



Morphological and Phytochemical Studies of *Hippophae rhamnoides* L.

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Abstract

Sea buck thorn (*Hippophae rhamnoides* L.) is one of the common squander heterothallic fruit crop. It is also called Golden Bush due to its appearance in cold desert regions in Ladakh. It is also called Leh Berry. Sea buckthorn is a ripe and yellow colour berries. It is a rich source of various vitamins such as Vitamin A, Vitamin B, Vitamin C and Vitamin K. That is also an excellent source of Phytosterols, organic acids, antioxidants such as ascorbic acid, tocopherols, carotenoids, and flavanoids. It is used as many beneficial affects such as antioxidant, anticancer, immunomodulatory, antibacterial, antiviral, anti-inflammatory, Cardioprotective, stomach ulcers, tumors. It is used in utilization in humans. It is used in scientific research and proselytizes in wide ranging.

Keywords: *Hippophae rhamnoides* L., Seabuckthorn, Phytosterols, Immunomodulatory

Introduction

Seabuckthorn (*Hippophae rhamnoides* L.) belong to the family of Elaeagnaceae. It is a shrubby plant that belongs to Eurasian community. It is mainly found in cold deserts such as Ladakh, Chamba, Kinnaur, Spiti valley (Dwivedi et al., 2006). It is commonly called Wonder plant, Ladakh Gold, Gold Mine and Golden Bush. It is a deciduous, hardy shrub having yellow and orange berries. In Indian market it is also called Ladakh berry and Power Berry (Dwivedi et al., 2006; Aras et al., 2007). This shrub is basically help in soil erosion due to have their nitrogen fixation property that is found in high altitude cold deserts (Kumar and Sagar., 2007). This shrub also used in landscaping and stabilize the river banks and sea shores. It is a valuable resource in the field of biotechnology, cosmetics, pharmaceuticals and nutraceuticals. Seabuckthorn is very nutritious and rich source of vitamins so it is called "Super Healthy Fruit" (Tamchos S., 2019; Yadav VK., 2016). It is rich in vitamin A, Vitamin B1, Vitamin B2, Vitamin B6, Vitamin C and Vitamin E. It contains fat soluble vitamins are also present (Li T et al., 2007).

Seabuckthorn naturally grows in higher altitudes at about 2500 to 3700 meters above the sea level. They are grown in sunny sides of steep slopes and riverbanks with tolerating temperatures such as -45 degree Celsius (Dhyani et al., 2007). Mostly in pulp of Seabuckthorn berries has Alpha, Beta and Gamma-carotens, glycopene and

zeaxanthin. It contains 5-hydroxytryptamine that is used in depression disease. It contains more carbohydrates are present such as glucose, fructose and xylose are present. It contains Malic acid, organic acids, quinic acids, oxalic acids, citric acid, tartaric acid is present in seabuckthorn (Fatima et al., 2012).

2. Morphological Description:-

Seabuckthorn leaves are linear, small, alternate and lanceolate reduce moisture loss with a grayish green crown like leaves are present. Its leaves are approx. 8cm long and 0.4 -0.6 cm wide in nature, This type of species in Seabuckthorn is used in preparation of various products such as antioxidants products are formed. Due to have their nutrients and bioactive compounds are present in their leaves. The seed of this seabuck thorn is ovate-elongate and elliptical in shape. The germination of seed is about 25-26 degree centigrade. Their seed contains saturated and unsaturated fatty acids are present such as Oleic acid, linolenic acid, linoleic acid is present. That type of seeds used in many purposes such as in cosmetics, pharmaceuticals, and in food industries (Singh V et al., 2005). The stem of seabuck thorn has laticiferous canal cells with its cork cells, fragments of parenchyma cells, vessels with annular thickness brown colour fluid is present in rhomboidal crystals of calcium oxalate compounds that has hypodermal and parenchyma cells are present (Schroelder WR., et al., 1991). The roots of seabuckthorn is strong and well developed with their root hairs. Horizontal roots have turions that give succors that is used in fixation of nitrogen in soil and also help in prevention in soil erosion (Bernath J et al 1992; Heinaaho M et al., 2006). The flower of seabuck thorn is dioecious in nature that has separate male and female in it. The male flower produces the pollens and pollination is occur by wind. But they never produce nectar. The floral buds lie in autumn season. The main difference occur five to six flowers but female has only two or three flower. It is the basic difference in flowering stage of seabuckthorn (Lu R., 2003). The fruit of seabuckthorn is orange, reddish and yellowish colour with small ovoid berries. They are sour in taste with 85% of aminoacids , organic acids, tannins, sugar and vitamins. Its oil is used in making pickles, marmalades, jams, juices, jellies, snacks (ANSAB. 2003).

