



Review

A fleeting appraisal of *H. rhamnoides* plantAhsan Zahid^a, Uzma Bashir^b, Misbah Firdous^b, Muhammad Imran Qayyum^c, Ashok Kumar Mandal^{d*}^aDepartment of Eastern Medicine, The Superior University Lahore Pakistan^bDepartment of Eastern Medicine, Faculty of Medical and Health Sciences, University of Poonch Rawalakot, State of Azad Jammu and Kashmir, Pakistan.^cDepartment of Pharmacy, Faculty of Medical and Health Sciences, University of Poonch Rawalakot, State of Azad Jammu and Kashmir, Pakistan.^dDepartment of Pharmacology, Faculty of Medicine, Universiti Malaya, Malaysia.

Abstract

Sea buckthorn Plant contains many dietary and medicinal compounds and it can be beneficial for human health. Mostly whole plant can be used for medicine. This plant can be grow in hilly areas of Pakistan. Four species and nine subtypes of *H. rhamnoides* can be identified across the world. Sea buckthorn has high medicinal importance due to its anti-oxidant value. The seed, pulp, fruit, and juice of Sea buckthorn showed over 190 bioactive components. Different chemical constituents can be present in it such as “Fat-soluble, vitamins (A, K, E), 22 fatty acids, 42 lipids, organic acids, amino acids, carbohydrates, Vitamins C, B1, B2, B6, B12, folic acid, Tocopherols and flavonoids, phenols, terpenes, and tannins”. The oil content of mature seeded, dried organic product mash and fruits accumulation after squeeze extraction is “8-20%, 20-25%, and 15-20%” respectively. The data was collected using Google scholar, pub Med, Med Rxiv. The use of Hippophae, extracts dramatically reduced the lethality of sulphur mustard. Animal toxicity tests were conducted utilizing base formulations and extract. All the biochemical values relating to “fuel metabolism, liver function, renal function, and haematological parameters” were normal. Hippophae oil used to treat heart difficulties, joint inflammation, skin disorders, and cancer but during pregnancy and surgery it cannot be used. different pharmacological activities can be done such as anti-cancer, anti-inflammatory, anti-healing, anti-bacterial, anti-oxidant, anti-tumor, anti-diabetic, anti-radiations, anti-carcinogenic and platelet aggregation.

Correspondence:

ashokmandal@um.edu.my

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Introduction: *H.rhamnoide* is a medicinal plant that its Flowers, Fruits, Leaves and Seeds, are used for centuries to treat different type of disease. This plant may grow up to 10 meters in length and has hard earthy colour bark. Leaves are small, straight lanceolate, substitute or inverse, coated on tiny, greenish or yellowish, show up with new leaves, male flower in terminal groups, female flower lone with a distance across of 6 mm, orange yellow or red in shading, and caustic to extremely acidic in taste [1]. The seed is solitary, elliptical, and has a shiny testa. The root architecture allows for development even on sensitive slants. A five-year-old plant can have a 5 m-deep tap base, with level roots spreading 6 to 10 m. In Asia, the bushes grow to be 0.5 to 6.0 m tall, seldom reaching 10m. Sea buckthorn is a spice with medicinal properties that has been used to treat a variety of ailments in China, Asia, and Europe for over a thousand years. Sea, buckthorn belonging to the *Elaegnaceae* family [1]. It is a deciduous shrub with yellow or orange natural products. There are three important Hippophae species in terms of taxonomy *H. rhamnoides* Linn. *H. salicifolia* D.Wear and *H.tibetana* Schlecht. A fourth plant category, was later shown in 1978. Until date, only four species and nine subtypes of *Hippophae rhamnoides* have been identified across the world, as shown below: *Hippophae rhamnoides* var. *sinensis*, *Hippophae rhamnoides* var. *turkestanica*. *Hippophae rhamnoides* var. *Yunnanesis*, *mongolica*, *Hippophae rhamnoides* Sub sp [2]. *Caucasia Hippophae rhamnoides* subsp. *Carpatica*. *Hippophae rhamnoides* var. *fluviatillis* Subspecies *rhamnoides* of *Hippophae rhamnoides*. *Hippophae rhamnoides* var. *gyantsensis* (This subspecies has recently been involved in an issue with species that rely on an orderly developmental connection.) Hippophae is endemic to Jammu and Ladakh region, Himachal Pradesh's "Chamba, Lahaul, Spiti region, and Kinnaur, Uttarakhand's Kumaon and Garhwal regions, and Sikkim". At a height of 1600–2500 m, the plant is spotted gregariously growing along stream edges and damp spots of the Himalayan viral desert [3]. They are very resistant to temperature restrictions, withstanding temperatures ranging from – 45 to +43 °C. They naturally produce on the uphill side of sudden inclines. Seaberries can withstand a long dry season, high levels of soil salinity, and caustic soils. Their fundamental foundation is effective. The roots are dense, and as a result, Seaberries are frequently employed to protect the soil from disintegration or in re-cultivation procedures. Berries of Hippophae address a affluent wellspring of physically dynamic mixes [4]. As a result, the plant has practically become the focus of attention all over the world. The branches of Hippophae are typically coated with a variety of rigid thistles. Seaberries are anemophilous and dioecious. Male plants contain 2–3 more flower bud than female ones. Blossoms not make nectar, so fertilisation by bugs is implausible; the sole possibility is wind fertilisation [5]. The oil content of mature seeded, dried organic product mash, and fruits accumulation after squeeze extraction is "8-20%, 20-25%, and 15-20%" respectively. The organic product oil is dull red, rose orange in colour and change than seed oil that is yellow or light orange in colour and smells musky. Hippophae oil used to treat asthma, heart

