

An Analysis of Health Benefits of Carrot

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ABSTRACT: carrot (*Daucus carota* subsp. *sativus*) is root vegetation that available in diversity of colors, comprising purple, black, red, white, & yellow. Carrots include carotenoids, flavonoid, polyacetylenes, vitamins, & minerals, all which provide diversity of nutritional & health advantages. Carotenoids, polyphenols, & vitamins found in carrots function as antioxidants, anticarcinogens, & immune enhancers, proving ancient saying that carrots are excellent for eyes. Carrot has shown to have anti-diabetic, cholesterol & cardiac disease reducing, anti-hypertensive, hepatoprotective, renoprotective, & wound healing properties. Carrot seed extracts have cardio- & hepatoprotective, antibacterial, antifungal, anti-inflammatory, & analgesic properties. All of these topics are covered in this review essay. Carrots are important tuber crop that is high in biochemical elements like carotenoid and soluble fiber, as well as variety of other functional elements with wellness properties. Carrot consumption is gradually rising as a result of its recognized as a valuable source of natural antioxidants with anticancer properties. Apart from being utilized in salads & curries in India, carrot roots may be professionally processed into nutritionally rich processed goods like as juice, concentrate, dry powder, tinned, preserve, chutney, pickle, & gazrailla. Carrot pomace, which contains approximately 50% β -carotene, may be used to enhance goods such as cake, bread, & biscuits, as well as to make a diversity of useful products. nutritional content, health-promoting phytonutrients, functional characteristics, product creation, & by-products usage of carrot & carrot pomace, as well as its prospective application, are all highlighted in this study.

KEYWORDS: Carrot, Health, Pigment, Plant, Vegetable.

I. INTRODUCTION

Carrots are tamed version of wild carrot, *Daucus carota*, which grows wild throughout Europe & southern Asia. plant was initially grown for its leaves & seeds in Persia, & it is thought to have originated there. taproot is majorly frequently consumed portion of plant, but greens are sometimes consumed as well. Carrots are a biennial plant in Apiaceae family of umbellifers. It produces a rosette of leaves at initially while expanding taproot. Apiaceae family's major significant crop is carrot. It's a root vegetation that's grown all throughout globe [1]. Carrots were originally utilized for medicinal reasons before becoming popular as a cuisine. Carrots were

grown in Europe before eleventh century, according to written sources. Carrot root flesh may be white, yellow, orange, red, purple, or very dark purple in hue. Yellow & purple skinned carrot varieties were first to be developed. Orange carrots, which are more common now, were created in Central Europe during 15th & 16th centuries. With discovery of its high provitamin A concentration, orange carrots have seen a fast increase in popularity. main antioxidant pigments present in carrots are carotenoids & anthocyanins. Carrot cultivar differences are based on pigments present. Carotenoids are phytochemicals that are yellow, orange, or red in color & present in majorly yellow & orange fleshed varieties. commonly consumed orange carrot is high in β -carotene, as well as provitamin A. yellow hue of carrots is attributable to lutein, which helps to prevent macular degeneration. red water-soluble anthocyanin pigment & red water-insoluble lycopene pigment found in certain cultivars' roots do not add to provitamin A levels. high lycopene concentration of carrots gives them their red color. Carrots high in anthocyanins, orange & purple [2]. Pigments are scarce in white flesh cultivars. Carotene levels in orange & yellow skinned cultivars rise as they mature. More carotenes are found in cortical area than in core. Through conventional breeding, overall carotenoid levels have risen significantly in last four decades, reaching 1000 ppm carotenoids on renewed weight basis. Furthermore, owing to high bio-availability of carrot carotenoids, it may offer considerable quantity of vitamin A in human diet when compared to other vegetables. Kaempferol, quercetin, & luteolin are all flavonoids found in carrots, making them a one-of-a-kind combo. Other phenols found in them include chlorogenic, caffeic, & p-hydroxybenzoic acids, as well as a diversity of cinnamic acid derivatives. Chlorogenic acid, a derivative of hydroxycinnamic acid, accounts for 42.2 percent to 61.8 percent of total phenolic chemicals found in tissue of carrot. [3].

Falcarinol content in fresh carrots is affected by carrot tissue cultivar & water stress. Falcarinol is major bioactive polyacetylenes found in carrots. This chemical is thought to activate cancer-fighting systems in human body. Falcarinol's beneficial impact may be owing to its hydrophobicity & capacity to create a very stable carbocation with forfeiture of water, serving as a highly reactive alkylating agent toward proteins & other macromolecules. Apart from other sesquiterpenes that have been detected in different biochemical studies, daucoside & daucos are sesquiterpenoids that were recently extracted

from carrot seeds & have a cytotoxic impact on human gastric cell lines [4].

