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Phytochemical analysis and total phenol content in *Daucus carota* Linn

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Abstract
Plants are the good sources for the discovery of pharmaceutical compounds and medicines. Natural products could be potential drugs for humans or live stock species and also these products and their analogues can act as intermediates for synthesis of useful drugs. In the present study Phytochemical analysis and total phenol content in *Daucus carota* Linn were determined using standard method. Phytochemical analysis refers to the extraction, screening and identification of the active substances that are present in a plant. Ethanolic extracts from carrots showed total phenolic content of 58 mg/gm dry plant material.

Keywords: total phenol content, phytochemical analysis, *Daucus carota* extract

Introduction
Fruits and vegetables are an important part of our diet. They provide, not only the major dietary fiber component of food, but also a range of micronutrients, including minerals, vitamins and antioxidant compounds, such as carotenoids and polyphenols (Augspole *et al.,* 2014) [2]. Increased consumption of fruits and vegetables containing high levels of phytochemicals has been recommended to prevent chronic diseases related to oxidative stress in the human body (Liu 2003; Rao and Rao, 2007; Pandey and Rizvi, 2009 [6, 10, 8]. Among them carrot belongs to horticultural crops of high recognition and importance due to its nutritional value and high concentration of bioactive constituents (Leja *et al.,* 2013) [5]. Plants are the good sources for the discovery of pharmaceutical compounds and medicines. Natural products could be potential drugs for humans or live stock species and also these products and their analogues can act as intermediates for synthesis of useful drugs (Makkar *et al,* 2009) [7]. Plants possess many - tocopherol and polyphenolsαphytochemicals with various bioactivities including, carotenodis, ascorbic acid, (Salah *et al.,* 1995; Papas 2002) [11, 9]. Natural antioxidants haven't cause health problems that may arise from the use of synthetic antioxidants which have side effects (Arouma *et al.,* 1992). Free radical reaction occur in the human body and food systems. Free radicals, in the form of reactive oxygen and nitrogen species, are an integral part of normal physiology. Over production of these reactive species can occur due to oxidative stress brought about by an imbalance of the bodily antioxidant defense system or free radical formation. These reactive species can react with biomolecules, causing injury and death (Halliweel, 2008) [4].

Carrot is one of the most important vegetables in the world; its bioactive constituents may be beneficial to a vast number of consumers. It is rich in pro-healthy antioxidants both of lipophilic (carotenoids) and hydrophilic (phenolic compounds) characters (Hager and Howard, 2006; Sharma *et al.,* 2012; Leja *et al.,* 2013) [12, 5]. Carrots are a good source of carbohydrates and minerals like Ca, P, Fe and Mg (Sharma *et al.,* 2012) [12].

Daucus carota Linn. commonly known as "carrots" belong to Family Apiaceae (Umbellieferae) and are cultivated all over the world as vegetable. *Daucus carota* Linn. has been used for treatment of anti-diarrhea, anti-infection, anti-high blood cholesterol, anti-inflammation, anti-seizure, anti-fungal anti-bacteria and anti-cancer (Balasundram, 2006) [3].

Materials and Methods
Plant Materials
Roots of *Daucus carota* Linn. were collected from local market of Kalina Mumbai. Specimens were identified and authenticated by Department of Botany, Kirti M. Doongursee College of Arts, Science and Commerce, Dadar (W), Mumbai.

Preparation of plant extracts
Roots of *Daucus carota* Linn. were washed and cut into thin slices, then dried in hot air oven at 40 oC for 48 h. Dried root were blended by using blender and filtered with sieve No. 16. Ten grams of the dry powder were extracted with petroleum ether (300 ml) and followed by 95% ethanol (300 ml) in a Soxhlet apparatus. The solvents were removed by using a rotary evaporator. Crude extracts were dissolved in dimethyl sulfoxide (100% (DMSO) and stored at -20oC until used.

Test for Phylobatannins
Plant powder sample was mixed with distilled water in a test tube, then skate it well and filtered to take the plant extract. Then to the plant extract, 1% aqueous hydrochloric acid was added and the sample was then boiled with the help of hot plate stirrer. Formations of red coloured precipitate confirmed a positive result.