difficulties, joint inflammation, skin disorders, and cancer [6]. Table 1 depicts the instrument of activity of sea, buckthorn oil. The oil concentration of Hippophae has been used in superficial cream for its anti-aging properties. The balm with Hippophae oil "0.5-1 percent" has been suggested for suppressing careening-activated edemas and uninvolved cutaneous hypersensitivity in the absence of irritation and adversely vulnerable skin damages. sea buckthorn oil is used in the treatment of burns and inflected wounds. Cell reinforcement, disease treatment, mending, platelets to aggravation, against radiation effect, therapy of gastrointestinal ulcers, as a liver defensive specialist, cancer prevention agent, platelet collection, and immunomodulator are some of the beneficial exercises of sea Buckthorn oil [7]. Due to the effects *H. rhamnoides* L. contain bioactive combinations is commonly used in conventional medicine. The constituents of sea buckthorn natural product are listed in Table 1. The lipids accumulate in the monocarp (plump section of the soil products) can be extracted from one or both seeds or mashes of the natural product by Basic extraction or the Supercritical Carbon Dioxide extraction [8]. In this type carbon dioxide is confined into a fluid state, is the preferred extraction approach. This extraction process yields refined oil with no plant strong material. Carbon Dioxide extracts the oil from the seeds and berries, which include magical omega unsaturated fats and beneficial vitamins [9].

Life cycle: Buds begin to growing by April as the snow end. Blossoming happens in July to August and fruiting in August to September [10].

Sea buckthorn constituents: The "seed, pulp, fruit, and juice" of sea buckthorn shown over 190 bioactive components. "Fat-soluble, vitamins (A, K, E)", "22 fatty acids, 42 lipids, organic acids, amino acids, carbohydrates, Vitamins C, B1, B2, B6, B12, folic acid, Tocopherols and flavonoids, phenols, terpenes, and tannins" are among these substances. It contains a lot of 'omega 3, 6, 7, and 9'. It is the only full plant which contains all fatty acids and a good quantity of Omega 7.