Various biochemical analyses have shown existence of coumarins. When carrots are kept, a bitter coumarin chemical is produced. Carrots were rated 10th in nutritional value out of 39 fruits & vegetables. Carrots are high in dietary fiber & trace mineral molybdenum, which is uncommon in vegetables. Molybdenum is necessary for iron absorption & helps in fat & carbohydrate metabolism. Magnesium & manganese are abundant in this fruit. Magnesium is required for bone formation, protein synthesis, B vitamin activation, nerve & muscle relaxation, blood coagulation, & energy generation. Magnesium is required for insulin secretion & action. Manganese aids glucose metabolism by working in tandem with enzymes in body. Manganese is a cofactor for antioxidant enzyme superoxide dismutase in body. Carrots include potassium & magnesium, which aid muscular function [5].

A. Health Benefits of Carrots

a. Antioxidant

Carrots, like many or colourful vegetables, are high in antioxidants. Carrots' biological & therapeutic effects may be due to its high concentration of antioxidant carotenoids, particularly β -carotene. Antioxidants are found in carrots in form of carotenoids, polyphenols, & vitamins. Carotenoids, which are found in abundance in orange carrots, are powerful antioxidants that may counteract effects of free radicals. Carrot roots contain flavonoids & phenolic derivative, both of which act as antioxidants. They have anticarcinogenic properties, as well as ability to decrease inflammatory insult & regulate immunological response [6].

b. Anticarcinogen & Immuno enhancer

Dietary carotenoids have proven to have anti-cancer properties owing to its antioxidant ability to reduce free radicals in body. A potential connection between diets high in carotenoids & a reduced incidence of prostate cancer has been discovered in studies. According to a meta-analysis published in 2008, individuals who consume a lot of carotenoids had a 21% reduced risk of lung cancer. Carrot intake has been found to decrease risk of lung cancer, breast cancer, & colon cancer in studies. Carrots are high in dietary fiber & trace mineral molybdenum, which is uncommon in vegetables. Molybdenum is necessary for iron absorption & helps in fat & carbohydrate metabolism. Magnesium & manganese are abundant in this fruit. Magnesium is required for bone formation, protein synthesis, B vitamin activation, nerve & muscle relaxation, blood coagulation, & energy generation. Carrots have a lot of health advantages, & this is one of them. Carrots include a wide range of minerals & antioxidants, as well as vitamin C, which will help to strengthen human immune system. Carrots provide a protective barrier for our bodies when consumed on a regular basis. 24 albino rats were used to test immunomodulatory impact of carrot-extracted carotenoid. Percentage change in lymphocytes, eosinophils, monocytes, & platelet count was assessed. Concentration of lymphocytes, eosinophils, monocytes, & platelets increased significantly in carotenoid-treated rats. β - & α -carotenoids in carrots were responsible for positive

impact. A lack of vitamin A may cause photoreceptors in eyes to degenerate, resulting in visual difficulties. Carotene (carotenoid with highest provitamin A activity) in carrots protects eyesight, particularly night vision, & protects against macular degeneration. Carrots are one of the best sources of provitamin A, & a high carotenoids consumption has been associated to a lower risk of postmenopausal breast cancer. Carrots are high in β -carotene & other carotenoids, as well as vitamins C & K, all of which are essential for carbohydrate & protein metabolism, as well as healthy development. Vitamin C aids in absorption of non-heme iron & is necessary in fight against infections, while vitamin K aids in prevention of bleeding. Potassium is abundant in carrots. As a result, drinking carrot juice may help you avoid this issue while keeping human skin moisturized. Carrots are beneficial in prevention & treatment of a diversity of skin conditions. Skin disorders like as pimples & acne, rashes, dermatitis, & other skin issues caused by Vitamin A deficiency may be treated with antioxidants included in this crop.

c. Benefits for Wound Healing

Carrots offer anti-inflammatory properties. In excision wound model, treatment of rats with lidocaine lotion of methanol extracts of carrots root made at various dosages showed significant decreases in wound area, epithelization time, and scar width when compared with untreated group mice. Nevertheless, the rate of wound closure increased significantly. Furthermore, animals given topical cream formulation containing a methanol extract of carrot seeds exhibited major improvements in scar strength properties, hydroxyproline composition, and crude protein.

d. Cardio- & Hepatoprotective Benefits

Cardio- & Hepatoprotective Benefits: Consumption of foods rich in carotenoids has proven to reduce risk of heart disease in studies. Carrots contain α -carotene & lutein, in addition to being high in β -carotene. Carrots protect human heart from oxidative damage, plaque development, & harmful cholesterol increase when consumed regularly. This is due to presence of soluble fibers that bind to bile acids. Carrot seed oil promotes cardioprotection and muscular contraction regulation in rats with neuroprotective effects myocardial injury through maintaining transmembrane domain enzymes. Reported in this study, the authors conclude whether carrot seed oil may have occlusive effects. Serum concentrations of aspartate alanine aminotransferase, alanine transaminase, and glutamate dehydrogenase were all significantly lower in rats administered carrot seed extraction. Carrot seeds have a hypolipidemic effect in rats. When rats given carrot seeds were compared to rats fed a control group, total cholesterol & triglyceride HDL & VLDL levels were found to be lower.