Test for Reducing Sugar
An amount of 0.50g of carrot was added in 5 ml of distilled water. Then 1 ml of ethanol mixed in plant extract. After that we took 1 ml of Fehlings solution A and 1 ml of Fehlings

solution B in a test tube, heated it to boiling and then poured it in the aqueous ethanol extract. When colour reaction was observed, it shows a positive result.

Test for Terpenoids
An amount of 0.8 g of selected plant sample was taken in a test tube then poured 10 ml of methanol in it. Shaken well and filtered to take 5 ml extract of plant sample. Then 2ml of chloroform were mixed in extract of sample and 3 ml of sulphuric acid were added in the sample extract. Formation of reddish brown colour indicates the presence of terpenoids in the sample.

Test for Flavonoids
For the confirmation of flavonoids in carrot, 0.5g of carrot extract were added in the test tube and 10 ml of distill water, 5ml of dilute ammonia solution were added to a portion of the aqueous filtrate of carrot extract followed by addition of 1 ml concentrate H2SO4. Indication of yellow colour shows the presence of flavonoids in carrot.

Test for Alkaloids
For the purpose of phytochemical analysis of carrot, 0.2 g of the sample were added in each test tube and 3 ml of hexane were mixed in it, shaken well and filtered. Then took 5 ml of 2% HCL and poured in a test tube having the mixture, filtered it and poured few drops of picric acid in a mixture. Formation of yellow colour precipitate indicated the presence of alkaloids. 10

Total phenolic content
To determine total phenolic contents in carrots and baby carrots, the amount of total phenolic compounds in baby carrot and carrot were assayed by Folin-Ciocalteu method as described by Chang *et al*. (2002). We found that ethanolic extracts of baby carrot and carrot had total phenolic content of 35.9±4.0 and 30.7±3.1 mg GAE/g dry plant material, respectively. We could not detect any phenolic compounds in petroleum extract fractions (Table 1). This result suggested that there were more phenolic compounds in ethanolic extract than petroleum extract and more phenolic compounds were found in baby carrots as compared to carrots

Results and Discussion
Phytochemicals are increasing acceptor as health promoting and maintaining and repairing agents in cells, tissues or the whole human body. The phytochemicals that are frequently associated with human health are carotenoids, polyphenols and tocopherols. This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important medicinal phytochemicals such as terpenoids, reducing sugar, flavonoids, alkaloids and phylobatannins were present in the sample. The result of the phytochemical analysis shows that carrots are rich in at least one of alkaloids, flavonoids, terpenoids, reducing sugar and phylobatannins. Phytochemicals play a vital role against number of diseases such as asthma, arthritis, cancer etc. unlike pharmaceutical chemical these phytochemicals do not have any side effects.

Table 1: Total amount of phytochemicals present in *Daucus carota* ethanol extract

Phytochemicals	*Daucus carota* ethanol extract
Phylobatannins	+++
Reducing sugars	++
Flavonoids	++++
Alkaloids	+++
Terpenoids	+++

Table 2: Total phenolic content in *Daucus carota* ethanol extract

Extract	Total Phenolic Content
Daucus carota ethanol extract	58 mg/gm

The phytochemical analysis conducted on the ethanol extract of *Daucus carota* revealed the presence of phenolic compounds, flavonoids, reducing sugar (carbohydrate), steroids and triterpenoids, tannin as major phytochemical groups. Phenolics are a major group of compounds that act as primary antioxidants or free radical scavengers. The amount of total phenolic content was determined with the Folin-Ciocalteu reagent. Gallic acid was used as standard compound. From the table above, it can be seen that, in *Daucus carota* ethanol extract, the amount of flavonoids exceed the amount of all other phytochemicals. Whereas phylobatannins, alkaloids and terpenoids showed a moderate concentration

Conclusion
Phytochemical analysis showed the presence of reducing sugars, flavonoids, terpenoids, alkaloids, phylobatannins in the extract. They have rich antioxidant property which can combat various diseases. Further research is required to isolate the active principle and elaborate on its mechanism of action in health and disease.

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