Fruits: The mature sea buckthorn berry is a therapeutic food. Chromatographic tests revealed that the mature berries of Hippophae include 'malic acid, oxalic acid, and an unknown acid'. Those organic acids also reduced toxicity of various medications "such as barbitals and antibiotic" as well as avoiding teratogenesis, X-ray damage, and the negative effects of oxygen treatment [11]. The mature fruit contains around 0.5 percent phospholipids, which include lecithin, cephalin, phosphate-dylinositol, and phosphatidyl. It has anti-fatty liver and anti-cirrhosis properties and can increase cellular metabolism. The mature fruit contains 0.09-0.36 percent betaine, a methylating product of glycine that has anti-ulcer, preventive, and therapeutic effects on atherosclerosis [12]. Phenol and flavonol" also boostup the human body prevent the breakdown of the vitamin C. The effects of flavonoids on the blood vessel need the contribution of Vitamin C, their activity can stabilize Vitamin C in body and it can decrease Vitamin C, oxidation [13]. These affects can also control decrease the cholesterol, prevent the Arteriosclerosis, Convert hyperthyroidism into euthyroidism and decrease inflammation. Some important

flavonoids compounds in *H. rhamnoides*, are, Isorhamnetine-3-o-galacto-Rhamnoside, Isorhamnetin-7-o-Rhamnoside, “IsoRhamnetin-5-o-Gluarablonside, Isorhamnetin-3-o-glucoglucoside, Isorhamnetin-3-o-Gluca-rhamnoside, Kaempferol, Isorhamnetin-3-o-gluco-7-orhamnside, 2,4-dihydroxy-chalcones-2-o-glucoiside, Quercitin-7-o-rhamnoside, Quercitin-3-o-glucoside, Quercitin, Isorhamnetin-3-o-glucoside, Isorhamnetin-3-o-galactoside, Quercitin-3-o-rutin, 2,4-dihydroxy-chalcones-2-o Glycoside” [14].

Stem: The outermost covering of stem contains 5-hydroxytryptamine (5-HT). It can be occurring in less amount in plant kingdom. 5-HT can work as a neurotransmitter and control body temperature, blood pressure and emotions. Moreover it has anti-cancer, anti-infection, anti-radiation properties. 5-HT can also encourage coagulation by the transform the fibrinogen into fibrin [15].

Leaves: Also have coumarins, which may also increase capillary function, has styptic and anticoagulation activities, antispasms, anti-vitiligo, anti-tumorogenesis, anti-numbness, antipyretic properties, and can control gall bladder problems. The leaves contain trierpene, the representative of which will be ursolic acid, which has a comparable effect to adrenocortical hormone. It has the ability to regulate the effects of sodium (Na+) and chlorine (Cl), as well as treats (hypocorticoidism), heals wounds, ulcers, and inflammation [16]. ‘ β -amyrinoley-lalcohol acid’ is found in the leaves. It has the ability to widen the cardiac and cerebral veins, hence improving blood circulation and lowering blood pressure. To summaries, sea buckthorn provides a plethora of physiologically active chemicals that are excellent for medical and wellness products [17].

Oil: We can extract oil from the seeds and pulp of sea buckthorn. Fresh sea buckthorn pulp can contain 4-13% oil. It contains 20-25% oil in its dry pulp. Sea buckthorn is a good source of unsaturated fatty acids. Pulp oil contains 180-240 mg of carotenoids per 100 g, with carotenoids accounting for 40-100 mg, vitamin E accounting for 110-330 mg, and unsaturated fatty acids, primarily linoleic and linolenic acids accounting for the remainder. [18]. In pulp oil different types of acids can be present such as oleanolic acid, Ursolic acid, with wound healing, toning and decrease the blood pressure effects. Pulp oil can also contain maximum amount of the palmitoleic acid about 43%. The seeds of the sea buckthorn can contain about 8-20% of oil. Its oil content is manily affected by harvesting time and also depends upon the colour and size of the berries. Seed oil also contains unsaturated fatty acid about 90% (linoleic 47mg, linolenic 18mg, olic 16mg) and also have saturated palmitic acid. seeds oil is the only one which contain linoleic and linolenic acid at the concentration of 1:1. The seeds of sea buckthorn can contain a large amount of essential fatty acid such as linoleic acid production up to 42%, of total fatty acid, @-linolenic acid about 39% of total fatty acid. it can also a greatest source of oleic acid. Its oil contains n-7, n-3, n-6 and n-9 fatty acid but it can be present in less amount. In below we can saw that how can we prepare oil from sea buckthorn berry fig 2 [19].

