e ISSN–2321–7987 | ●●● Article ●●● |Visit us : *www.researchjournal.co.in*|

Nutritional importance of Seabuckthorn

R.S. Bali[1], Ravinder Kour[2] **and** Usha[3]

[1]Department of Forestry, College of Forestry (V.C.S.G. Uttarakhand University of Horticulture and Forestry), Ranichauri, (Tehri Garhwal) India
[2]Indira Gandhi National Open University (IGNOU), New Delhi (India)
[3]Rani Laxshhmi Bhi Central Agricultural University, Jhansi (U.P.) India
(E-mail: drrajandersingh@gmail.com)

Seabuckthorn (*Hippophae* spp) a promising multipurpose tree of Himalaya, belonging to the family Elaeagnaceae, and is the most useful genus in the family. It is a thorny, temperate bush and is widely distributed throughout the dry temperate regions of Europe and Asia. As the name indicates Seabuckthorn, the plant has been growing from sea level to high altitude mountain regions but mainly distributed in higher elevation of Indian Himalaya, from Ladakh (J & K) to Lahaul – Spiti (H.P), Kumaon and Garhwal in Uttarakhand, Sikkim and Arunachal Pradesh (Chauhan, 1995). Under natural conditions Seabuckthorn grows on slopes, well drained soil with silt, river banks, lakes, sea shores and waste lands. It is well adapted to dry conditions. Seabuckthorn the wonder plant of cold arid Himalaya, grows in wastelands, dry rocks and along river belts in Indus, Nubra, Chanthang, Suru, zanskar and Lauhal – Spiti valleys in India (Singh *et al.*, 2000).

Recently it has attracted the attention of scientific communities in India due to its manifold properties. The various parts of the plant are quite rich source of anti – oxidants, flavonoids, vitamins (C, E, A, B, K) etc. that has been found application in health food, drugs and cosmetic industries General Information.

Seabuckthorn fruits when used fresh are rich in nutrients such as carbohydrates, organic acids, amino acids and vitamins. The vitamin content of Seabuckthorn is much higher than any other fruit or vegetable. Seabuckthorn usually finds its use in making soft drinks and other food products due to the presence of high content of vitamin C (Rongsen, 1992). The Seabuckthorn juice is a good source of several amino acids and minerals.

Mature fruit of Seabuckthorn is rich source of nutrients, minerals and biomolecules.

Processing and products : There, potentially, is a wide array of products possible from sea buckthorn fruit for use as food, fresh fruit, nutraceuticals, pet foods, cosmetics, and skin preparations for improving the health and appearance of the skin.

Juice extraction : If fresh pressed juice is allowed to stand one or two days it will separate into three phases: an upper floating particulate phase, a center liquid portion, and a sinking particulate sediment. This separation is undesirable from a consumer point of view (Kleinschmidt *et al.*, 1996).

If pulp oil is left in the juice, it will result in the formation of an oil layer on the juice surface, creating an oil ring that remains on the package surface after the juice is removed. This oil ring remaining on the package is unsightly and undesirable. Centrifugal reduction of the juice oil content below about 0.1% will eliminate the floating oil problem. As the oil is removed by the disk stack centrifuge, the coarse sediment will be sedimented to the bottom of the bowl and can be removed automatically by the dislodging mechanisms present in the centrifuge (Beveridge *et al.*, 1999). Alternatively the crushed berries or extracted juice may be treated with a preparation containing pectinmethylesterase (PME) (Lui and Lui, 1989), or perhaps treated with one of the many commercially available hydrolytic enzyme preparations.

For preservation purposes, it is necessary that the juice be sterilized / pasteurized. High-temperature-short-time (HTST) processes of 80°–90°C for several seconds are preferred (Liu and Lui, 1989). This is because the juice is somewhat delicate and will sustain a loss of flavor and develop an off-flavor if heated beyond the conditions indicated. Furthermore, vitamin C is destroyed by heating so maximum retention is promoted by HTST processing.

The juice turns brown after about 6 months at 15°–20°C, and this browning is reduced under non-oxidative conditions. Reducing storage temperatures to 4°C prolongs storage life (Zhou and Chen, 1989) and enzymes and sunlight are important sources of browning initiation.

Normally, sea buckthorn juice is an opalescent, to very turbid juice depending upon the amount of suspended solids remaining after centrifugation. However, ultra filtration may be used to remove all particulate and produce a clear juice (Bock *et al.*, 1990; Heilscher and Lorber, 1996). The ultra filtration membrane can have a molecular weight cutoff of 100,000 or more and the process produces an oil-free permeate and an oil-rich retentate which can be utilized for production of pulp oil rich in vitamin E and a solid material rich in carotenoids which may be used as an isolation source for the pigment or as a dietary supplement.

Oil extraction : Sea buckthorn offers two possibilities for oil extraction. Pulp oil exists in the juice pulp and is isolated as a cream layer by centrifugal technology. The usual methods for manufacturing oil commercially require countercurrent (usually) extraction of the oil bearing material, seed or pulp, with an organic solvent, commonly hexane (Weiss, 1963 and 1970).

Increasingly, consumers are demanding fewer residues in their foods. Newer extraction techniques such as supercritical fluid extraction (SCE) especially carbon dioxide under high pressure can be used to reduce oil residues. Sea buckthorn oil may be a secondary product since it is a specialty oil used in medicine, as a nutraceutical supplement, and in cosmetics (Beveridge *et al.*, 1999).

Pigment : A pigment termed "sea buckthorn yellow" can be extracted from sea buckthorn waste material. The waste material could be the press cake remaining after juice extraction or the sediments remaining after centrifugation. In one process the pigment is extracted with low concentrations of alcohol (Chen *et al.*, 1995; Liu *et al.*, 1989) after concentrating the suspension to 11°–13° Brix. The waste material is spray dried to yield a yellow powder. It contains flavones but also, carotene and vitamin E. Supercritical CO_2 has also been used to extract a yellow coloring material from sea buckthorn waste. Pressure had the greatest influence on extraction with yields increasing with extraction pressure. A yield of 64% total carotenoids was achieved under processing conditions of 60 MPA, 85°C (Messerschmidt *et al.*, 1993).

Teas : Sea buckthorn leaves contain nutrients and bioactive substances. These include flavonoids (Chen *et al.*, 1991), carotenoids, free and esterified sterols, triterpenols, and isoprenols (Goncharova and Glushenkova, 1996). Numerous products can be made from the air dried leaves including teas and tea powders.

Animal feed : One potentially large market for sea buckthorn, are nutraceutical products for animals. The large volume of "waste" material from sea buckthorn, such as leaves, fruit, pulp, and seed residues from juice and oil extraction, could be developed into a value-added product. Sea buckthorn leaves contain approximately 15% protein and berry and seed residues still contain valuable chemical substances at low concentrations.

Received : 09.06.2017 *Revised : 01.10.2017* *Accepted : 15.10.2017*