Pharmacological Activities of Daucus Carota And Its Active Ingredients – A Review

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Abstract- *Daucus carota commonly known as the carrot, is a root vegetable that belongs to the family Apiaceae. Carrots have ability to synthesize a wide variety of bioactive constituents such as polyacetylene (Falcarinol, Falcarindiol, and Falcarindiol- 3 acetate), carotenoid (ὰ- carotene, β-carotene), luteolin, dietary fibers, phenolic compound, lycopene and anthocyanins. The pharmacological studies revealed that the plant possessed cytotoxic, antioxidant, antidiabetic, gastroprotective, nephroprotective, hepatoprotective, cardiovascular, anti-inflammatory and wound healing effects. In this review, an attempt has been made to exploit the active ingredients of carrots and their pharmacological use.*

Keywords- Carrots, Therapeutic, Anticancer, Antitumor, Bioactive

I. INTRODUCTION

Daucus carota (The Carrot) is usually an orange coloured root vegetable, though its purple, black, red, white and yellow cultivars are also found. It belongs to the family Apiaceae. The most commonly eaten part of the root is taproot which provides a source of Vitamin A and fiber in the diet. It also contain good amount of Vitamin K and Vitamin B6. Carrots are grown from the roots and their most of cultivars usually mature within 70-80 days under optimum conditions. They grow well in 15 to 20^{o} C temperature. Below this temperature they become pale and slenderer [1, 2]. Based on their root shape and storage capabilities carrots are classified into four categories such as Chantenay, Nantes, Danvers and Imperator. Chantenay type has strong foliage with relatively short and blunt tipped roots. They can be stored very well. Nantes type has sparse foliage with long and round tipped roots. Their roots have high content of sugars and brittle. So, they are meant for long term storage. Danvers type has strong foliage with wide shouldered pointed and longer roots. They are suitable for long term storage and used in processing and fresh market. Imperator has strong foliage with narrower and slender roots. Their sugar content is less and can be stored better than other types [1, 3, and 4]

II. ORIGIN AND DISTRIBUTION

Carrots are believed to be originated in Afghanistan which remains the primary centre of its diversity. Their early use was mainly medicinal to treat wounds, stomach problems, ulcers, liver and kidney ailments. They were established as a food crop in India, China and Japan by the 13th century. The cultivated carrots were originated from Europe, Asia and Africa and now have spread throughout the world. Different kinds of carrots are grown in different parts of the world. Carrots are now a popular vegetable grown all over the world. In India, orange hard root carrots, reddish softer juicy, purplish or almost black carrots are grown in different parts of country [5, 6]

III. NUTRITIONAL AND HEALTH BENEFITS OF CARROTS

In recent times, carrots have become a favorite food due to number of their health benefits. They are crunchy, tasty, highly nutritious and a particularly good source of beta carotene, fiber, vitamin K1, potassium, and antioxidants. They contain 86-95% water and about 10% carbohydrates. They are also a very good source of fiber. Just two small medium sized Carrots that's about 100 grams provide 41 calories and contain 88% water, 0.9 grams proteins, 9.6 grams Carbohydrates, 4.7 grams sugar, 2.8 grams fiber and 0.2 grams fat. Carrot are an exceptionally rich source of carotenes and vitamin-A. 100 g fresh carrot contains 8,285 μg of β-carotene and 16,706 IU of vitamin-A [7]. Beta-carotene is effective natural antioxidants that reduce the presence of potentially damaging free radicals. It maintains good vision and is important for growth, development, and immune function. Carrots also contain appreciable quantities of thiamine, riboflavin [8-10]. The roots are used as vegetables and in soups, curries and other dishes. They can be eaten raw in salads or cooked in various ways. The essential oil present in seeds of carrots can be used as a flavoring agent and in perfumes [11]. A number of health benefits associated with carrots include strengthening of the immune system, regulation of metabolism, maintenance of healthy skin and vision, and reduction of the risk of high blood pressure, stroke, heart disease, and some types of cancer.