3. Phytochemical Description:-

Sea buck thorn has 200 nutrients are available in nature. Whereas Vitamin C is very important nutrient is available. Carotenoides and polyphenolic compounds, phenolic acids and flavaonoids are present in seabuck thorn.

a) Carotenoides

Beta carotene is a precursor of vitamin A .where lutein and zeaxanthin helps in macular pigment present in the eye. They help in cancers and eye health. There is the presence of Lutein, zeaxanthin, Beta cryptoxanthin,, Gamma carotene, Alpha carotene, cis beta carotene, beta carotene, lycopene, xanthophylls. There are all the carotenes are present in seabuck thorn (Eggersdorfer Metal., 2018).

b) Polyphenols

There are 100 polyphenolic compounds are present in seabuck thorn. There is the presence of phenolic acids, ferilic acid, gallic acid, vanillic acid, caffeic acid, protocatechuic acid, m-coumaric acid, o-coumaric acid, p-coumaric acid, Quinic acid, cinnamic acid, 2,5 Dihydroxyphenyllactic acid, vallic acid, hydroxycaffeic acid and syringic acid is present in polyphenols. These all types of polyphenols are present in seabuckthorn (Ji M etal., 2020).

c) Flavonoides

Flavanoids play important role in prevention of chronic diseases such as cancer whether it is of breast cancer, colon cancer, prostate cancer, cardiovascular disease and diabetes (Guo etal., 2017). They have the property of antioxidant and antiproliferative activities. There is the presence of quercetin-3-O-rutinoside, isorhamnetin-3-o-rutinoside, isorhamnetin-3-oglucoside, catechin, rutin, quercetin, isorhamnetin, kaempferol, quercetin -3-o- rutinoside, quercetin -3-o-glucoside, Isorhamnetin-3-o-sophoroside-7-o-rhamnoside are flavanoids are present (Liu S etal.,2021).

d) Fatty acids

Fatty acids help in treating in skin and mucous membranes disorders and reduce the eye syndromes and cardiovascular disorders. In pulp of seabuckthorn there are 11 fatty acids are present. Mainly palmitic acid, palmitoleic acid and oleic acids are present. The monosaturated fatty acid was significantly higher than the cultivated berries. While the polyunsaturated fatty acids are present in cultivated berries (Vaitkeviciene N etal., 2019).

e) Phytosterols

It is mainly a bioactive component. That is particularly used in cardiovascular diseases. There are 14 sterol compounds have been detected in seabuck thorn pulp. That phytosterols are 4-desmethyl sterols are cholestanol derivatives which contains beta sitosterol, stigmasterol, campesterol and 4, 4-dimethylsterols are present (Teleszko M., 2015).

4) Conclusion:-

Seabuck thorn is a highly valuable plant. Which contains 200 bioactive compounds is present. It includes antioxidant activities, anticancer activity, anti inflammatory activity, hyperlipidemic activity, antiobesity activity, antimicrobial activity, anti viral activity, neuroprotective and has hepatoprotective effects are present. It has the ability to development of economic and ecological development. It helps in prevention and treatment of diseases and help in developing the scientific and in sustainable manner.

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