THE SCIENCE WORLD
A Monthly e Magazine
ISSN:2583-2212
April, 2023; 3(04), 531-536

Popular Article

Seabuckthorn a 'Super Healthy Fruit' of Ladakh: Nutritional Value, Health Benefits and Applications

Skarma Choton*, Julie D Bandral, Monika Sood and Anjali Langeh
Division of Food Science and Technology, Sher-e- Kashmir University of Agricultural Sciences and Technology, Jammu
https://doi.org/10.5281/zenodo.7874756

Abstract

Seabuckthorn (*Hippophae rhamnoides L*) belongs to the family *Elaegnaceae* is an economically and ecologically important plant of Ladakh. Seabuckthorn is a Super Healthy Fruits rich in bioactive compounds viz., vitamins, antioxidant and minerals. Seabuckthorn exhibits antibacterial, antifungal, antiviral, anticancer activity and several other health benefits. Seabuckhthorn has a wide range of application in food, cosmetics and pharmaceutical industry. Seabuckthorn has immense potential in the sustainable socio-economic development and nutritional security of Ladakh. Judicious exploitation, traditional usage coupled with commercial value and modern scientific research will bring immense benefit to modern society and local people from the 'Wonder Plant' of Ladakh.

Keywords: Seabuckthorn, Bioactive compounds, Antioxidant, Antiviral, Nutritional Security

Introduction

Ladakh the northern most Trans-Himalayan region of India houses diverse groups of medicinally important wild plant species. One of these plants is Seabuckthorn (*Hippophae spp. L.*) traditionally known by different names like *Shishu-lulu, tses-ta-lulu, Tsermang, Tsoks-kyur, Pili* etc. Seabuckthorn (*Hippophae rhamnoides L.*) is an ecologically and economically important plant that belongs to the family *Elaegnaceae*. The ripe fruits of Seabuckthorn referred to as 'Super Healthy Fruit' are among the most nutritious and vitamin-rich fruits. Every part of the plant viz. fruit, leaf, twig, root and thorn has been traditionally used as medicine, nutritional supplement, fuel and fence, and therefore seabuckthorn is popularly known as 'Wonder Plant', 'Ladakh Gold', 'Golden Bush' or

'Gold Mine'(Stobdan *et al.,* 2011).

Fig 1. Seabuckthorn (*Hippophae rhamnoides L.***)**

Distribution

In India, Seabuckthorn is widely distributed in UT Ladakh, followed by Kumaon Garhwal (Uttrakhand), Lahaul- Spiti and Kinnaur (Himachal Pradesh) and Sikkim/Arunachal Pradesh in the North east region as in fig 1. (Tamchos and Kaul, 2018). Ladakh remains the major site for a natural seabuckthorn resource with over 13,000 ha of the total area under seabuckthorn in the country (Husain *et al.,* 2018).

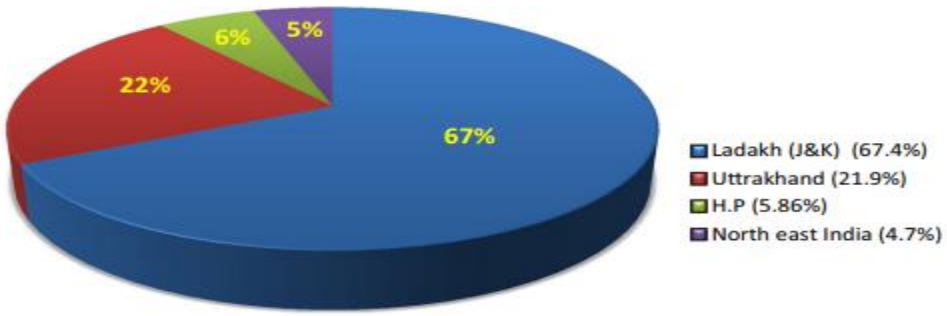

Fig. 1. Area (in %age) under Seabuckthorn in Indian subcontinent (Source: Tamchos and Kaul, 2018)

Nutritional value of seabuckthorn

Seabuckthorn berries are rich source of as many as 190 bioactive compounds. Seabuckthorn berries of Ladakh region content multivitamins including vitamin C (275 mg/100g), vitamin A (432.4 IU/100g) and minerals including potassium (647.2 mg/l), calcium (176.6 mg/l) and iron (30.9 mg/l) as in (Table 1) (Stobdan *et al.,* 2017). Vitamin C represents a nutrient of major importance in Seabuckthorn and presence of these antioxidant vitamins in high quantity indicates its strong

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 28.04.2023

antioxidant property. Seabuckthorn exhibit 10 times higher vitamin C concentration than that of kiwi fruit (*Actinidia deliciosa P.*) which is commonly known as a rich source of ascorbic acid (Nawaz *et al.*, 2019). Seabuckthorn seed content valuable oil that is characterized by high oleic acid content and one to one ratio of omega-3 and omega-6 fatty acids. Seabuckthorn leaf is a rich source of protein, antioxidant including tannins, flavonoids, carotenoids, free and esterified sterols.

