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Phytochemical Appraisal of Cucurbitaceae Plants Extracts

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ABSTRACT

The present study deals with the phytochemical screening of selected medicinal plant drugs of Cucurbitaceae family. Leaves of test plants (*Coccinia indica, Momordica dioica, Praecitrullus fistulosus* and *Trichosanthes dioica*) were extracted successively with petroleum ether, methanol and water by hot extraction method and screened for the presence of alkaloids, carbohydrates, glycosides, flavonoids, proteins, resins, steroids and tannins. Obtained findings concluded that selected plants are good source of various phytochemicals. This experimental work revealed the presence of various biologically active secondary metabolites which could be helpful in the lead to drug discovery and development.

Keywords: Phytochemical, Screening, Medicinal plants, Extract

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INTRODUCTION

Plants were used to cure diseases and infections during prehistoric times. Medicinal plants are economical, easily available and affordable. The therapeutic importance of plants lies in some chemical substances that produce a specific physiological action on the human body. The assessment of all the drugs is based on phytochemical and pharmacological approaches which leads to the drug discovery referred as natural product screening. Any part of the plant such as bark, leaves, flowers, roots, fruits and seeds may contain active components. These bioactive constituents of plants are alkaloids, glycosides, flavonoids, tannins and others. These compounds have various pharmacological and medicinal activities.[1, 2]

The selected plants are of equal importance due to the presence of most of the tested major phytoconstituents. Since these plants have been used in the treatment of different ailments, the medicinal role of these plants could be associated to such recognized bioactive compounds. The quantitative analysis of these phytochemicals will be an attractive region for the study. The analysis and characterization of bioactive compounds from plants is noteworthy to determine their medicinal value. Various chemicals have been used to extract bioactive compounds from plants. These phytoconstituents seemed to be the potential to act as a source of useful drugs. *Coccinia indica, Momordica dioica, Praecitrullus fistulosus* and *Trichosanthes dioica* were selected for the phytochemical screening of these cucurbitaceae plants. The family cucurbitaceae includes a large group of crops like cucumbers and melon which are medicinally indispensable. The plants of the family are collectively known as cucurbits. It is a distinct family without any close relatives.[3] Plants of this family have many medicinal and nutritional benefits. So it is imperative to find out the active agents possessing pharmacological activity in plants coming under the family. Hence, the present experimental work was selected for assessing the existence of phytoconstituents in various extracts of the selected plant drugs.

MATERIALS AND METHODS

Preparation of plant extracts

All the selected plant leaves of *Coccinia indica, Momordica dioica, Praecitrullus fistulosus* and *Trichosanthes dioica* were collected from various sources, dried in shade and crushed into moderately coarse powder. These powdered drugs were extracted successively with petroleum ether, methanol and water by hot extraction method separately. The extracted solvents were evaporated under reduced pressure using a rotary vacuum evaporator to get semisolid mass. The dried extract of each plant drug was weighed and noted. The

percentage yield was calculated and the extracts were suitably labeled and stored.

Phytochemical screening of prepared plant extracts

All the plant extracts (Petroleum ether, methanol and aqueous extracts of *Coccinia indica, Momordica dioica, Praecitrullus fistulosus* and *Trichosanthes dioica*) were screened for the presence of various secondary metabolites such as alkaloids, carbohydrates, glycosides, flavonoids, proteins, resins, steroids and tannins according to the standard phytochemical methods. [4-7]

Detection of Alkaloids

Mayer's test:

Extracts were treated with mayer's reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.

Wagner's test:

Extracts were treated with wagner's reagent. Formation of brown reddish brown precipitate indicates the presence of alkaloids.

Detection of Carbohydrates

Benedict's test:

Equal volume of benedict's reagent is added to tested extract. Heat for 5 min and observe the color change and precipitate formation and analyze the test result.

Detection of Glycosides

Killer Killani Test:

Little glacial acetic acid, one drop of 5% $FeCl_3$ and concentrated H_2SO_4 were added to the test sample resulted reddish violet ring at the junctions of two layers.

Detection of Flavonoids

Lead acetate test:

Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates that the presence of flavonoids.

Detection of Protein & Amino acids

Biuret test:

In 0.5 mg 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 that the presence of protein.

Ninhydrin test:

About 0.5 mg 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.

Test for Resins

Turbidity test:

1 ml of extract was dissolved in acetone and the solution was poured in distilled water. Turbidity indicated the presence of resins.

Detection of Steroids

Liebermann-Bur chard test:

2 mg of dry extract was dissolved in acetic anhydride, heated to boiling, cooled and then 1 ml of concentrated sulphuric acid was added along the sides of the test tube. Formation of green colour indicated the presence of steroids.

