the Loess Plateau region of China, 51 out of 350 bird species are entirely dependent upon SEABUCKTHORN fruit as a food and 80 bird species are partly dependent upon SEABUCKTHORN.

Wide adaptation, nitrogen fixation, extensive and well developed root system, compact canopy and dense forest of SEABUCKTHORN, protect the soil from wind and water erosion.



The Process

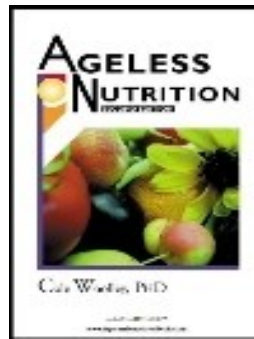
In the early hours of dawn when the berries are dew-ridden, local women, with their wooden baskets and sticks, venture into the desert oasis to harvest them in order to ensure that they yield the maximum nutrition possible.

The thorny nature of the bush and the tender and small stature of the berries make their harvesting extremely tedious. In order to ensure that both the plant and the berries don't get damaged, the basket is placed under the plant and the branches are gently tapped till the ripe berries fall into them.

They are then immediately transported to the processing units where they are cleaned, washed and subsequently processed into pulp. The pulp is then stored and transported for further processing using state of the art facilities to bring you the perfect blend of the ancient and the modern.

The SEABUCKTHORN harvesting season is from late August to early October. The roads connecting Spiti to the outside world are threatened with closure from October onwards and immediately after the harvesting season the processed pulp has to be transported out of Spiti.

The timing of the same clashes with the apple season in lower Spiti and Upper Kinnaur as a result of which there is a real battle for trucks as a result of which their price increases to twice the normal price.



Biochemical Characteristics OF SEABUCKTHORN

Fruit of SEABUCKTHORN is very rich in variety of vitamins and other bioactive compounds with nutritional and medicinal properties.

Fruit

Weight of 100 fruits may vary from 15 to 70g, although in some cases, it may be as low as 8 g or as high as 110g. The fruit may contain 60-85 percent juice and it may yield about 65 percent juice by centrifugal method (Heilscher and Lorber, 1996). Each fruit contains a seed, weighing on average 15-20 mg, containing 11 percent moisture and 8-18 percent oil.

Dry Matter

In the ripe SEABUCKTHORN fruits, dry matter is represented by fat and non-lipid fractions. Generally dry matter constitutes about 15 percent of the total weight of the fruit. It is known that small-fruited SEABUCKTHORN contains more dry substances than large-fruited one.

Soluble Solids

Soluble solids represent an important fraction of the SEABUCKTHORN juice, because of the high concentration of organic acids typical of its berry. Chinese SEABUCKTHORN berries possess the highest content, varying from a minimum of 5.6 to a maximum of 22.7°Brix.

Proteins and Amino Acids

Total protein level in fresh fruits of SEABUCKTHORN is in the range of 2.1-3.4 percent. In seeds, it may be between 18-33 percent. Protein content in the pulp varies from 0.79-1.64 percent, that is why pulp or juice seems cloudy or opalescent product, which provides a stable turbidity to the juice. The majority of SEABUCKTHORN proteins are well-ingested albumins and globulins. As studied in Russian forms, globulins (53.7-56.0 percent) and albumins (33.1-38.4 percent) are important proteins, which contain a large number of free amino acids, among them aspartic acid is quantitatively most important.

Pectin

Pectin content of the SEABUCKTHORN fruits is low. Pectin value was estimated in Siberian SEABUCKTHORN (Var. Katun) ranging from 0.2 to 1.2 percent.

Sugars

Although, SEABUCKTHORN berries are not considered rich in sugars, however, sugar is an important ingredient of SEABUCKTHORN fruit, as it plays a useful role in determining the sweetness of its juice and in fact the sugar : acid ratio has been reported to constitute the major promoter of taste of SEABUCKTHORN fruit juice. The average content of sugar in fruits is 2.00-3.26 percent and in the sweetest Russian forms, it can go

up to 7.0 percent. The sugar is composed of glucose (1.3-1.8 percent), fructose (0.7-2.3 percent), and saccharose (0.07-0.30 percent). There are minor amounts of xylose, mannitol, sorbitol and xylitol.

Organic Acids

Organic acids and sugars are the major portion of the soluble solid fraction of the fruit pulp of SEABUCKTHORN fruit. Fruit juice of SEABUCKTHORN is quite rich in organic acid, pH of juice being near to 2.7. Chinese showed the highest content of organic acid (4.1 to 9.1 percent) and 2.1-3.2 percent in some Russian forms. About 90 percent of the total acidity is represented by malic and quinic acids in Chinese, Russian and Finnish berries, malic acid being a major constituent. Presence of vitamin C organic acid and tannic acid in the fruit of SEABUCKTHORN make it an ideal sources for the production of several beverages particularly health protection juices.

