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Preliminary Phytochemical Screening of Aqueous Extract of Various Parts of *Luffa acutangula* (Ridge Gourd)

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Abstract: The bioactive compounds that are produced by plants are collectively called as Phytochemicals. This includes Alkaloids, flavanoids, phenols, saponins and many others.The phytochemical ingredients are plant-derived compounds, which protect the plants from environmental stresses, including insects, bacteria and fungus and weather changes. Though phytochemicals are not considered 'essential nutrients', it has become apparent that they offer many health benefits to the plants. It is well-known that plants produce these chemicals to protect themselves but recent research demonstrates that they can also protect humans against diseases. There are more than thousand known phytochemicals and they offer protection to many chronic diseases such as diabetes, cancer, heart disease and Alzheimer's. Also phytochemicals are able to reduce the oxidative damage to our cells. The objective of the present study was to investigate the presence of various phytochemicals in the aqueous extract of Luffa acutangula peel, flesh and seeds. The aqueous extract of all the three – peel,flesh and seeds of Ridge Gourd showed similar results. The three different aqueous extracts were found to contain Carbohydrates, proteins, Saponins, Terpenoids, Quinones and Tannin . It is expected that the important phytochemical properties recognized by our study in the indigenous medicinal plants will be very useful in the curing of various diseases when taken along with our food.

Keywords: Aqueous extracts, Luffa acutangula, Phytochemical screening.

1. Introduction

Ridge gourd is the fruit of a subtropical vine that belongs to the cucumber family and is native to central and eastern Asia, including the Indian subcontinent. The plant is quite hardy and easy to cultivate and is even grown indoors in regions with colder climates. Ridge gourd is popular as a vegetable in various regional cuisines in Asia, but the fruit is only edible before it ripens. As it matures, the fruit becomes increasingly fibrous, which makes it unfit for consumption, but great for use as a loofah or scrubber. The entire plant of *Luffa acutangula* is medicinally important and is used extensively in Indian traditional system of medicines. From Ayurveda point of view, ridge gourd increases vata (the impulse principle necessary to mobilize the function of the nervous system) and kapha (the body fluid principle which relates to mucous, lubrication and the carrier of nutrients into the arterial system) and also it cools down and pacifies the dosha pitta (the energy principle which uses bile to direct digestion and hence metabolism into the venous system) in the body [1]. Medicinal plants constitute an important natural wealth of a country. They play a significant role in providing primary health care services to rural people. They also serve as therapeutic agents as well as important raw materials for the manufacture of traditional and modern medicine. Medicinal plants particularly conceive several different pharmacological active compounds that may act individually, additively or in synergy to improve health.Phytochemicals are bioactive compounds found in plants that work with nutrients and dietary fibers to protect humans against diseases. They are non-nutritive compounds (secondary metabolites) that contribute to flavor and color. Many phytochemicals have antioxidant activity and reduce the risk of many diseases.In view of this background we performed the preliminary phytochemical analysis of the aqueous extract of *Luffa acutangula* peel, flesh and seeds.

2. Materials And Methods

2.1 Collection of Plant Materials :

The Ridge gourd was collected from the fields of Tirupattur, Vellore district,Tamilnadu, India.

2.2 Preparation of Extracts:

The collected raw Ridge gourd were washed thoroughly and peeled off. Then the seeds were removed from the flesh. Sliced the peel and the flesh into small piece and shade dried the peel, flesh and seeds for 10 days and finally pulverized into coarse powder. It was stored in a well closed container free from environmental climatic changes till usage. The aqueous extract of *Luffa acutangula* peel, flesh and seeds were prepared by boiling 5g of dried powder *Luffa acutangula* peel, flesh and seeds with 100 ml of sterile double distilled water individually for 20 minutes at 60 °C. The extract was

cooled to room temperature and filtered using whatman filter paper No.1. The filtrate aqueous extract was stored in a refrigerator in order to be used for further experiments. The filtrate aqueous extract of *Luffa acutangula* peel, flesh and seeds were used for the phytochemical screening.

2.3 Screening of Phytochemical Components for the Aqueous Extract :

Preliminary phytochemical analysis was carried out for the aqueous extract as per standard methods described by Harbone and Kokate [2, 3]

2.3.1 Detection of Alkaloids:

Mayer's test: The extract was treated with Mayer s reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.

Wagner s test: The extract was treated with Wagner s reagent. Formation of brown/reddish brown precipitate indicates the presence of alkaloids.

2.3.2 Detection of Flavonoids:

Lead acetate test: Extracts were treated with few drops of lead acetate solution.Formation of yellow color precipitate indicates the presence of flavonoids.

H2SO4 test: Extracts were treated with few drops of H2SO4. Formation of orange colour indicates the presence of flavonoids.

2.3.3 Detection of Steroids:

Two ml of acetic anhydride was added to five ml of the extract and then added each with two ml of H2SO4. The color was changed from violet to blue or green indicates the presence of steroids.

2.3.4 Detection of Terpenoids:

Salkowski s Test: Five ml of the extract of the peel, flesh and seeds were mixed with two ml of chloroform and then added carefully the 3 ml of concentrated H2SO4 to form a layer. An appearance of reddish brown colour in the inner face indicates the presence of terpenoids.

2.3.5 Detection of Anthraquinones :

Borntrager s Test:About five ml of the extract was boiled with10% HCl for few minutes in a water bath. It was filtered and allowed to cool. Equal volume of Chloroform was added to the filtrate.Few drops of 10% ammonia was added to the mixture and heated. Formation of pink colour indicates the presence of anthraquinones.

