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"PHYTOCHEMICAL SCREENING AND INVITRO ANTHELMINTIC ACTIVITY OF METHANOLIC EXTRACT OF CARICA PAPAYA LEAVES"

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ABSTRACT

Development of anthelmintic resistance and high cost of conventional anthelmintic drugs lead to the evaluation of medicinal plants as an alternative source of anthelmintics. In the present study, the leaves of carica papaya 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 leaves of carica papaya belonging to the family caricaceae. 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 look like with the intestinal worms.The time of paralysis and the 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 carica papaya in the treatment of Helminthiasis.

KEYWORDS: Carica papaya, phytochemical screening, pheretima posthuma, piperazine citrate.

INTRODUCTION

Medicinal Plant

Medicinal plants are also called as medicinal herbs, have been discovered for the used in traditional medicine practices since in the prehistoric times. Plants synthesize the hundreds

of chemical compounds for the functions are including defense against the insects, fungi, diseases, and herbivorous. The Numerous phytochemicals with a potential established biological activity have been identified. However, since the single plant contains widely diverse phytochemicals, the effects of using a whole plant as a medicine are uncertain. Further, the phytochemical are content an pharmacological actions, if any, of many plants having medicinal potential remain unassessed by rigorous scientific research to define the efficacy and safety.

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

Medicinal plants are widely used in the non-industrialized societies, mainly because they are readily available and cheaper than modern medicines. The annual global value export to 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 of dollars. In most of the countries, there is a little regulation for traditional medicine, but the World Health Organization coordinates with a network to encourage safe and rational usage. Medicinal plants face both general threats, such as climate change and habitat destruction, and the specific threat of over-the collection to meet market demand.

Helminthiasis

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

The **first group** Platy helminths includes in the flatworms, tapeworms, and flukes.

The **second group** contains threadworms, roundworms, and hookworms. This phylum is called Nematoda. Threadworm may be microscopic, and such as the vinegar eel worm, or more than 1-metre (3 feet) long. They are found in the damp earth, moss, decaying substances, fresh water, or salt water. Some roundworms are also parasites: the Guinea worm, for example, they 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 are divided into segments or rings. This phylum is called as Annelida. Among these are the worms of the earthworms and the bristle worms of the sea.

Worms may also called as helminths, particularly in medical terminology while referring to parasitic worms, especially the Nematoda (roundworms) and Cestode (tapeworms). Hence, "helminthology" is the study of parasitic worms. When a human or an animals, such as a dog or horse, is said to "have worms", it means that it is infected 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 a anthelmintic drugs.

MATERIALS AND METHODS

Plant profile

Papaya (carica papaya) leveas also called **papaw** or **pawpaw,** succulent fruit of large plant of family caricaceae. Thought its origin is rather obscure, the papaya may represent the fusion of two or more species of carica native to maxico and central America. Today it is cultivated throughout the tropical world into the warmest parts of the subtropics. The papaya fruit is slightly sweet. It is taken as breakfast in many countries. It is also used as salads, pies, sherbets, juices and confections. It is an unripened fruit, which can be cooked like squash papaya .The papaya plant is considered a tree, though its palm like trunk, up-to 8 meters tall, not a woody as the designation generally implies. The plant is crowned deeply by lobed leaves and sometimes 60cm across. The fruit is commonly spherical to cylindrical in form, is 75 to 500 mm (3 to 20inches) or even more in length, and sometimes weighs as much as 9 to 11.5 kgs. It is very juicy flesh and in deep yellow or orange to salmon-colour. The numerous round, wrinkled black seeds attached to it. The unripe fruit contains a milky juice in which is present a protein digesting enzyme know as papain, which greatly resembles the animal enzyme pepsin in its digestive action. The juice is used in preparation of various remedies for indigestion and in the manufacture of meat tenderizers. Papayas are usually grown from

seeds. Their development is rapid, unfavourable conditions a plant may live five years or more. The papaya ring spot virus nearly wiped out the papaya crops around the world first hitting Hawaiian plantations in the 1940s and soon spreading. A genetically modified (GMO) variety named the Rainbow papaya was developed in early 2000s with resistance to the virus. It is one of the first GMO fruits in commercial production.

Figure 1: Carica Papaya Leaf.

Scientific classification of carica papaya:

Kingdom - Plantae

Sub-kingdom - Tracheobionta

Class – Magnoliopsida

Sub-class- Dilleniidae

Division - Magnoliophyta.

Super division - spermatophyta

Order - Brassicales

Superorder –Rosanne

Family - Caricaceae

Genus- Carical

Botanical name- carica papaya.

Description

Carica papaya belongs to the family caricaceae. The leaves are medium to large size, averaging 50-70 centimeters in diameter and 18-19 centimeters in length, and are broad, flat, and deeply, palmately lobed. The roots are tap root system, the flowers are five parted and highly dimorphic the male flowers have the stamens fused to the petals . The female flowers have a superior ovary with five contorted petals loosely connected at the base. Papaya is a polygamous plant with three basic types of flowers viz. staminate, pistillate and

hermaphrodite. The steam is taproot system. The fruit is melon-like which varies greatly in shape and size. The skin of unripe fruit is smooth, green, and thin and changes to deep orange or yellow when rip. The flesh varies from 2.5to5.0 cm in thickness and yellow to orange in colour.

