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PHYTOCHEMICAL SCREENING AND INVITRO ANTIHELMINTIC ACTIVITY OF METHANOLIC EXTRACT OF DAUCUS CAROTA LINN.

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ABSTRACT

Development of anthelmintic resistance and high cost of conventional anthelmintic drugs led to the evaluation of medicinal plants as a alternative source of anthelmintics. In the present study, the roots of *Daucus Carota* were successively extracted with maceration using methanol as a solvent. The aim of the present study was to perform the phytochemical screening and to evaluate the anthelmintic activity of methanolic extract of roots of *Daucus Carota* belonging to the family Apiaceae. The anthelmintic activity was analyzed by methanolic extract of different concentrations-25,50,100mg/ml by using Indian adult earthworm, *Pheretima posthuma* having anatomical and physiological resemblance with intestinal worms. The time of paralysis and time of death were studied and the activity was compared with Piperazine citrate as a standad reference. We demonstrated that, the results supported the traditional use of *Daucus Carota* in the treatment of Helminthiasis.

KEYWORDS: *Daucus Carota* roots, phytochemical screening, pheretima posthuma, piperazine citrate.

INTRODUCTION

MEDICINAL PLANTS

Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medicine practices since prehistoric times. Plants synthesize hundreds of chemical compounds for functions including defense against insects, fungi, diseases, and herbivorous

mammals. Numerous phytochemicals with potential or established biological activity have been identified. However, since a single plant contains widely diverse phytochemicals, the effects of using a whole plant as medicine are uncertain.[1] Further, the phytochemical content and pharmacological actions, if any, of many plants having medicinal potential remain unassessed by rigorous scientific research to define efficacy and safety.

The earliest historical records of herbs are found from the Sumerian civilization, where hundreds of medicinal plants including opium are listed on clay tablets, c. 3000 BC. The Ebers Papyrus from ancient Egypt, c. 1550 BC, describes over 850 plant medicines.[2] The Greek physician Dioscorides, who worked in the Roman army, documented over 1000 recipes for medicines using over 600 medicinal plants in De materia medica, c. 60 AD; this formed the basis of pharmacopoeias for some 1500 years. Drug research sometimes makes use of ethnobotany to search for pharmacologically active substances, and this approach has yielded hundreds of useful compounds.[3] These include the common drugs aspirin, digoxin, quinine, and opium.

Medicinal plants are widely used in non-industrialized societies, mainly because they are readily available and cheaper than modern medicines.[4] The annual global export value of the thousands of types of plants with medicinal properties was estimated to be US$2.2 billion in 2012. In 2017, the potential global market for botanical extracts and medicines was estimated at several hundred billion dollars. In many countries, there is little regulation of traditional medicine, but the World Health Organization coordinates a network to encourage safe and rational usage.[5] Medicinal plants face both general threats, such as climate change and habitat destruction, and the specific threat of over-collection to meet market demand.[6]

HELMINTHIASIS

Helminthiasis, also known as worm infection, is any macroparasitic disease of humans and other animals in which a part of the body is infected with parasitic worms, known as helminths. Worms include several groups.

- The first group Platyhelminthes includes the flatworms, tapeworms, and flukes. They have a flat, ribbon- or leaf-shaped body with a pair of eyes at the front. Some are parasites.
- The second group contains the threadworms, roundworms, and hookworms. This phylum is called Nematoda. Threadworms may be microscopic, such as the vinegar eelworm, or

more than 1-metre (3 feet) long. They are found in damp earth, moss, decaying substances, fresh water, or salt water. Some roundworms are also parasites: the Guinea worm, for example, gets under the skin of the feet and legs of people living in tropical countries.

- The third group consists of the segmented worms, with bodies divided into segments or rings. This phylum is called Annelida. Among these worms are the earthworms and the bristle worms of the sea.
- Worms may also be called helminths, particularly in medical terminology when referring to parasitic worms, especially the Nematoda (roundworms) and Cestoda (tapeworms). Hence, "helminthology" is the study of parasitic worms. When a human or an animal, such as a dog or horse, is said to "have worms", it means that it is infested with parasitic worms, typically roundworms or tapeworms. Deworming is a method to kill off the worms that have infected a human or animal by giving anthelmintic drugs.