Effects on Health: The berries of sea buckthorn can be used as a traditional medicine for treatment and prevention of diseases in different countries like Europe, Asia, china. Due to its effects on human organism sea buckthorn become popular. It can be important Due to its anti-inflammatory, antioxidant, anti-viral, cardio protective, anti-bacterial and vasolilating effect. It can be also helpful in wound healing, skin disorders, stomach ulcer and reduced pain. sea buckthorn also reduce sebum secretion and positive effects against asthma and pulmonary disease, and also great effect on platelet aggregation. Sea buckthorn has positive affect in wound healing, loss of hair, slow down ageing, protection against radiations. It has also positive effects on mental disorders. In elder people it can be used to reduce memory loss. Its positive effect on utilized for speeding up the wound healing specially after the nose, throat, ear operation.

Uses and effectiveness:

Eczema: According to new research, using sea buckthorn peel oil for four months can help with atopic dermatitis. However, taking *H. rhamnoides* seed oil by mouth has no such effect. Furthermore, using a lotion containing 10% to 20% *H. rhamnoides* to the skin for 4 weeks does not appear to relieve the symptoms of mild-to-moderate atopic dermatitis [20].

Wrinkles and skin damage: New study indicates that taking *H. rhamnoides* fruit oil with a mix of other components through mouth can improve skin damage and wrinkles. When it used in conjunction with a skin lotion containing 0.1 percent tazarotene [21].

Heart disease: Newly research shows that The use of sea buckthorn extract thrice a day for 6 weeks through orally can Reduced the chest pain, Reduced cholesterol level, Heart Disease and Improve heart function.

Side effect and safety: When used as food, sea buckthorn berries are safe. The berries of the sea buckthorn are often used in jam, pies, beverages, and other delicacies. When consumed orally or used topically, sea buckthorn berries are possible safe [22].

Pregnancy and breast feeding: Not any satisfactory information about safety of the use of it during pregnancy and breast feeding. So avoid it during it [23].

Bleeding disorder: *H. rhamnoides* when taken for therapy, it can be utilised to slow down blood clotting. Some worry that it will raise the risks of bruising and bleeding in those with bleeding disorders. [24]

Low blood pressure: Newly research shows that the used of sea buckthorn as a medicine can reduced the blood pressure. Current Theory shows that patients who has already low blood pressure the use of sea buckthorn products can reduced its too much blood pressure.

Surgery: When used as a medication, sea buckthorn may reduce blood coagulation. There is considerable fear that it will result in more bleeding during and after surgery. Stop using sea buckthorn at least two weeks before your procedure. [25].

Pharmacological Activities

Anti-Cancer Properties: Key ingredients in *H. rhamnoides L.* increase apoptosis in cancer cells like HT-29 human colon cancer cells, HL-60 and K562 human blood cancer cells, as well as baicalin-induced death in

malignant cells. Sea buckthorn juice not only inhibits the development of human liver cancer (SGC7901) and the lymphatic blood cancer (L1200), but it also kills S180 and P388 cancer cells. Cisplatin's genotoxic effect on mouse somatic and germ cells was reduced by SBT juice. SBT fruit has the ability to reduce carcinogen-induced, stomach and skin tumorigenesis, which may include activation of phase II and antioxidant enzymes as well as DNA-binding activity of IRF-1, a recognized anticancer transcription factor that causes growth inhibition and apoptosis induction [26].

Anti-Healing Properties: By enhancing antioxidants and guarding against sulphur dioxide and mustard-gas-induced harm, SBT enhances epidermal wound healing, burn wound healing, and dermal wound healing. TFH increased the strength of tendons, which can be attributed to increased collagen content and collagen matrix formation in the wound, as well as a changed cytokine profile [26]. TGF1 and fibrogenic cytokines, which drive collagen formation in tendons, may be increased by TFH, whereas COX-2 is decreased in healing tendons. SBT is expected to have anti-mutagenic action via an anti-oxidative mechanism. Sea buckthorn juice is more effective than ascorbic acid at inhibiting the endogenous generation of N-nitroso compounds, hence preventing tumour growth [27].