Table 1. Nutritional value of Seabuckthorn

Nutrient	Composition
Vitamin C	275 mg/100g
Vitamin A	432.4 IU/100g
Vitamin E	3.54 mg/100g
Riboflavin	1.45 mg/100g
Niacin	68.4 mg/100g
Potassium	647.2 mg/l
Calcium	176.6 mg/l
Iron	30.9 mg/l
Phosphorous	84.2 mg/l
Magnesium	22.5 mg/l
Zinc	1.4 mg/l

(Source: Stobdan *et al.*, 2017)

Health benefits of Seabuckthorn

Seabuckthorn is mentioned in the writings of ancient Greek scholars such as Theophrastus and Dioscorides, known as a remedy for horses. The medicinal value of seabuckthorn was recorded as early as the 8th century in the Tibetan medicinal classic *rGyud Bzi*. Seabuckthorn (*Hippophae rhamnoides* L.) is recorded as *Bar-sTar* in Tibetan medicine and there are over a hundred popular seabuckthorn based formulations in various pharmacopoeias of *Sowa Rigpa* (Tibetan medicine), which is being practiced in Ladakh as *Amchi* (Stobdan *et al.*, 2013). Seabuckthorn (*H. rhamnoides L.*) has recently gained worldwide recognition, for its pharmaceutical and nutraceutical potential and is currently cultivated in several parts of the world (Masoodi *et al.*, 2020).The pharmacological studies demonstrated seabuckthorn exhibits antibacterial, anti-sebum, antifungal, anti-psoriasis, anti-

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 28.04.2023

atopic dermatitis, antiulcerogenic effect, anti-atherogenic effect, radioprotective effects, beneficial effects on experimental injury and clinical diseases of the liver, inhibition of platelet aggregation and wound healing activities. A high amount of vitamin C strengthens the immune system by removing free radicals due to its antioxidant activity. Sea buckthorn extract can effectively inhibit prostate cancer growth and its advantage as an adjuvant in cancer therapy is that fastens regeneration after the use of chemotherapy. Seabuckthorn oil improves blood circulation, facilitates oxygenation of the skin, removes excess toxins from the body, protects against infections, prevents allergies, eliminates inflammation and inhibits the aging process. Seabuckthorn oil lowers blood cholesterol and helps to prevent atherosclerosis. Seabuckthorn oil positively influence brain functions and the central nervous system by an antidepressant effect. Besides, it has also been included in various cosmeceuticals for its use in skin-eventone, rejuvenation, smoothening, removal of scars, wrinkles and pigmentation, and also in hair-related problems (Ahani and Attaran, 2022). Seabuckthorn exhibited an antiviral activity against the herpes virus, influenza virus (Enkhtaivan *et al.,* 2017) and Dunge virus (Jain *et al.,* 2014). In addition, viruses like Adeno, HIV and HPV can also limit by seabuckthorn. 14-Noreudesmanes and a phenylpropane heterodimer from seabuckthorn berry inhibit replication of Herpes simplex type 2-virus (Redei *et al.,* 2019).

Applications of Seabuckthorn

Seabuckthorn has been used traditionally for a variety of purposes as every part of the plant viz. fruit, leaf, twig, root and thorns has been used as medicine, nutritional supplement, fence and fuel. A wide array of products is possible from Seabuckthorn for pharmaceuticals, cosmetics and food industry (Figure 2). The high vitamin concentration makes seabuckthorn fruit highly suitable for the production of nutritious soft drinks. Defense Institute of High-Altitude Research (DIHAR) has been working on Seabuckthorn since early nineties and has developed various seabuckthorn based products such as beverages (Leh Berry), jam, herbal tea, antioxidant herbal supplement, herbal appetizer, UV protective oil and animal feed. Seabuckthorn oil is mostly used in cosmetic industry or as nutraceutical supplement. The oil has topical antioxidant, skin nourishing, UV reflective and moisturizing properties that protects the skin against harmful UV radiations (Husain *et al.,* 2018).

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 28.04.2023

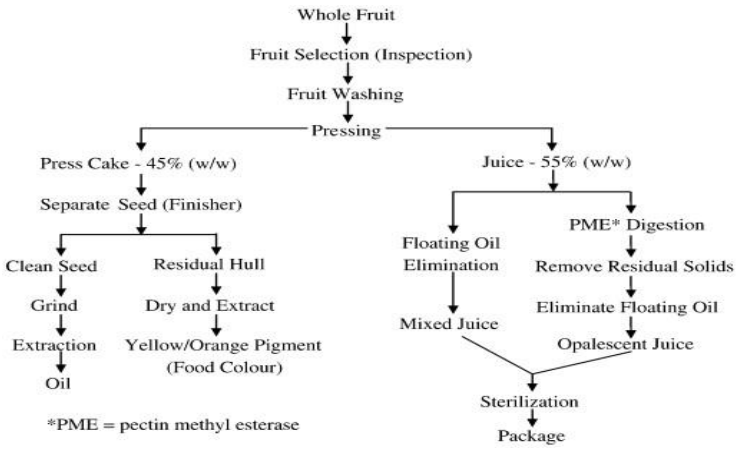

Fig. 2. Processing of seabuckthorn berries (Source: Bal *et al.*, 2011)