IV. CONSTITUENTS

Carrot is one of the important root vegetables rich in bioactive compounds like polyacetylene (Falcarinol, Falcarindiol, and Falcarindiol- 3 acetate), carotenoids (ά-carotene, β- carotene), luteolin, dietary fibers, phenolic compounds, lycopene and anthocyanins. These chemical constituents of carrot have significant health promoting benefits [12]

1. Polyacetylenes

Polyacetylenes are a class of highly bioactive compounds with many useful pharmacological interests. The carrot polyacetylenes include Falcarinol, Falcarindiol, and Falcarindiol- 3 acetate. They are produced by plants, primarily as an antifungal compound, protecting roots from liquorice fungus as well as bacteria. Interestingly, recent studies have found that these compounds have an inhibitory affect on colorectal and leukaemia cancer cells in rats. [12-15]

2. Carotenoids

Carotenoids comprise of a group of natural pigments most widely found in nature, responsible for colours ranging from yellow to red of flowers, leaves, fruits and some roots among which carrot stands out. Dietary intake of carotenoids is inversely associated with the risk of a variety of cancers in different tissues. Preclinical studies have shown that some carotenoids have potent antitumor effects under both *in vitro* and *in vivo* conditions. β- Carotene is one of the major carotenoids known to exhibit provitamin A activity [16-19].

3. Luteolin

Luteolin is a common flavonoid that exists in many types of plants including fruits, vegetables, and medicinal herbs. Plants rich in luteolin have been used in Chinese traditional medicine for treating various diseases such as hypertension, inflammatory disorders, and cancer [20, 21].

4. Phenolic Compounds

Phenolic are ubiquitous plant components that are primarily derived from phenylalanine via the phenyl propanoid metabolism. The main phenolic compounds found in carrots are chlorogenic acids. Polyphenols that are commonly quantified in purple carrots include 5 anthocyanins [22, 23].

5. Dietary fibers

Dietary fiber is an indigestible complex carbohydrate found in plants that cannot be absorbed by the body and have no calorific value. However, there are numerous health benefits of eating fiber rich diets such as prevention of constipation, regulation of blood sugar, protection against heart diseases, reducing high levels and prevention of certain forms of cancers [24]. Depending upon the solubility, fibers are classified into soluble and insoluble types. Soluble fibers are non-cellulosic polysaccharides such as pectin, gums and mucilage whereas insoluble mainly consists of cell wall components such as cellulose, hemicellulose and lignins [25]. Carrots are high in dietary fibres and their cell wall is composed of pectin, cellulose, lignin and hemicellulose [26]

6. Lycopene

Lycopene is a Phytochemical that belongs to a group of pigments known as carotenoids. It is red, lipophilic and naturally occurring in many fruits and vegetables, including carrot and carrot-based products containing the highest concentrations of bioavailable lycopene. Several epidemiological studies have linked increased lycopene consumption with decreased prostate cancer risk. These findings are supported by *in vitro* and *in vivo* experiments showing that lycopene not only enhances the antioxidant response of prostate cells, but that it is even able to inhibit proliferation, induce apoptosis and decrease the metastatic capacity of prostate cancer cells. [27, 28]

V. PHARMACOLOGICAL ACTIVITIES OF *Daucus carota*

The World Health Organization (WHO) estimates that 80 percent of the world population presently use herbal medicine for some aspect of primary health care [29]. Phytochemical analysis of *Daucus carota* showed that it contained alkaloids, carbohydrates, chlorogenic acid, flavonoids, phenols, essential oil, terpenoids and coumarin. The pharmacological studies revealed that the plant possessed various pharmacological activities which are given as under:

1. Cytotoxic effect

Cancer is the leading cause of death in both developed and developing countries which presents higher mortality rates. The presence of flavonoids and carotenoids in carrot is associated with its cytotoxic effects. Zgheib *et al.* (2014) investigated the anticancer effect of *Daucus carota* in lung, skin, breast and glioblastoma cancer cell motility and invasion. They observed a pronounced decrease in cancer cell motility in four cell lines. This treatment also led to a decrease

in cancer cell invasion and an increased cell adhesion [30. Further, Tawil *et al* (2015) studied the cytotoxic effect of *Daucus carota* oil extract (DCOE) in acute myeloid leukaemia (AML) cells and found that DCOE induced selective apoptosis in AML cells, possibly through a MAPK-dependent mechanism [31]. Zeinab *et al*. (2014) investigated the chemopreventive effects of oil extract from *Daucus carota* umbels on 7,12-dimethyl benz(a)anthracene (DMBA)-induced skin papilloma in mice and found that both intra peritoneal and topical treatment decreased infiltration and hyperplasia with an increase in the level of hyperkeratosis [32].