MATERIALS AND METHODS

PLANT PROFILE

Carrots (or) Daucus Carota Var. Sativus is a domesticated plant that has been grown by human civilizations for over a thousand years. Origanating in central Asia as a scrawny weed, the carrot has been transformed throught domestication. Over great lengths of time the carrot as we know it was created through careful gentic selection.

Today carrots exist in many forms ranging from noxious weeds to important crops. Wild carrots are prevalent in the united states and are considered in most areas to be a non native invasive weed. The wild form of the carrot is often called Queen Anne’s lace and displays the compound flat topped gathering of flowers that is characteristic of the Apiaceae family. The domesticated variation possesses the same flower, but has been bred to produce a greatly enlarged storage root that is harvested for foodstuff.

Farming of carrots has become a large business. The business has grown recently as carrots have become an important contributor to the word food supply. In the united states the consumption of carrot has been on the rise. A wave of health conciseness has helped boost consumption through promoting fresh vegetables and healthy eating.

Fig: Daucus Carota.

Scientific classification of Daucus carota

Kingdom - Plantae

Subkingdom -Viridiplantae

Class - Magnoliopsida

Division -Magnoliophyta

Sub division -Spermatophytina.

Superdivision -Embryophyta

Order -Apiales

Superorde r-Asteranae

Family -Apiaceae

Genu s-Daucus

Species -D.carota

Subspecies -D. C. Subsp. sativuvs

Botanical name -Daucus carota

Description

Carrot, Daucus carota, is an edible, biennial herb in the family Apiaceae grown for its edible root. The carrot plant produces a rosette of 8–12 leaves above ground and a fleshy conical taproot below ground. The plant produces small (2 mm) flowers which are white, red or purple in color. The root can grow to between 5 and 50 cm (2.0–20 in) long and reach 5 cm (2.0 in) in diameter. The foliage of the plant can reach a height of 150 cm (59.1 in) when in flower. The carrot plant can be annual or biennial and may also be referred to as wild carrot. The plant is believed to have originated in Europe or the Western Mediterranean.

Traditional uses

Wild carrot is used for urinary tract problems including kidney stones, bladder problems, water retention, and excess uric acid in the urine; and also for gout, a painful joint problem caused by too much uric acid. The seed oil is used for severe diarrhea (dysentery), indigestion, and intestinal gas.

Pharmacological Effects

Daucus carota, commonly known as carrot, is a popular medicinal plant with various pharmacological activities mentioned in traditional Persian medicine (TPM) and modern phytotherapy including.

- Antioxidant
- Analgesic
- anti-inflammatory
- Antimicrobial
- Antifungal
- Diuretic
- Lithontripic
- Emmenagogue
- intra occular hypotensive
- Gastroprotective
- Hepatoprotective
- Aphrodistic
- Nephroprotective
- Antispasmodic
- Anticancer
- Antiestrogenic
- Cardioprotective
- wound healing activities.

Collection And Authentication Of Plant Material

Daucus Carota plant roots were collected from the plants present in the sathupally forest area and they were aunthenticated by Dr. Madhavshetty, Dept. of Botany, SV University,

Tirupathi. The samples werw preserved in the Mother Teresa Pharmacy College for the future reference.

Extractrion procedure

Maceration(Methanolic extract)

Fresh roots of Daucus carota(carrot) were washed with distilled water and dried. The roots were cutted into small pieces and dried for 2 weeks and then powdered. 100g of fine powder was dissolved in 500ml of methanol and macerated for 3days with frequent agitation.

RESULTS AND DISCUSSION

Preliminary phytochemical screening of plants was predominant to the detection of bioactive principles which is a new source of therapeutically and industrially valuable compounds that may lead to the discovery of new drugs. In the present study, the presence of phytochemicals were screened with the methanol extracts of the *Daucus carota* roots and the results are shown in Table 1. Crude extracts and medicines are manufactured based on the principles of natural compounds even by pharmaceutical companies, may lead to large scale exposure of humans to natural products. Presence or absence of important bioactive compounds in an extracts were identified by color reactions with specific chemicals, this procedure is simple for preliminary pre-requisite before going to phytochemical investigation. Hence, in the present work, the crude extracts obtained by methanol as a solvent was screened for the presence of phytochemicals. The methanol extract shows the presence of alkaloids, saponins, flavonoids, proteins, glycosides and terpenoids, steroids and tannins. Saponins have health benefits such as lower cholesterol, antimicrobial, anti-inflammatory and anticancer properties. The methanol extract shows the presence of steroids, flavonoids, tannins, glycosides, terpenoids, reducing sugars, saponins and proteins.