Conclusion and Future Prospects

Seabuckthorn has immense potential in the sustainable socio-economic development and nutritional security of Ladakh. However, the local people of Leh and Kargil districts are still unaware of the multitudinal benefits of this Super plant. There is a need for undertaking research of rich nutritive food values and make farmers aware of the utility of this species. There is a need for novel techniques and approaches for integrated processing of Seabuckthorn berries into their nutraceutical and therapeutic products. The products can be certified as organic as most seabuckthorn products are derived from natural forest and community land where application of chemical fertilizers and pesticides is negligible. It is necessary that this wonder plant should be promoted on a large scale and religiously by the local and Governments. Judicious exploitation, traditional usage coupled with commercial value and modern scientific research will bring immense benefit to modern society from the lesser-known shrub of the Himalayas.

References

Ahani, H. and Attaran, S. 2022. Therapeutic potential of Seabuckthorn (*Hippophae rhamnoides* L.) in medical sciences. *Cellular, Molecular and Biomedical Reports*, **2**(1): 22-32.

Bal, L.M., Meda, V., Naik, S.N. and Satya, S. 2011. Sea buckthorn berries: A potential source of valuable nutrients for nutraceuticals and cosmoceuticals. *Food Research International*, **44**(7): 1718-1727.

Enkhtaivan, G., John, K.M,. Pandurangan, M., Hur, J.H., Leutou, A.S. and Kim, D.H. 2017. Extreme effects of Seabuckthorn extracts on influenza viruses and human cancer cells and correlation between flavonol glycosides and biological activities of extracts. *Saudi Journal of Biological Sciences*, **24**(7):1646-1656.

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 28.04.2023

Husain, M., Rathore, J.P., Rasool, A., Parrey, A.A., Vishwakarma, D.K. and Mahendar, K. 2018. Seabuckthorn: A multipurpose shrubs species in Ladakh cold desert. *Journal of Entomology and Zoology Studies*, **6**(2): 1330-1337.

Jain, A., Chaudhary, S.and Sharma, P.C. 2014. Mining of microsatellites using next generation sequencing of seabuckthorn (*Hippophae rhamnoides L.*) transcriptome. *Physiology and Molecular Biology of Plants*, **20**(1):115-123

Masoodi, K.Z., Wani, W., Dar, Z.A., Mansoor, S., Anam-ul-Haq, S., Farooq, I., Hussain, K., Wani, S.A., Nehvi, F.A. and Ahmed, N., 2020. Sea buckthorn (*Hippophae rhamnoides L.*) inhibits cellular proliferation, wound healing and decreases expression of prostate specific antigen in prostate cancer cells in vitro. *Journal of Functional Foods*, **73**: 104102.

Nawaz, M.A., Khan, A.A., Khalid, U., Buerkert, A. and Wiehle, M. 2019. Superfruit in the Niche-Underutilized Sea Buckthorn in Gilgit-Baltistan, Pakistan. *Sustainability*, **11**(20): 5840.

Redei, D., Kusz, N., Rafai, T., Bogdanov, A., Burian, K., Csorba, A., Mandi. A., Kurtan, T., Vasas, A. and Hohmann, J. 2019. 14- Noreudesmanes and a phenylpropane heterodimer from sea buckthorn berry inhibit Herpes simplex type 2 virus replication. *Tetrahedron*, **75**(10):1364-1370.

Stobdan, T., Dolkar, P., Chaurasia, O.P. and Kumar, B., 2017. Seabuckthorn (*Hippophae rhamnoides L.*) in trans-Himalayan Ladakh, India. *Defence Life Science Journal*, **2**(1): 46-53.

Stobdan, T., Targais, K., Lamo, D. and Srivastava, R.B. 2013. Judicious use of natural resources: A case study of traditional uses of seabuckthorn (*Hippophae rhamnoides L.*) in trans-Himalayan Ladakh, India. *National Academy Science Letters*, **36**: 609-613.

Stobdan, T., Yadav, A., Mishra, G.P., Chaurasia, O.P. and Srivastava, R.B. 2011. Seabuckthorn: the super plant (production, characterization, postharvest & health applications). *DIHAR, Defence R&D Organisation: New Delhi, India*.

Tamchos, S. and Kaul, V. 2019. Seabuckthorn: opportunities and challenges in Ladakh. *National Academy Science Letters*, 42: 175-178.

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com

Published 28.04.2023