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PHYTOCHEMICAL SCREENING AND INVITRO ANTHELMINTIC ACTIVITY OF METHANOLIC EXTRACT OF ALLIUM CEPA BULBS

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ABSTRACT

Development of anthelmintic resistance and high cost of conventional anthelmintic drugs lead to the evaluation of medicinal plants as a alternative source of anthelmintics. In the present study, the bulbs of Allium Cepa 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 bulbs of Allium Cepa belonging to the family Amaryllidaceae. 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 Allium Cepa in the treatment of Helminthiasis.

KEYWORDS: Allium Cepa bulbs, phytochemical screening, pheretima posthuma, piperazine citrate.

INTRODUCTION

Medicinal Plants

Now a days, medicinal plants are considered as potential sources of new drugs. The term medicinal plant include various types of plants used in herbalism or herbal medicine it is the use of plants for medicinal purposes, and the study such uses. Plants have been used for medicinal purposes long before prehistoric period. Ancient Unani manuscripts Egyptian

papyrus and Chinese writings described the use of herbs. Evidence exist that Unani Hakims, Indian Vaids and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Indigenous cultures such as Rome, Egypt, Iran, Africa and America used herbs in their healing rituals, while other developed traditional medical systems such as Unani, Ayurveda and Chinese Medicine in which herbal therapies were used systematically.

Traditional systems of medicine continue to be widely practised on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several synthetic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments.

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 various functions, including defense and protection against insects, fungi, diseases, and herbivorous mammals.

Medicinal plants are considered as a rich resources of ingredients which can be used in drug development either pharmacopoeial non pharmacopoeial or synthetic drugs. A part from that, these plants play a critical role in the development of human cultures around the whole world. A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. This description makes it possible to distinguish between medicinal plants whose therapeutic properties and constituents have been established scientifically, and plants that are regarded as medicinal but which have not yet been subjected to a thorough scientific study.

Bioactive compounds, such as poly phenols an antioxidents present in plant based food provide a several health benefits beyond basic nutrition and are positively involved in the prevention of diseases many studies found several intresting biological properties plant foods, such as anti-inflammatory, anti-viral, anti –microbial, anti-oxidant, anti-mutagenic, anti-quorum sensing activities.

MATERIALS AND METHODS

Plant profile

Cepa is placed under the family Amaryllidaceae. It is perennial herb with a stem in underground bulb. The root system is fibrous adventitious. The underground bulb, cylindrical and flesh, with sheathy leaf foundation with a parallel venation appears from a cluster of progressive leaves. Pedicels are of the same length, derived from the peduncle apex that equals all flowers. Flowers are ebracteolate, bracteate, and hypogynous, tiny, complete, blonde, trimerous, actinomorphic, and protandrous. There are 6 tepals, arranged, white in two whorls of three each, syntepalous showing aestivation of valvate. There are 6 stamens, arranged in two whorls of three each, apostamenous, epitepalous, and opposite to tepals. Introse, basifixed, anthers dithecous, and dehiscing longitudinally. The gynoecium is syncarpous and tricarpellary. Ovary trilocular, superior with two ovules in each locule on axile placentation. The style of gynoecium is simple with slender stigma. Fruit is loculicidal capsule. Its seed is endospermous. In Asia, about 660 allium species are found. But in Central America, Africa, and South America, some species are found. Onions are thought to have originated in Afghanistan/Iran/USSR and are now produced in more than 175 countries around the world. Onions belong to the Amaryllidaceae family, while some authors mention them as Alliaceae. Onions are a perennial crop that can be red, white, or yellow and eaten raw, mature, pickled, or powder in its tender condition. The plants are normally white or purple with tiny flowers. Onion is highly regarded and stored as pickles for its flavor and nutritious values. Its leaves are also used in soups and salads.[1] The common onion has one or two leafless flower stalks reaching 75–180 cm (2. 5–6 feet) in height and ending in a sphere of flat, greenish, white flowers. The concentric leaf bases of the plant grow swell to form a food bulb in the underground. Most commercially cultivated onions are cultivated from the thin, dark seeds of the plant which are planted directly in the ground, but often from small bulbs or transplants. The onions can thrive under a variety of growing conditions and are very hardy. The bulbs differ in size, form, color, and pungency, while warmer temperatures are usually more mild and sweeter than other climates.