e. Anti-Diabetic

Carrots' antioxidants & phytochemicals may help control blood sugar levels, making them anti-diabetic. To prevent high blood pressure & heart disease, American Heart Association (AHA) recommends eating a fiber-rich diet & boosting potassium while lowering salt consumption. Carrots are an excellent source of all of these nutrients. According to these researchers, study participants with lower levels of carotenoids had higher blood glucose levels as

well as higher fasting insulin levels. As degree of glucose intolerance grew, so did carotenoid levels. The results indicate that carotenoids high in vitamin A, such as those found in carrots, may assist diabetics control their disease.

f. Dental Health

Carrots are good for human teeth & mouth because they scrape away plaque & food particles. Carrots stimulate gums & make it easier for a lot of saliva to produce. Saliva is alkaline, which helps to keep acid-forming & cavity-forming microorganisms in check. Carrots contain nutrients that fight dangerous bacteria in mouth & prevent tooth decay.

g. Anti-Bacterial & Anti-Fungal Properties

A study found that essential oil extracted from wild carrot's aerial portions inhibited enteropathogen *Campylobacter jejuni*. Essential oil phenylpropanoids, such as methylisoeugenol & elemicin, were shown to have antibacterial properties against *Campylobacter coli* & *Campylobacter lari* strains. Carotol substantially decreased colony radial size & prevented fungal growth. Inhibitory impact of daucol, on or h&, was smaller than that of carotol. Compound -caryophyllene had no impact. Carotol seems to be primary chemical responsible for carrot seed oil extracts' antifungal action, according to findings.

h. Carrots for Glowing Skin

Carrots are high in Vitamin C & antioxidants, so they keep human skin looking young & healthy. Carrots may be used to make a simple & cheap face mask. To achieve glowing skin, all you have to do is combine shredded carrot with honey & apply it as a face mask.

i. Anti-Ageing Benefits:

Collagen is a kind of protein that is necessary for skin's suppleness to be maintained. It helps to prevent wrinkles & slow down aging process. Vitamin A, as an antioxidant, fights free radicals to prevent wrinkles, discoloration, & an uneven skin tone, all of which are symptoms of aging.

j. Sun Protection

Carrots contain beta-carotene, a skin-friendly ingredient that is converted to vitamin A in body. It aids in skin tissue regeneration & offers protection from sun's harmful rays. Antioxidants & carotenoids protect & condition skin, increasing its resistance to sun & aiding in healing of sunburns. In fact, drinking carrot juice during summer serves as a natural sunblock.

k. Suitable for Dry Skin

Potassium shortage may cause dry skin. Potassium is abundant in carrots. As a result, drinking carrot juice may help you avoid this issue while keeping human skin moisturized. Carrots are beneficial in prevention & treatment of a diversity of skin conditions. Skin disorders like as pimples & acne, rashes, dermatitis, & or skin issues caused by Vitamin A deficiency may be treated with antioxidants included in this crop. However, don't eat too many carrots since they may cause human complexion to become yellowish-orange. Carrot juice improves health of human hair as well. Carrots provide greatest hair benefit of all.

B. Fertility Benefits

Carrot seed extract has a gender-specific fertility impact. Carrot seeds have shown to have anti-fertility effects in females in pharmacological tests. Carrot seed extract, on or h&, has shown to stimulate spermatogenesis in male rats, according to a study. Researchers discovered that rats given carrot seed extract recuperated through gentamicin-induced reproductive toxicity & had improved spermatogenesis. As result, carrot seed extract was able to stimulate spermatogenesis & sperm stores in cauda epididymal region. Impact is thought to be caused by an increase in testosterone levels in male rats, which is a biological process. Carrot seed extracts are high in antioxidants, thus increase in cauda epididymal sperm stores may be due to antioxidant impact [7].

C. Anti-Inflammatory & Analgesic Benefits

Experiments have shown that carrot seed extract has anti-inflammatory & analgesic properties. Carrot seeds, according to a reporter, have anti-inflammatory properties. Carrageenan, histamine, & serotonin were used to cause paw edema in rats, while formaldehyde was used to cause arthritis. Surprisingly, rats given a high dosage of carrot seed extract had a lower illness severity. A writhing effect was produced by intra-peritoneal injection to evaluate carrot's analgesic efficacy. Following injection of carrot seed extract, writhing effect was significantly reduced. Another study discovered that carrot seed extract components had anti-inflammatory effects owing to inhibition of cyclooxygenase enzymes, & that they offered substantial anti-inflammatory benefits even when compared to anti-inflammatory medications such as aspirin, ibuprofen, naproxen, & celebrex.