Anti-oxidant effects and immune-modulating properties: Sea buckthorn provides a high concentration of natural anti-oxidants in all components. Its Leaves, Stems, Bulbs, Roots, and Bloom are high in ascorbic acid, as well as "carotenoids, polyphenols, flavonoids, Tocopherols, alkaloids, chlorophyll derivatives, amino acids, and amines". Exogenous chemical or stress influences can induce free radicals, a byproduct of cellular metabolism, to cause a variety of illnesses. The anti-oxidant and alpha-glycosidase inhibitory activities of sea buckthorn leaf extract, fractions, and isolated components were investigated. The butanol fraction, which included the most phenolic compounds, had the strongest radical-scavenging activity as well as the most potent alpha-glycosidase inhibitory impact. Sea buckthorn flavonoids have anti-oxidant and anti-carcinogenic properties. They protect cells from oxidative damage, genetic mutations, and cancer. In mice, sea buckthorn berries were shown to have a possible chemo preventive effect [28].

Anti-Inflammatory Properties: SBT reduces lymphocyte production, demonstrating that activation of T cells is inhibited. Because of the presence of certain mitogens, SBT increased lymphocyte proliferation. C-reactive protein, also known as a sign of inflammation and associated with risk for cardiovascular disease, was reduced by SBT. The inhibition of NO generation by *H. rhamnoides* leaf extract could be attributed to a decrease in the expression of the INOS gene, which was noticeable at the mutation level when Moab was probed against INOS. The activation of nuclear factor (NF)- κ B and subsequent INOS mRNA expression were essential for the initiation of the NO generation cascade caused by lipopoly-saccharides in macrophages [29].

Anti-Tumor Properties: The extract of Hippophae that includes flavonoids that have been shown to protect bone marrow from radiation damage and to speed up bone

marrow Recovery in cancer Patient with Hippophae, the hemopoietic system recovers quickly after chemotherapy. In preliminary laboratory experiments, the seed oil was discovered to boost nonspecific immunity and have an anti-tumor impact. The tumour development was suppressed by 5-HT hippophan, which was extracted from sea buckthorn bark.

Gastro-Enterological Properties: Hippophae seed oil has long been used to heal acid reflux, and laboratory tests confirm its potency in this purpose. By regulating pro-inflammatory mediators, sea buckthorn oil normalizes stomach acid and decreases inflammation. Hippophae extract was effective in avoiding stomach damage [11].

Anti-Diabetic Properties: Benefits of sea buckthorn also contain reduction of diabetic symptom. This effect is produced by lowering glucose levels by dietary supplementation with *H. rhamnoides*. In diabetes *H. rhamnoides* not lowered sugar levels, including FBS and 2 hours' postprandial blood glucose. it can be helped to alleviate problems. Sea buckthorn has also been demonstrated to relieve symptom as weariness, dry mouth, dry eyes in non-diabetic conditions, it is uncertain if it has therapeutic impact on diabetes symptoms. Studies must be undertaken to investigate and validate the effect of SBT on diabetes symptoms. Overall, sea buckthorn is a contender for diabetic supplementary treatment [30].

Anti-Atherogenic and Hypoglycemic Activity: When sea buckthorn oil was applied to normal and hypercholesterolemic mice, the atherogenic index was significantly reduced, and acetylcholine-induced relaxation of vessels was clearly delayed, suggesting that levels could be restored. In normal mice, sea buckthorn reduced sugar and fat levels, and its influence on glycometabolism may be related to gluconeogenesis regulation. It is used as a metabolic regulator in traditional medicine for conditions like glossitis, or, hair loss pain relief, benign hypertrophies of the prostate, anti-obesity, gout, and chronic prostatitis. [31].