Figure:1

Scientific Classification

Kingdom	**Plantae**
Subkingdom	Tracheobionte
Superdivision	Spermatophyte
Division	Magnoliophyta
Class	Equisetopsida
Subclass	Magnoliidae
Superorder	Lilianae
Order	Asparagales
Family	Amaryllidaceae
Genus	Allium

Distribution

The onion is original from Asia, concretely from Iran and Pakistan, and it is known since 6, 000 B. C. From this continent it spreaded to Europe, thanks to the Romans, and then to America. Nowadays, it is mainly cultivated in Asia. The main producing countries are China, India, the United States and Turkey.

Traditional uses

Onion has been used to treat diabetes and is reputed to lower blood sugar levels. Externally; fresh onion juice is used to prevent bacterial and fungal infections. It can be applied to wounds and stings on the skin, used to remove warts, used to stimulate hair growth, and even used to reduce unwanted skin blemishes.

Physico chemical characteristics

Physico-chemical analysis showed that onion seeds possessed high amount of oil (21.86%-25.86%) and crude protein (15.7%-26.1%). It was determined that moisture content of samples was in the range of 6. 49-9.79% while ash content was between 3. 58-4.80%.

Pharmacological effects

A. Anti- microbial effect

B. Anti- bacterial effect

C. Anti-viral effect

D. Anti-fungal effect

E. Anthelmintic effect

F. Anti-protozoal effect

G. Anti-cardiovascular effect

H. Anti-cancer effect

I. Anti-diabetic effect

J. Anti-oxidant effect

K. Detoxification

L. Anti- platelet and fibrinocytic effect

M. Hypolipidemic

N. Anti- inflammatoryeffect

COLLECTION OF PLANT MATERIAL

Alium cepa were collected from the market of sathupally. The samples were preserved in mother Teresa pharmacy college for the future reference.

Extraction procedure

MACERATION: (Methanolic extraction)

Figure:2

The dried onions were powdered, and soak in methanol and then macerate it for 3 days in a air tight container with frequent agitation. Then filter the solution and obtained the methanolic extract**.**

RESULTS AND DISCUSSIONS

Preliminary phytochemical screening of plants was pre dominant to the detection of bio active 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 extract of the Allium Cepa bulbs and the results are shown in Table 2. Crude extracts and medicines are manufactured based on the principles of natural compounds even by pharmaceutical companies, may lead to large scale exposure of human to natural products. Presence or absence of important bioactive compounds in an extracts were identified by colour 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 carbohydrates, proteins, flavanoids, steroids, saponins, alkaloids, tannins. Saponins have health benefits such as lower cholesterol, anti microbial, anti inflammatory and anti cancer properties.

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 Allium Cepa bulbs.

Test	Methanol
Carbohydrates	+
Proteins	+
Flavanoids	+
Steroids	+
Glycosides	-
Saponins	+
Alkaloids	+
Tannins	+
Amino Acids	-
Triterpinoids	+

+ indicates the presence of the phytochemical;

- indicates the absence of the phytochemical

Figure:3

Flavonoids are secondary metabolite having various pharmacological properties such as anti-oxidative, anti-fungal, anti-inflammatory and diuretic actions.[16-18] 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 led to muscle relaxation and flaccid paralysis.

Table 2: Anthelmintic activity of Methanolic extract of *Allium cepa bulbs.*

Groups	Dose in Concentration (mg/ml)	Time of paralysis(min)	Time of death (min)
Control	-	-	-
Methanolic extract	25	24. 23±3. 13	27. 45 ± 2. 57
	50	19. 28± 2. 49	21. 06±2. 39
	100	11. 29± 3. 09	12. 28 ± 2. 27
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 ***Allium cepa*** *bulbs* and standard drug solution not only illustrate paralysis, but also causes death of worms especially at higher concentration of 100 mg/ml, in very less time was shown in Fig 4, 5.

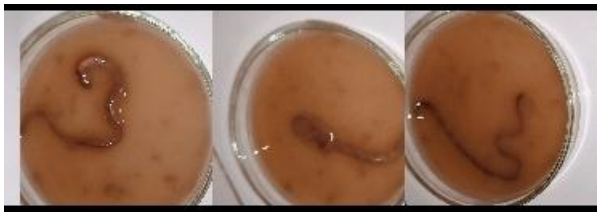

Figure-4: Anthelmintic activity of methanolic extract of Allium cepa bulbs.

Figure-5: 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 triterpenoids. This present research work shows the presence of different phytochemical constituents like triterpenoids, 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 phytoconstituents, 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 Allium cepa *bulbs* 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 Allium cepa *bulbs* 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 leaves as anthelmintic drug. Biological parameter can be concluded that the Methanolic extract of Allium cepa *bulbs* at 100 mg/ml shows significant anthelmintic activity.

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