II. LITERATURE REVIEW

João Carlos et al. discussed Nutritional & Health Remunerations of Carrots & their Seed Extracts in which they explained how Carrots include carotenoids, vitamins, & minerals, all of which provide a diversity of nutritional & health advantages. Carotenoids, polyphenols, & vitamins found in carrots serve as antioxidants, anticarcinogens, & immunoenhancers, in addition to proving old saying that carrots are excellent for eyes. Carrot has shown to have anti-diabetic, cholesterol & cardiovascular disease reducing, & wound healing properties. Carrot seed extracts have cardio- & hepatoprotective, antibacterial, antifungal, anti-inflammatory, & analgesic properties. This review article discusses all of them [8].

Thakur N et al. discussed chemical composition, functional properties & processing of carrot in which they explained how Carrot is an essential root vegetation that is high in bioactive substances such as carotenoids & dietary fibre, as well as a diversity of functional components with health-promoting qualities. Carrot consumption is gradually rising as a result of its recognized as a valuable source of natural antioxidants with anticancer properties. Apart from being utilized in salads & curries in India, carrot roots may be professionally processed into nutritionally rich processed goods like as juice, concentrate, dry powder, tinned, preserve, & y, pickle, & gazraila. nutritional content, health-promoting phytonutrients, functional characteristics, product creation, & by-products usage of

carrot & carrot pomace, as well as its prospective application, are highlighted in this study [9].

Scarano A et al. discussed Phytochemical analysis & antioxidant properties in colored tiggiano carrots in which they explained how in human diet, carrot (*Daucus carota* L.) is a significant source of bioactive chemicals. Local farmers in Apulia (South Italy) have cultivated colorful varieties of carrots throughout years, which are closely linked to local rituals & customs. Carrot of Saint Ippazio, known as Tiggiano carrot, is a notable variety among many. Carotenoids, anthocyanins, phenolic acids, sugars, organic acids, & antioxidant activity were measured in Tiggiano carrots in this research. When compared to yellow & cultivated orange carrots, our findings showed that yellow-purple carrots had greatest amounts of bioactive chemicals as well as best antioxidant capacity [10].

III. DISCUSSION

Carrots include carotenoids, flavonoids, polyacetylenes, vitamins, & minerals, all of which provide a diversity of nutritional & health advantages. Carotenoids, polyphenols, & vitamins found in carrots function as antioxidants, anticarcinogens, & immunoenhancers, proving ancient saying that carrots are excellent for eyes. Carrot has shown to have anti-diabetic, cholesterol & cardiovascular disease reducing, anti-hypertensive, hepatoprotective, renoprotective, & wound healing properties. Carrot seed extracts have cardio- & hepatoprotective, antibacterial, antifungal, anti-inflammatory, & analgesic properties. All of these topics are covered in this review paper.

CONCLUSION

Carrots are rich in nutrients & have many health advantages. Carrots are high in carotenoids, phenolic compounds, polyacetylenes, & vitamins, & as a result, they may help decrease risk of some illnesses. Carrot chemicals have shown to have antioxidative, anticarcinogenic, & immunoenhancer properties in studies. Carrot has shown to have anti-diabetic, cholesterol & cardiovascular disease reducing, anti-hypertensive, hepatoprotective, renoprotective, & wound healing properties. Mechanism through which certain carrot chemicals reduce risk of certain illnesses is complicated & sometimes unclear. Carrot seed extracts have cardio- & hepatoprotective, antibacterial, antifungal, anti-inflammatory, & analgesic properties.

Carrots are high in dietary fiber & trace mineral molybdenum, which is uncommon in vegetables. Molybdenum is necessary for iron absorption & helps in fat & carbohydrate metabolism. Magnesium & manganese are abundant in this fruit. Magnesium is required for bone formation, protein synthesis, B vitamin activation, nerve & muscle relaxation, blood coagulation, & energy generation. Magnesium is required for insulin secretion & action. Manganese aids glucose metabolism by working in tandem with enzymes in the body. Carrot consumption is gradually rising as a result of its recognized as a valuable source of natural antioxidants with anticancer properties. Apart from being utilized in salads & curries in India, carrot roots may be professionally processed into nutritionally rich processed

goods like as juice, concentrate, dry powder, tinned, preserve, chutney, pickle, & gazpacho. Carrot pomace, which contains approximately 50% beta-carotene, may be used to enhance goods such as cake, bread, & biscuits, as well as to make a diversity of useful products. Nutritional content, health-promoting phytonutrients, functional characteristics, product creation, & by-products usage of carrot & carrot pomace, as well as its prospective application, are all highlighted in this study.

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