Anti-Radiation activity: The radioprotective effect of sea buckthorn on the level of cells with regard to of detoxification of radicals activity, as tested in vitro, may shed light on cellular survival, proliferative enhancement, immunostimulation, and, eventually, whole-body survival. SBT appears to contribute to its radioprotective efficacy by maintaining chromatin organisation, triggering hypoxia, preserving hydrogen atom donations, preventing free radical salvaging, and inhibiting the cell cycle at G2-M stages by affecting with topoisomerase-I activity, as well as maintaining mitochondrial and genomic DNA from radiation. [32].

Anti-bacterial and anti-viral activity: Extracts from sea buckthorn plants are primarily responsible for these effects. Pressed oil is a powerful inhibitor of bacterial growth, particularly that of *Escherichia coli*. Sea buckthorn seed oil had strong antibacterial activity against *Escherichia coli* (growth inhibition zone diam. 4.0 mm) Hippophae also being demonstrated to have exclusive biological capabilities against viral infections, including antiviral action against influenza virus and the herpes virus. The suppression of viral neuraminidase, which is contained in the virus, provides the suppressive impact on the

influenza virus. In cellular cultures, sea buckthorn also prevents HIV infection. SBT leaf extract have considerable anti-Dengue activity and may be used to treat Dengue fever [33].

Anti-carcinogenic activity: The anti-carcinogenic activity of sea buckthorn is also one of its beneficial benefits. Substances derived by sea, buckthorn fruit have mostly been shown to have anti-carcinogenic properties. Quercetin, which promotes apoptosis in cancer cells, has been one of the essential aspects leading to this action [34]. The most promising results have been recorded in the treatment of individuals having colon cancer, leukaemia, and prostatic carcinoma. Other research suggests that sea buckthorn oil reduces hematological damage induced by chemotherapy, like used to treat leukaemia. Substances like as catechin, gallic acid, and epigallocatechin have been linked to therapeutic benefits. Sea buckthorn has been shown to improve the restriction of specific elements that cause stomach cancer in people. Apoptotic morphological alterations in the nucleus, counting chromatin condensation, were also detected in HL-60 cells treated with flavonols derived from *H. rhamnoides*, like quercetin, kaempferol, and myricetin [35].

Sea buckthorn in Cosmetics: Many regions produce sea buckthorn products with medicinal and cosmetic properties, including as liquids, powders, plasters, films, pastes, tablets, liniment, contraceptives, and sprays. Because Hippophae oil possesses UV-blocking properties, it is utilized in sun block lotion. Besides from that, this plant is utilized in skin grafts, cosmetics, and corneal wound treatment. Shampoo and other widely accessible cosmetic products include this ingredient. SBT berry oil is identical to natural skin sebum lipids and provides significant skin healing and anti-aging properties. Anti-inflammatory, anti-microbial, analgesic, and regenerating properties of sea buckthorn oil Palmitoleic acid, a fatty acid found in *H. rhamnoides* oil, is a key component of skin [36]. It moisturizes the skin and is beneficial in the treatment of skin problems such as atopic dermatitis. This oil primarily reduces inflammation, disinfects germs, relieves pain, removes blood stasis, increases blood circulation, improves human immunity, and promotes tissue renewal [37].

Role of SBT in human/ animal diet: Recently, there has been an increase in interest in using Hippophae, products in both human and animal nutrition. Because of the berries' beneficial characteristics and distinct flavor, they may be used to make "juice, bonbons, jelly, jam, alcoholic and non-alcoholic drinks, and dairy product flavors". Oils derived from the seeds and pulp can be utilized to make dietary supplements "such as jelly, plant capsules, or oral fluids". They are also found in cosmetics such as shampoo. The leaves are used to make extracts, teas, and cosmetics. Sea buckthorn is high in minerals and bioactive compounds. 'Sugar, organic acids, amino acids, essential fatty acids, Phytosterols, flavonoids, vitamins, and minerals are abundant in berry juice'. The juice contains 18 amino acids and 24 minerals [38]. The total Phytosterols concentration is 4–20 times that of soybean oil. Seeds are a good source of oil since they have a high amount of oleic acid and n-3 and n-6 fatty acids. The oil absorbs UV rays