Vitamin C

SEABUCKTHORN is famous for very high content of vitamin C (100-2750 mg/100g), which are 4-100 times higher than any vegetable and fruit. Generally, Chinese SEABUCKTHORN (ssp. *Sinensis*) 360-2500mg and *H.salicifolia* (2750 mg) in Indian Himalayas are richest in vitamin C, whereas Russian and European forms are low to medium. It is anti-oxidant, scavenger of free radicals, inhibits the formation of potentially carcinogenic N-nitroso compounds and thus offers protection against stomach cancer. Ascorbic acid also plays a critical role in wound repair and healing/regeneration process.

Oil

Oil of SEABUCKTHORN berries is the most valuable product of this plant, as it possesses anti-oxidant, wound healing, anti-ulcer, anti-tumor and curing cardiovascular etc. properties. Generally, the oil content of SEABUCKTHORN fruit is low (about 4 percent), whereas as ssp. *Turkestanica* in western Pamirs, Tajikistan is quite rich in oil of fresh fruits (6.8-13.7 percent). Russian and central Asian forms are known to be rich in oil, where the oil content on the average does not fall below 6.0-6.6 percent. In Lahaul valley, Indian Himalayas, total oil in fresh fruits varied from 2.9-4.6 percent in *H. rhamnoides* ssp. *turkestanica* and much lower of 2 percent in *H. salicifolia*. The total oil content varies from 2-4 percent in pulp to 8-16 percent in seed.

Fatty Acids

Unsaturated fatty acids make about 85 percent of total oil. The human body absolutely requires the polyunsaturated EFAs α -linoleic acid (omega-6 fats) and alpha-linolenic acid (omega-3 fats). Both fatty acids repair the cell membrane after oxidation due to attack of free radicals. SEABUCKTHORN seed oil is very high in two essential fatty acids, Linoleic acid (30-40 percent) and α -linoleic acid (20-35 percent). The dominating fatty

acids in the soft parts of the fruit are palmitoleic acid (16-54 percent). Generally less than 14 percent of Linoleic acid and less than 3 percent of α -linoleic acid are usually found in pulp oil. Palmitoleic acid has attracted an increasing interest due to its possible effects on many physiological processes including cholesterol and triglyceride lowering and stroke reducing effects. Palmitoleic acid is a principal constituent of skin fat and the extract is recommended for skin softening and anti-wrinkle products.

Vitamin E

Important antioxidant function of vitamin E, also known as tocopherols, appears to be the inhibition of lipid peroxidation, scavenging free radicals. Low intakes of vitamin E and other anti-oxidants results into certain types of cancer and atherosclerosis. Both pulp and seed oils of SEABUCKTHORN are rich in vitamin E, much higher than other nutrient oils. Chinese experts have found the highest vitamin E content in seed oil of *H. rhamnoides* subsp. *turkestanica* (159 mg/100g) and lowest in pulp oil was found in *H. rhamnoides* subsp. *sinensis* (248mg/100g oil).

Vitamin K

Vitamin K promotes normal coagulation of blood during the injuries of blood vessels, and its content varies from 0.65-1.3mg/100gm of fresh fruit, 59-64mg/100g in pulp oil to 110-230mg/100g in seed oil, which is more than many horticulture crops.

Carotenoids

Various colours of ripe berries of SEABUCKTHORN, ranging from yellow to bright red are related to occurrence of carotenoids. Carotenoids are linked with a decreased risk of heart disease, cancer, and degenerative eye diseases like macular degeneration and cataracts. Beta-carotene, the most dominant carotenoid in SEABUCKTHORN, intake is associated with reduced risk of breast, stomach, esophageal, and pancreatic cancers. Total carotenoid content in SEABUCKTHORN fresh fruit varies generally from 1mg to 120mg/100g, whereas content of β -carotene varies from 0.2 to 17mg/100g. Red and orange-red fruits are richer in carotenoids as compared with the less intensely colored fruits like yellow and orange-yellow. Different growth conditions influence the carotenoid content in the soft parts of the berries. Carotenoid content has been found increasing with the maturation of fruit. Soft part (pulp) oil of ssp. *sinensis* growing in Shanxi province of China had a maximum carotenoid level of 2140mg/100g and a minimum value of 2.1mg/100g in north Caucasus. It is established that carotenoides of SEABUCKTHORN fruits consist of α -carotene, β -carotene, lycopene and zeaxantin. Many studies have found β -carotene to be a major carotenoid, making 15-55 percent of total carotenoides, depending on the place.