In another study, Zaini *et al*. (2011) studied the effects of five fractions from carrot juice extract (CJE) [three polyacetylene (falcarinol, falcarindiol and falcarindiol-3-acetate) and two carotenoids (beta-carotene and lutein) in human lymphoid leukaemia cell lines. Treatment of all three lymphoid leukaemia cell lines with the fraction from carrot extracts contained polyacetylene and carotenoids showed that they were significantly cytotoxic. Treatments with purified polyacetylene also induced apoptosis in a dose and time responsive manner. Falcarinol and falcarindiol-3-acetate isolated from *Daucus carota* were more cytotoxic than falcarindiol. In contrast, the carotenoids showed no significant effect on either apoptosis or cell proliferation in all investigated cells [33].

Similarly, Shebaby *et al.* (2014) studied the anticancer effect of *Daucus carota* oil extract fractions on the human breast adenocarcinoma cell lines MDA-MB-231 and MCF-7 and found that they possessed the highest cytotoxicity against both cell lines. Flow cytometric analysis revealed that both fractions induced the accumulation of cells in the sub-G1 phase and increased apoptotic cell death and chromatin condensation. The increase in apoptosis in response to treatment was also apparent in the increase in BAX and the decrease in Bcl-2 levels as well as the proteolytic cleavage of both caspase-3 and PARP as revealed by Western blot. Treatment of MDA-MB-231 cells with either fraction also significantly reduced the level of phosphorylated Erk but did not show any effect on phosphorylated Akt [34].Khalil *et al*. (2015) investigated cytotoxic essential oils from the fruits of *Daucus carota* var. sativus (yellow carrot) and var. boissieri (red carrot), a highest cytotoxic activity was observed against HepG-2 cell with IC50 values ranging from 163-172 µg/ml for both oils [35].

It had been concluded that the active constituents of *Daucus carota* exerted a strong cytotoxic effect against different cancer cell lines. However, further studies are required to evaluate the effects of *Daucus carota* on other apoptotic genes and additional through investigations cytotoxic agent is essential.

2. Antioxidant effect:

An antioxidant is a molecule that inhibits the oxidation of other molecules. Oxidation is a chemical reaction that can produce free radicals, leading to chain reactions that may damage cells. Re *et al.* (1999) performed the free radical scavenging activity by using ABTS (2, 2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) free radical scavenging assay. Their results showed that Ethanolic extracts from baby carrots and carrots had antioxidant activities of 42.2±3.9 and 34.5±2.8 mg VCEAC/g dry plant material, respectively. Ethanolic extracts of baby carrots and carrots showed high scavenging activities with IC50 = 830 µg/ml and 837.5 µg/ml, respectively. Antioxidant activities of petroleum extract from baby carrots and carrots were 14.7±0.9 and 4.2±0.6 mg VCEAC/g dry plant material, respectively. [36] Similarly, Nicolle *et al*. (2003) studied the effects of a 3-week supplementation of the diet with carrot (15% dry matter) in antioxidant status in rats and observed that carrot consumption improved the antioxidant status [37].

Sun *et al.* (2009) studied the antioxidants and antioxidant capacities of seven colored carrots byusing ABTS and DPPH methods. They found anthocyanins were the major antioxidants in purple-yellow and purple-orange carrots, and chlorogenic acid was the major antioxidant in all carrots. Both the DPPH and ABTS assays showed that the hydrophilic extract had higher antioxidant capacity than the hydrophobic extract. Purple-yellow carrots had the highest antioxidant capacity, followed by purple-orange carrots, and the other carrots did not significantly differ [38]. Kumarasamy *et al*. (2005) isolated the flavones from the methanol extract of *Daucus carota* seeds (luteolin, luteolin 3'-O-beta-Dglucopyranoside and luteolin 4'-O-beta-D-glucopyranoside) and studied them for antioxidant effects. Among these three flavones, luteolin showed the highest degree of free radical scavenging activity (RC50 = 4.3 x 10-4 mg/ml) in the DPPH assay [39]. In an another report, Shabby *et al. (2013)* evaluated *in vitro* antioxidant activity of *Daucus carota* oil extract (DCOE) using DPPH, ferrous ion chelating assay (FIC) and the ferric reducing antioxidant power assay (FRAP). DCOE exhibited antioxidant activity in all assays. The FRAP value was 164 ± 5.5 µmol for FeSO4 /g, and the IC50 values for DPPH and FIC assays were 2.1 ± 0.03 mg/ml and 0.43 ± 0.02 mg/ml, respectively [40]. Khalil *et al.* (2015) investigated the antioxidant activity of the essential oils from the fruits of *Daucus carota* var. sativus (yellow carrot) and var. boissieri (red carrot) using DPPH. Both oils were able to reduce DPPH and to prevent the degradation of the

deoxyribose sugar in a concentration dependent manner. Carrot oils showed promising scavenging activity of DPPH with an IC50 of 12.71 mg/ml and 14.15 mg/ml for the yellow and red carrot oils, respectively [35].