2.3.6 Detection of Phenols:

Ferric chloride test: 10ml of the extract was treated with few drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenol.

Lead acetate test: 10 ml of the extract was treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of phenol.

2.3.7 Detection of Saponins:About 0.5ml of the extracts was shaken with five ml of distilled water. Formation of frothing (appearance of creamy of small bubbles) shows the presence of saponins.

2.3.8 Detection of Tannins:

A small quantity of extract was mixed with water and heated on a water bath. The mixture was filtered and ferric chloride was added to the filtrate. A dark green colour was formed. It indicates the presence of tannins.

2.3.9 Detection of Carbohydrates:

0.5ml extracts were dissolved individually in five ml distilled water and filtered. The filtrate was used to test the presence of carbohydrates.

2.3.10 Detection of Protein & Amino acids Biuret test:

To 0.5 ml of extract equal volume of 40% NaoH solution and two drops of one percent copper sulphate solution was added. The appearance of violet colour indicates the presence of protein.

Ninhydrin test: About 0.5 ml of extract was taken and two drops of freshly prepared 0.2% Ninhydrin reagent was added and heated. The appearance of pink or purple colour indicates that the presence of proteins, peptides or amino acids.

2.3.11 Detection of Oils and Resins: The extract was applied on the filter paper. It develops a transparent appearance on the filter paper.It indicates the presence of oils and Resins.

3. Results and Discussion

The preliminary qualitative phytochemical screening of the crude aqueous extract of *Luffa acutangula* peel,flesh and seeds were done to assess the presence of bioactive components. The presence of alkaloids, flavonoids, tannins, phenols, steroids, anthraquinones, carbohydrates, proteins and amino acids, oils and resins, terpenoids and saponins were determined (Table 1).

TABLE.1 QUALITATIVE PHYTOCHEMICAL SCREENING OF AQUEOUS EXTRACT OF *Luffa acutangula* PEEL,FLESH AND SEED

S.NO	Phytochemicals Tested	*Luffa acutangula Peel*	*Luffa acutangula Flesh*	*Luffa acutangula Seed*
1.	Alkaloids	-	-	-
2.	Flavonoids	+	+	+
3.	Steroids	-	-	-
4.	Terpenoids	+	+	+
5.	Anthraquinones	+	+	+
6.	Phenols	-	-	-
7.	Saponins	+	+	+
8.	Tannins	+	+	+
9.	Carbohydrates	+	+	+
10.	Proteins and Amino Acids	+	+	+
11.	Oils and Resins	-	-	-

(+) Present (-)Not detected

The similar study was conducted with the Aqueous Extract of *Luffa aegyptiaca* (Sponge gourd) Leave Sample and reported the presence of biologically active components[4].The phytochemical screening of all the three aqueous extracts demonstrated the presence of different types of phyto compounds like saponins, flavonoids, tannins, anthraquinones, carbohydrates, proteins and amino acids which could be responsible for the various pharmacological properties. These entire secondary metabolites component showed antioxidant and antimicrobial properties through different mechanism [5]. Phytochemical constituents such as tannins, flavonoids and several other aromatic compounds or secondary metabolites of plants serve as defense mechanism against predation by many microorganism, insects and herbivores. The curative properties of medicinal plants are perhaps due to the presence of various secondary metabolites such as flavonoids, saponins, steroids etc [6, 7,8,9,and 10]. Flavonoids have been reported as the most important bioactive compounds which exhibited a wide range of biological activities such as antioxidant, anti-inflammatory, antimicrobial, antiangionic,anticancer and anti-alergic [11].The biological functions of flavonoids apart from its antioxidant properties include protection against platelet aggregation, microbes, ulcers and hepatotoxins [12].Saponins are other type of bioactive chemical constituents which are involved in plant disease resistance because of their antimicrobial activity [13]. Saponins natural tendency to ward off microbes makes them good candidates for treating fungal and yeast infections. These compounds served as natural antibiotics, which help the body to fight infections and microbial invasion (14). Tannins are phenolic compound and their derivatives are also considered as primary antioxidant or free radical scavengers [15].The naturally occurring anthraquinones possess a broad spectrum of bioactivities, such as cathartic, anticancer, anti-inflammatory, antimicrobial, diuretic, vasorelaxant, and phytoestrogen activities, suggesting their possible clinical application in many diseases.(16). we have found that most of the biologically active phytochemicals were present in the aqueous extract of *Luffa acutangula* peel, flesh and seeds. The medicinal properties of *Luffa acutangula* peel, flesh and seeds extract may be due to the presence of above mentioned phytochemicals.

4. Conclusion

The selected *Luffa acutangula* as a whole is the source of the secondary metabolites i.e., flavonoids, terpenoids, tannins, anthraquinones, carbohydrates, proteins , amino acids, and saponins. Medicinal plants play a vital role in preventing various diseases. The antidiuretic, anti-inflammatory, anti analgesic, anticancer, antiviral, antimalarial, antibacterial and antifungal activities of the medicinal plants are due to the presence of the above mentioned secondary metabolites. Medicinal plants are used for discovering and screening of the phytochemical constituents which are very helpful for the manufacturing of new drugs. The phytochemical analysis of the medicinal plants are also important and have commercial interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases. Thus we hope that the important phytochemical properties identified by our study in the local plant of *Luffa acutangula* will be helpful in the coping of different diseases.Also,we recommend to find the individual components, separate and quantify in future that may render help in pharma.

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