FLAVONOIDS

SEABUCKTHORN fruit and leaves are very rich source of FLAVONOIDS. FLAVONOIDS are found in all parts of SEABUCKTHORN, i.e. leaves (3.8-4.0 percent), fruits, juice and seeds. Russians have estimated 420-552mg/100g FLAVONOIDS fresh fruits of various SEABUCKTHORN populations. SEABUCKTHORN growing in west Pamirs had FLAVONOIDS 310-1238mg/100g dry wt in leaves and 168-859mg/100g in crude fruits. Studies found that the juice and dried fruit residue contained FLAVONOID of 0.2 percent and 0.55 percent, respectively in SEABUCKTHORN from western Sichuan, China. The main FLAVONOIDS identified in SEABUCKTHORN are leucocyanidin, catechin, flavonol and trace flavanone. From flavonol, the isorhamnetin, quassin and camellin could be isolated. They have been found to possess very strong anti-oxidant activity. It has found that FLAVONOIDS improve the immunity of the body, lower the osmosis of the capillary wall and prevent oxidation of vitamin C. FLAVONOIDS have been found in controlling arteriosclerosis, reducing cholesterol level, turning hyperthyroidism into euthyroidism and eliminating inflammation. They have also been found effective against tumor and radiation damage.

Sterols

Sterols constitute the main portion of unsaponifiable matters. All sterols in SEABUCKTHORN oil belongs the following 4 series, i.e., ergosterols, stigmasterol, lanosterols and amyryns. Due to their structural similarity to cholesterol, plant sterols are well studied for their cholesterol absorption inhibition properties. In addition to their cholesterol lowering property, plant sterols may possess anti-cancer, anti-atherosclerosis, anti-inflammation and anti-oxidation activities. The amount of sterols, in the fruit pulp of studies forms ranged between 0.16 and 0.76 percent, but in the seeds, it ranged from 0.19 to 0.96 percent. It was found that content of sterol in SEABUCKTHORN oil is about 10 times higher than other oils. Total sterol content in the pulp oil (soft part) of SEABUCKTHORN fruit ranged from 1 percent to 3 percent. Juice oil, processed by centrifugation of pressed juice of subsp. *sinensis*, had 720 mg/100g sterols.

Folate

Folate is a water-soluble vitamin B known to have several benefits to human health, such as prevention of neural tube defect in babies, an action against cardiovascular diseases caused by elevated plasma homocysteine and certain forms of cancer. SEABUCKTHORN fruits have been found to be a rich source of folate (29µg/100g fresh weight).

Betain

SEABUCKTHORN accumulates betain an anti-ulcer compound in high amount. It varied from 19.9 to 190 mg/100g in SEABUCKTHORN cultivars growing at Urals Curative Plants Garden, Russian. Betain quantity in SEABUCKTHORN fruits varied from 512 to 897 mg percent in Altay cultivars and from 728 to 1389 mg percent in East Sayan forms.

5-hydroxytryptamine (5-HT)

Of the chemical neurotransmitter substances, serotonin is perhaps the implicated in the etiology or treatment of various disorders, particularly those of the central nervous system, including anxiety, depression, obsessive-compulsive disorder, schizophrenia, stroke, obesity, pain, hypertension, vascular disorders, migraine and nausea. The peel of stem and fruit of SEABUCKTHORN contains serotonin. In Russian forms, experts estimated 1.1-2.6 mg/100g serotonin in SEABUCKTHORN fruit. 5-hydroxytryptamine (5-HT) isolated from SEABUCKTHORN bark inhibited tumor growth.

Tannins

SEABUCKTHORN leaves have been found to contain high content of polyphenols, including tannins (10-12 percent). Therefore, SEABUCKTHORN plant leaves have been proposed as the prospective source of dyeing and tanning substances. Fruits, pulp and juice were found to be poor in tannins (0.02, 0.02 and 0.004 percent, correspondingly). SEABUCKTHORN tannins are important source of anti-viral drugs.

Metallothionein

Metallothionein acts as detoxifying agency for heavy metals and as free radical scavenger for most toxic radical, hydroxyl radical (HO). Metallothionein inhibits the erythrocyte hemolysis, and stress induced ulcer and diabetes. In view of the high anti-oxidant activity, which is 7-8 times higher than human serum, it can be commercially utilized in sufficient quantity from SEABUCKTHORN.

Seabuckthorn Research

There are over 130 different studies documenting the healthy benefits of SEABUCKTHORN - that's a lot! We're proud to be standing on the shoulders of giants in the medical and scientific fields. We encourage everyone that's interested in learning more about SEABUCKTHORN to do their own research on this incredible little berry, but be forewarned that some of the research gets pretty in-depth - code for boring. To help out, we have compiled a list of resources starting with the easiest to read and ending up with the really smarty pants stuff. Have fun exploring and don't fall asleep.