3. Gastro-protective effect:

Gastritis has become one of the very common gastrointestinal tract disorders in clinical practice. One of the factor causing gastritis is the prolonged intake of non steroidal anti-inflammatory drugs (NSAIDs) which is commonly adopted by people suffering pain. The NSAIDs such as aspirin cause loss of mucosal integrity resulting in gastric mucosa inflammation. Carrot (Daucus carota) has long been used as a traditional medicine for various ailments. The presence of flavonoids and carotenoids in carrot is associated with gastroprotective effect. Chandra *et al.* (2015) studied the therapeutic potential of 50% ethanol extract from *Daucus carota* roots (EDC) as antisecretory, gastro protective and antacid capacity using experimental rats. Assessment of EDC antisecretory and *in vivo* antacid capacities was carried out using a pyloric ligation induced ulcer model. The gastro protective effect was assessed with an absolute ethanol induced ulcer model. The integrity of gastric mucosa was evaluated using the estimation of glutathione and gastric mucus level and with histopathological examination of gastric mucosal cells. The effect of the extract on the liver was assessed by measuring serum biochemical parameters. The EDC significantly ($P< 0.01$-0.001) reduced gastric lesions in both models. It also significantly ($P< 0.05$-0.001) reduced the volume of gastric content, the total acidity was significantly ($P< 0.05$-0.001) reduced with the doses of 100 and 200 mg/ kg EDC. The mucus content and glutathione level increased significantly ($P< 0.05$) in the absolute alcohol-induced ulcer. The EDC also showed *in vitro* antacid capacity. Histopathological studies further confirmed the effects of EDC by inhibiting congestion, edema, hemorrhage, and necrosis in gastric mucosa [41].

Wehbe *et al.* (2009) investigated the antipeptic ulcer effects of the aqueous and methanolic extracts of *Daucus carota* umbels against ethanol induced gastric ulcer in rats. They found that both the extracts showed significant protection against ethanol induced gastric ulcer with a curative ratio of 46.8 and 68.7%, at a dose of 250 mg/kg body weight, respectively [42]. Khatib *et al.* (2010) studied the gastro protective potential of the fresh juice extract of the roots of *Daucus carota* (200 and 400 mg/kg) in gastric ulcerations experimentally induced by pylorus ligation, aspirin and ethanol induced. The *Daucus carota* extracts were significantly decreased free acidity, total acidity and ulcer index, while it increased the pH and the mucus content as compared with control. The *Daucus carota* extract at a dose of 400 mg/kg produced 60.45, 56.80 and 43.51 % ulceration inhibition when the gastric ulceration were induced by pylorus ligation, aspirin and ethanol, respectively [43]. In an another study, Jinn *et al.* (2014) studied the gastro protective effect of 4.08 g carrot juice administered by feeding tube on the hydrochloric acid concentration in the stomach in aspirin induced Wistar-strain rats. The result of carrot juice consumption together with aspirin shows a statistically significant reduction in HCl concentration in the stomach ($P< 0.05$). The result was also significant when compared with Misoprostol [44].

4. Nephroprotective and hepatoprotective effects:

Carrot and its constituents also exert Nephroprotective and hepatoprotective effects. Mital *et al.* (2011) studied the renoprotective activity of *Daucus carota* root extract in renal ischemia reperfusion injury in rats and found that *Daucus carota* extracts exerted significant renoprotective activity probably by the free radical scavenging activity [45]. Afzal et al. (2013) investigated the protective and curative potential of *Daucus carota* root extract in renal ischemia reperfusion injury in rats. In this study they observed that Direct methanol extract (DME), at a dose of 500 mg/kg body weight significantly ($P< 0.001$) reduced the levels of serum creatinine (1.173-3.090 mg/dl), uric acid (2.267-3.500 mg/dl) and urea (84.75-132.00 mg/dl) compared to disease control [46]. Sodimbaku *et al. (2016)* studied the nephroprotective effects of ethanolic root extract of *Daucus carota* (200 and 400 mg/kg, po) against gentamicin induced nephrotoxicity in albino Wistar rats. They found that gentamicin intoxication induced elevated serum urea, BUN, uric acid, and creatinine levels were significantly ($P< 0.01$) decreased in a dose-dependent manner in groups that received *Daucus carota.* The nephroprotective effects of *Daucus carota* were further confirmed by histological observations [].