PHYTOCHEMICAL SCREENING

The extracts of different plant materials were subjected to phytochemical studies using the Standard method described by Trease& Evans (1989).

Table 1: Preliminary phytochemical screening of *Daucus carota roots.*

Test	Methanol
Alkaloids	+
Steroids	+
Tannins	+
Anthraquinones	-
Resins	-
Phenols	-
Flavonoids	+
Terpenoids	+
Glycosides	+
saponins	+
Reducing sugars	+
proteins	+

+ indicates the presence of the phytochemical;

- indicates the absence of the phytochemical.

Flavonoids are secondary metabolite having various pharmacological properties such as anti-oxidative, anti-fungal, anti-inflammatory and diuretic actions.

The mechanism for anthelmintic activity of plant extracts are due to presence of secondary metabolites bind to free proteins in the gastrointestinal tract of host animal and glycoprotein on the cuticle of the parasite. The result of anthelmintic activity on earthworm *pheretima posthuma* was shown in Table-2 reveals that, different concentrations used have shown paralysis and death of worms and it was compared in the same concentration with Piperazine citrate. This standard drug may cause hyperpolarization of worms muscle by GABA agonistic action opening Chloride ion channels that cause relaxation and depresses responsiveness to contractile action of Acetylcholine. By increasing chloride ion conductance of worm muscle membrane initiates hyperpolarization and reduced excitability that lead to muscle relaxation and flaccid paralysis.

Table 2: Anthelmintic activity of Methanolic extract of *Daucus carota roots.*

Groups	Dose in Concentration (mg/ml)	Time of paralysis (min)	Time of death (min)
Control	-	-	-
Methanolic extract	25	25.23±3.13	26.15 ± 2.35
	50	23.15± 2.58	24.06±2.48
	100	14.29± 2.21	16.48 ± 2.34
Standard drug	25	11.16 ± 1.05	13.12 ± 2.59
	50	9±2.35	11.22 ± 1.34
	100	6 ± 0.27	8.49 ± 0.28

The methanolic extract of *Daucus carota roots* and standard drug solution not only illustrate paralysis, but also causes death of worms especially at higher concentration of 100 mg/ml, in less time was shown in Fig 2,3.

Figure-2: Anthelmintic activity of methanolic extract of *Daucus carota* roots.

Figure 3: Anthelmintic activity of standard drug.

In addition, Tannins or their metabolites have an undeviating effect on the possibility of the pre-parasitic stages of helminthes and other phytochemical constituents might be responsible for an anthelmintic activity include flavonoids and terpenoids. This present research work shows the presence of different phytochemical constituents like alakaloids, terpenoids, glycosides, flavonoids with biological activity that can be valuable therapeutic index. The plant extracts can be used for further isolation of compounds for their anthelmintic activity.

CONCLUSION

The presence of phytoconstituent such as flavonoids in plants, indicates the possibility of antioxidant activity and this activity will help in preventing a number of diseases through free radical scavenging activity. Since the plant *Daucus carota roots* has been used in the treatment of different ailments, the medicinal roles of this plant could be related to identify bioactive compounds. The present analyses suggest that *Daucus carota roots* contain potentially health-protective phytochemical compounds with a potent source of natural antioxidants and antibacterial activities that may be clinically promising. The present results will form the basis for collection of new plant species for further investigation in the potential

discovery of new bioactive compounds. Further studies are need for in-vitro model are required to find out and to establish effectiveness and pharmacological rationale for the use of plant roots as anthelmintic drug. Biological parameter can be concluded that the methanolic extract of *Daucus carota roots* shows less anthelmintic activity.

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