and supports healthy skin. Carotenoids free, and esterified sterols, triterpenes, and iso-prenols are among the nutrients and bioactive compounds found in the leaves. Because of its beneficial benefits on animal health, sea buckthorn has long been utilized as an ingredient to feed combinations in animal nutrition. It has been noticed that there is a favourable influence on the superiority of animal products. The ancient Greeks fed sea buckthorn leaves and branches to their animals, which had a favourable effect on weight increase and a shiny coat, notably in horses. Sea buckthorn leaves and seeds cake are high in minerals and nutrients, making them an excellent animal feed. *H. rhamnoides* Leaves, Seed, and fruits remnants as a viable feed for farm animals and poultry, particularly in dry and cold climates. Hippophae has a favourable effect on egg production and laying hen body weight in poultry [39].

Safety and toxicity studies: SBT fruit extract significantly protects against arsenic-induced oxidative damage. Another study looks at the preventive properties of seed oil beside harm caused sulphur dioxide inhalation. The use of Hippophae, extracts dramatically reduced the lethality of sulphur mustard. Toxicity tests on animals were carried out using centred mixtures and extracts. All biochemical values for "fuel metabolic rate, the function of the liver, renal function, and haematological parameters" were within normal limits. There were no adverse effects found in any of the seed oil-treated groups in acute and subacute oral toxicity trials. Table 2 explains certain phyto-actives as well as their medicinal properties [40].

Conclusion: It can be concluding that sea buckthorn Plant contains many dietary and medicinal compounds and it can be beneficial for human health. Sea buckthorn has high medicinal values due to its highly anti-oxidant properties. It whole plant can be used in chronic disease but there is need of further research on it as this plant can be used traditionally for asthma but scientifically work was not proved on it in literature, in further studies I will work on its anti-asthmatic activities.

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Table I: Chemical constituent of *H.rhamnoides*

Ingredients	Seed oil	Pulp oil	Fruit oil
Carotenoids	30-250	300-870	1280-1860
Total acids	11	38	-
Total flavonoids	-	-	550
Total sterols	1094	721	-
Saturated fatty acid	13	33	30
Vitamin k	110-230	54-59	-
Vitamin E	207-	171	300-600
Unsaturated fatty acid	87	67	70

Table 2: phytoconstituents and their medicinal properties

Phyto-constituents	Medicinal properties
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Phytosterols	Anti-cancer and improve the microcirculation in the skin
Carotenoids	Help in collagen synthesis
Vit k	Anti-ulcer effect and stop bleeding
Zinc	Improve blood circulation
Coumarins	Control sleep and regulate appetite
Polyphenolic compound	Act as wound healing and cardiac protection
Vit B complex	Stimulate nerve regeneration
Organic acid	Reduced the risk of heart attack
Tocopherols	Help to relieve pain



Figure 1. Seeds and fruits of sea buckthorn

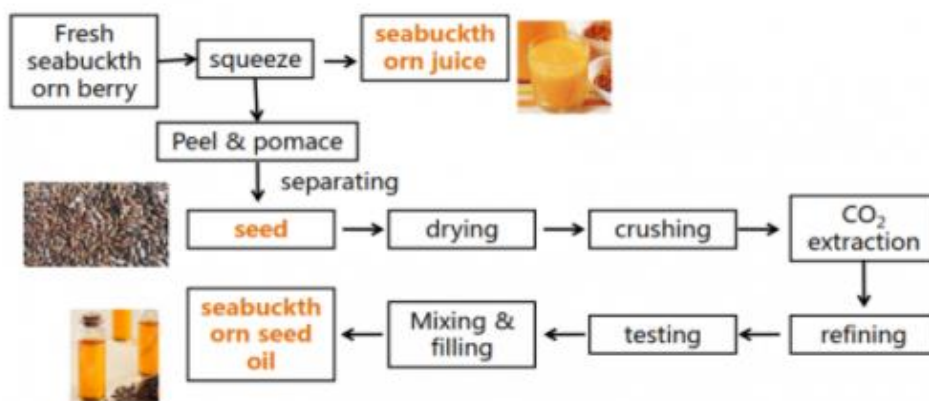


Figure 2. Oil extraction process