Singh *et al.* (2012) studied the hepatoprotective and antioxidant activity of methanolic extract of *Daucus carota* seeds in experimental rats. A significant decrease in serum glutamic pyruvic transaminase (SGPT), serum glutamic-oxaloacetic transaminase (SGOT) and alkaline phosphatase (ALP) levels was observed in all drug treated groups as compared to thioacetamide group ($P< 0.001$), furthermore, significant ($P< 0.001$) increase in superoxide dismutase (SOD), catalase (CAT), glutathione reductase (GRD), glutathione peroxidase (GPX) and glutathione-S-transferase (GST) was observed in all drug treated groups as compared with thioacetamide group. However, a significant ($P< 0.001$) reduction in lipid peroxidation (LPO) was observed as compared to toxic control group [48]

Bishayee *et al. (* 1995) evaluated the effect of carrot extract on CCl4-induced acute liver damage in mice. The extracts significantly lowered the serum levels of glutamate oxaloacetate transaminase, glutamate pyruvate transaminase, lactate dehydrogenase, alkaline phosphatase, sorbitol and glutamate dehydrogenase elevated by CCl4-induction. Extract also decreased the elevated serum bilirubin and urea. The increased activities of hepatic 5'-nucleotidase, acid phosphatase, acid ribonuclease and decreased levels of succinic dehydrogenase, glucose-6-phosphatase and cytochrome P-450 produced by CCl4 were reversed by the extract in a dose-responsive way [49]

5. Cardiovascular effect:

Cardiovascular diseases include coronary artery diseases (CAD) such as angina and myocardial infarction. The cardiovascular effect of *Daucus carota* has been studied by many scientists. Gilani *et al*. (1994) studied that the ethanolic extract of *Daucus carota* at the dose of 10–100 mg/kg caused a dose-dependent fall in systolic and diastolic arterial blood pressure in normotensive anesthetized rats. [50]. Muralidharan *et al.* (2008) investigated aqueous extract of *Daucus carota* tubers for inotropic and cardioprotective effects by measuring various biochemical parameters at the test doses of 250 and 500 mg/kg. Isoproterenol (5.25 mg/kg and 8.5 mg/kg) was administered subcutaneously on 29th and 30th day respectively in order to induce myocardial infarction. Cardiac tonicity was estimated by evaluating Na+K+-ATPase, Mg2+-ATPase and Ca2+-ATPase levels in heart. The levels of Na+K+-ATPase and Mg2+-ATPase were decreased and that of Ca2+ATPase was increased in extract-treated group significantly ($P< 0.001$). Cardioprotection was assessed by estimating serum aspartate transaminase, alanine transaminase, lipid peroxidase, and lactate dehydrogenase levels and cardiac total protein, lipid peroxidase, and lactate dehydrogenase. The levels altered by isoproterenol were restored significantly by the administration of the extract [51].

6. Anti-diabetic effect:

Diabetes is a disease characterized by hyperglycemia resulting from defects in insulin secretion or action or both .This results in damage dysfunction and failure of various organs especially for the eyes, kidney, heart and blood vessels**.** Houri *et al*. (2015) studied dichloromethane (DCM) extract of carrot roots stimulated insulin-dependent glucose uptake (GU) in adipocytes in a dose dependent manner. They isolated two polyacetylenes i.e. falcarinol and falcarindiol from the DCM extract and found that both polyacetylenes significantly stimulated basal and/or insulin-dependent GU in 3T3-L1 adipocytes and porcine myotube cell cultures in a dose-dependent manner [52]

Pouraboli *et al.*2015 studied the effect of the methanol extract of *Daucus carota* (wild carrot) seeds (100, 200 and 300 mg/kg for 6 days), on the serum levels of lipids and biochemical indices of kidney and liver function in streptozocin induced diabetic (type 1) rats. They found that the extract significantly decreased serum levels of total cholesterol, triglycerides and creatinine at all doses. Furthermore, they observed that the oral administration of extracts (200 and 300 mg/kg) significantly decreased serum levels of Low density lipoprotein cholesterol, aspartate amino transferase and urea. Also, extract (300 mg/kg) decreased serum level of alanine aminotransferase ($P< 0.05$) [53].