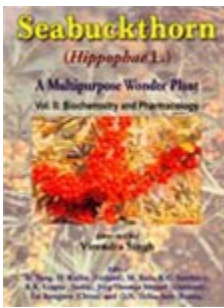
Important Disclaimer: SEABUCKTHORN has only recently attracted the attention of the west. SEABUCKTHORN research in the past few years has begun to identify characteristics which yield one of the most complex and highest nutrient densities known to man. Scientific studies supporting SEABUCKTHORN's status as a "superfood" number up to 5x those of nearest competitor. According to PubMed (the gold standard for peer reviewed medical research) SEABUCKTHORN has over 175 studies compared to less than 60 for other popular superfruits such as Acai, Mangosteen, and Gogi. PubMed is a service of the U.S. National Library of Medicine and the National Institutes of Health that includes over 16 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s

SEABUCKTHORN Research is dedicated to providing consumers and professionals with unbiased research involving all aspects of SEABUCKTHORN. SEABUCKTHORN Research is also the home of the *Complete Guide to SEABUCKTHORN - A Review* which you can purchase and download for \$19.95.



[*SEABUCKTHORN* *Hippophae Rhamnoides L.*
A Whole Food Answer to Better Nutrition
Marcus C.C.W. Elliott, M.D. - 2005](#)

SEABUCKTHORN - Hippophae Rhamnoides L. A Whole Food Answer to Better Nutrition written by Harvard trained Dr. Marcus Elliott is an easy to read book that explains the health benefits of SEABUCKTHORN.



[SEABUCKTHORN \(Hippophae L.\)](#)
[A Multipurpose Wonder Plant](#)
[Vol. II: Biochemistry and Pharmacology](#)
[Editor-in-Chief: Virendra Singh - 2006](#)

To his chapter titled, *Free Radicals, Diseases, Anti-oxidants and Anti-oxidant Properties of SEABUCKTHORN* to a chapter on *SEABUCKTHORN as a Radio-Protector* Dr. Virendra Singh offers a comprehensive look at SEABUCKTHORN in his book *SEABUCKTHORN (Hippophae L.) - A Multipurpose Wonder Plant*. This second edition comprises 42 different papers written by scientists from Russia, China, Indian, Finland, Germany, and Central Asia. The first section on "Biochemistry" has 25 papers and deals with the bioactive compounds like vitamins, carotenoids, FLAVONOIDS, sterols, tannins, fatty acids, amino acids, and minerals. The second section on "Pharmacology" has 12 papers and provides in depth information on studies, experiments, and clinical trails on the efficacy of SEABUCKTHORN on various diseases of the skin, cardiovascular system, cancer, ulcer, and wounds in animals and some studies in human beings. The final "Miscellaneous" section consisting of 5 papers deals with such topics as processing technology and health food product development. The book is ideal for researchers, herbalists, policy makers, and those interested in knowing more about SEABUCKTHORN.



PubMed is a service of the U.S. National Library of Medicine and the National Institutes of Health that includes over 16 million citations from MEDLINE and other life science journals for biomedical articles back to the 1950s. A search for seabuckthorn or hippophae rhamnoides will produce over 130 studies.



Google scholar covers peer-reviewed papers, theses, books, abstracts, and other scholarly literature. You'll find publications from academic publishers, professional societies, and scientific journals. Do a search on Google Scholar for SEABUCKTHORN and you'll find over 500 scholarly articles. Now do a search for hippophae rhamnoides and you'll find about 2,300!



In 1985 China, Finland, and Russia advocated communication and cooperation on the study and research of SEABUCKTHORN. Their first conference dedicated to SEABUCKTHORN was held in 1989 where they formed the International SEABUCKTHORN Association (ISA) dedicated to the promotion and utilization of

SEABUCKTHORN. At their third conference in 1995 they established the International Center for Research and Training on SEABUCKTHORN (ICRTS). The association now holds international conferences every two years. The English version of their website (www.icrts.org) contains some high level information, but you'll easily see that there's a lot more information on the Chinese version (www.icrts.org/chinese). You can paste this URL into BabelFish (babelfish.altavista.com) and have the site translated into English.

É¾ That's Chinese for SEABUCKTHORN. We don't know how much research you'll actually get done with this one, but it's kinda fun. Copy and paste É¾ into Google and you'll find over 300,000 hits. You can then paste a Chinese URL into BabelFish (babelfish.altavista.com) and have it translated into English. Like we said, we don't know how much valuable information you'll find, but interesting none the less. Here are some other languages you can search for and translate:

- É¾ = Chinese
note: if you are not seeing chinese characters then you don't have the Chinese language pack. Your search will not work.
- Sanddorn = German
- Havtorn = Swedish
- Olivello Spinoso = Italian
- Tyrni = Finnish
- Espino de Mar, Falso Espino, Espino Amarillo = Spanish