Traditional uses

Papaya is cultivated for its edible ripe fruits juice is popular beverage and its young leaves, shoots, and fruits are cooked as a vegetable. The fruits are a source of flavouring used in candies, jellies, preserves, and ice creams.

Pharmacological effects

Anti – viral effect, Anti – fungal effect, Anti – amoebic effect, Anti – helminthic effect, Anti – diabetic effect, Anti – inflammatory effect, Anti – septic effect, Anti – microbial effect, Anti – parasitic effect, Anti – hypertensive effect, Anti – bacterial effect, Anti – cancer effect, Anti – hyperlipidemic effect.

Collection And Authentication Of Plant Material

Carica papaya 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 were preserved in the Mother Teresa Pharmacy College for the future reference.

Extraction procedure

Maceration (Methanolic extract)

Fresh leaves of carica papaya (papaya) were washed with distilled water and dried. The leaves 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.

Figure-2: Methanolic extract

RESULTS AND DISCUSSION

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 extracts of the carica papaya and the results are shown in Table 1. Crude extracts and medicines are manufactured based on the principles of natural compound seven by pharmaceutical companies, may lead to large scale exposure of humans to natural products. Presence or absence of important bio active 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 & amp; Evans (1989).

Table 1: Preliminary phytochemical screening of carica papaya.

Test	Methanol
Alkaloids	+
Carbohydrates	-
Tannin's	+
Anthraquinones	+
Phytosteroids	+
Phenol's	-
Flavonoids	-
Terpenoids	+
Cardiac Glycosides	+
Protiens and amino acid	+

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 hyper polarization of worms muscle by GABA agonist 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 hyper polarization and reduced excitability that lead to muscle relaxation and flaccid paralysis.

Table 2: Anthelmintic activity of Methanolic extract of carica papaya.

Groups	Dose in Concentration (mg/ml)	Time of paralysis(min)	Time of death(min)
Control	-	-	-
methanolic extract	25	23.23±3.13	26.15 ± 2.26
	50	18.15± 2.51	20.06±2.48
	100	14.29± 2.19	15.48± 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 carica papaya 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 3.

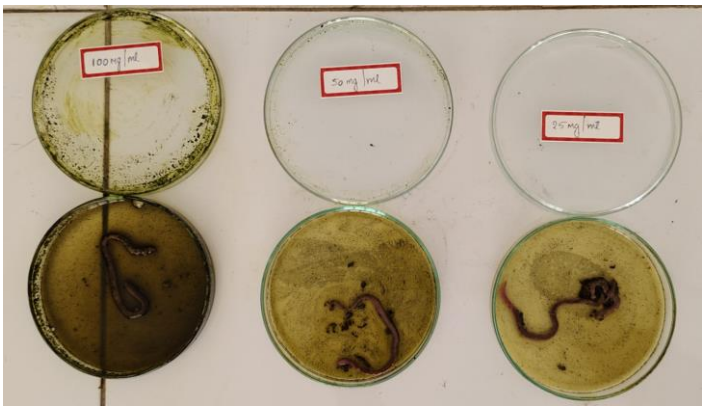

Figure 3: Anthelmintic activity of methanolic extract of carica papaya.

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 alkaloids, 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 carica papaya has been used in the treatment of different ailments, the medicinal roles of this plant could be related to identify bio active compounds.The present analysis suggest that carica papaya 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 bio active compounds. Further studies are need for in-vitro model are required to find out and to establish effective anthelmintic drug. Biological parameter can be concluded that the methanolic extract of carica papaya shows less anthelmintic activity.

REFERENCES

1. G. Aravind, D. Bhowmik, S. Duraivel, and G. Harish, “Traditional and medicinal uses of Carica papaya,” Journal of Medicinal Plants Studies, 2013; 1: 7–15.
2. H. C. Ong and J. Norzalina, “Malay herbal medicine in Gemencheh, Negri Sembilan, Malaysia,” Fitoterapia, 1999; 70(1): 10–14.
3. N. Sarala and S. Paknikar, “Papaya extract to treat dengue: a novel therapeutic option?” Annals of Medical and Health Sciences Research, 2014; (4)3: 320–324.
4. S. Rajapakse, N. L. De Silva, P. Weeratunga, C. Rodrigo, C. Sigera, and S. D. Fernando, “Carica papaya extract in Dengue: a systematic review and meta-analysis,” BMC Complementary and Alternative Medicine, 2019; (19)1: 265.
5. H. Arksey and L. O’Malley, “Scoping studies: towards a methodological framework,” International Journal of Social Research Methodology, 2005; 8(1): 19–32.
6. World Health Organization (WHO), Global Report on Traditional and Complementary Medicine 2019, WHO, Geneva, Switzerland, 2019.
7. J. Charan, D. Saxena, J. P. Goyal, and S. Yasobant, “Efficacy and safety of Carica papaya leaf extract in the dengue: a systematic review and meta-analysis,” International Journal of Applied And Basic Medical Research, 2016; 6(4): 249–254.

8. Bahagian Dasar dan Perancangan Strategik Farmasi Kementerian Kesihatan Malaysia, "Garis panduan menjalankan penyelidikan di bawah program perkhidmatan farmasi kementerian Kesihatan Malaysia, 2018.
9. C. P. Kala, "Leaf juice of *Carica papaya* L.: a remedy of Dengue fever," Medicinal & Aromatic Plants, 2012; 1: 1-2.