7. Anti-inflammatory effect:

Anti-inflammatory refers to the property of a substance or treatment that reduces inflammation**.** Wehbk *et al.* (2009) studied the anti-inflammatory effects of the aqueous and methanolic extracts of *Daucus carota* umbels in acute and chronic inflammation in rats. In acute inflammation, both the extracts produced maximum anti-inflammatory activity at doses of 400 and 140 mg/kg body weight with 90.9 and 58.6% inhibition, respectively. In chronic inflammation**,** the same doses showed maximum anti-inflammatory activity with 58 and 44.1% inhibition, respectively [42].

Mani *et al*. (2006) investigated the ethanolic extract of *Daucus carota* seeds for anti-inflammatory and analgesic activity at the doses of 100, 200 and 400 mg/kg. They found that higher doses of the extract (200 and 400 mg/kg) inhibited carrageenan, histamine and serotonin-induced paw edema as well as formaldehyde-induced arthritis successfully. These doses of extract also significantly attenuated the writhing responses induced by an intraperitoneal injection of acetic acid and late phase of pain response induced by an subplantar injection of formalin in mice [54]. Mornin *et al.* (2003) investigated seed extracts of *Daucus carota* seed extracts as Cyclooxygenase (COX) enzymes inhibitor. Compounds, 2, 4,5-trimethoxybenzaldehyde, oleic acid, trans-asarone and geraniol, isolated from seed extract showed 3.32, 45.32, 46.15, and 3.15% of prostaglandin H endoperoxide synthase-I (COX-I) inhibitory activity and 52.69, 68.41, 64.39 and 0% prostaglandin H endoperoxide synthase-II (COX-II) inhibitory activity, respectively at 100 mg/ml. Compound 2,4,5-trimethoxy benzaldehyde showed selectivity towards COX-II enzyme inhibition at 100 µg/ml [55].

8. Wound healing effect:

Wound healing is a natural restorative response to tissue injury. Healing is the interaction of a complex cascade of cellular events that generates resurfacing, reconstitution, and restoration of the tensile strength of injured skin. Patil *et al.* (2012) evaluated the soft paraffin based cream containing 1%, 2% and 4% w/w of ethanolic extract of *Daucus carota* (EEDC) root in wound healing activity on excision and incision wound models. Animals treated with topical EEDC cream formulation (1%, 2% and 4% w/w) showed significant decrease in wound area, epithelization period and scar width whereas, the rate of wound contraction was significantly increased (P< 0.01, P< 0.001 and P< 0.001 respectively) as compared to control group animals in excision wound model. In incision wound model there was significant increase (P< 0.01 and P< 0.001) in tensile strength, hydroxyproline and protein content of animals treated with topical EEDC cream formulation (2% and 4% w/w, respectively). Its ethanolic extract of root cream when applied topically did not show any sign and symptoms of skin irritation [56].

VI. CONCLUSION

The carrot (*Daucus carota*) is a root vegetable. It is a biennial plant which belongs to the family Apiaceae . Carrots have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions and to cure various diseases such as cancer, blood pressure, liver disorders, asthma, etc. The medicinal value of the carrot is due to the presence of several secondary metabolites in them such as xanthophylls, lycopene, anthocyanins, luteolin, polyacetylenes, falcarinol, falcarindiol and pyrrolidine. Phytochemical analysis showed that the root of *Daucus carota* also contained alkaloids, carbohydrates, chlorogenic acid, flavonoids, phenols, essential oil, terpenoids, coumarin, many vitamins and minerals. The pharmacological studies revealed that the plant possessed cytotoxic, antioxidant, antidiabetic, antimicrobial, smooth muscle relaxant, hypotensive effect and decrease intraocular pressure, gastro-protective, nephro-protective, hepato-protective, cardio protective antidepressant memory enhancement, anti-inflammatory, reproductive, wound healing effects. The carrot extracts alone and in combination with the anticancer drugs may offer a good strategy for the treatment of a variety of human cancers that are resistant to chemotherapy and worthwhile for further perspective.

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