Tests for Tannins

Gelatin test:

Tested plant extracts when treated with a gelatin solution gives white precipitate.

RESULTS AND DISCUSSION

Phytochemical analysis conducted on the plant extracts revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities**.** This screening detects the various important compounds which could be used as the base of modern drugs for curing various diseases. It is reported that polyphenolic compounds, flavonoids and tannins, commonly found in different plants and exert multiple biological response.[8]

Phytochemical screening of petroleum ether extract of *Coccinia indica* covered the presence of proteins, resins and steroids. Phytochemical screening of *Momordica dioica* revealed the presence of carbohydrates and steroids in petroleum ether extract. Phytochemical screening of *Praecitrullus fistulosus* was exposed the presence of proteins, resins and steroids in petroleum ether extract. Phytochemical screening of *Trichosanthes dioica* resulted in the presence of proteins and steroids in petroleum ether extract. All the findings were reported in table 1.

Phytochemical screening of methanolic extract of *Coccinia indica* exposed the presence of glycosides, flavonoids and tannins. Phytochemical screening of *Momordica dioica* revealed the presence of tannins, flavonoids and proteins in methanolic extract. Phytochemical screening of *Praecitrullus fistulosus* was exposed the presence of carbohydrates, tannins and flavonoids in methanolic extract. Phytochemical screening of *Trichosanthes dioica* resulted in the presence of alkaloids, tannins and flavonoids in methanolic extract. All the findings were reported in table 2.

Phytochemical screening of aqueous extract of *Coccinia indica* exposed the presence of alkaloids, flavonoids and tannins. Phytochemical screening of *Momordica dioica* revealed the presence of alkaloids, glycosides, flavonoids and proteins in aqueous extract. Phytochemical screening of *Praecitrullus fistulosus* was exposed the presence of alkaloids, resins, tannins and flavonoids in aqueous extract. Phytochemical screening of *Trichosanthes dioica* resulted in the presence of glycosides, tannins and flavonoids in aqueous extract. All the findings were reported in table 3.

Table 1 Preliminary phytochemical screening of petroleum ether extracts of selected plant drugs

S.N.	Phytoconstituents	Test Name	CI	MD	PF	TD
1	Alkaloids	Mayer's Test	(-ve)	(-ve)	(-ve)	(-ve)
		Wagner's Test	(-ve)	(-ve)	(-ve)	(-ve)
2	Carbohydrates	Benedict's Test	(-ve)	**(+ve)**	(-ve)	(-ve)
3	Glycosides	Killer Killani Test	(-ve)	(-ve)	(-ve)	(-ve)
4	Flavonoids	Lead acetate test	(-ve)	(-ve)	(-ve)	(-ve)
5	Proteins & Amino acids	Biuret Test	**(+ve)**	(-ve)	(-ve)	**(+ve)**
		Ninhydrin Test	**(+ve)**	(-ve)	**(+ve)**	(-ve)
6	Resins	Turbidity Test	**(+ve)**	(-ve)	**(+ve)**	(-ve)
7	Steroids	Libermann- Bur chard Test	**(+ve)**	**(+ve)**	**(+ve)**	**(+ve)**
8	Tannins	Gelatin Test	(-ve)	(-ve)	(-ve)	(-ve)

Table 2 Preliminary phytochemical screening of methanolic extracts of selected plant drugs

S.N.	Phytoconstituents	Test Name	CI	MD	PF	TD
1	Alkaloids	Mayer's Test	(-ve)	(-ve)	(-ve)	**(+ve)**
		Wagner's Test	(-ve)	(-ve)	(-ve)	(-ve)
2	Carbohydrates	Benedict's Test	(-ve)	(-ve)	**(+ve)**	(-ve)
3	Glycosides	Killer Killani Test	**(+ve)**	(-ve)	(-ve)	(-ve)
4	Flavonoids	Lead acetate test	**(+ve)**	**(+ve)**	**(+ve)**	**(+ve)**
5	Proteins & Amino acids	Biuret Test	(-ve)	**(+ve)**	(-ve)	(-ve)
		Ninhydrin Test	(-ve)	(-ve)	(-ve)	(-ve)
6	Resins	Turbidity Test	(-ve)	(-ve)	(-ve)	(-ve)
7	Steroids	Libermann- Bur chard Test	(-ve)	(-ve)	(-ve)	(-ve)
8	Tannins	Gelatin Test	**(+ve)**	**(+ve)**	**(+ve)**	**(+ve)**

Table 3 Preliminary phytochemical screening of aqueous extracts of selected plant drugs

S.N.	Phytoconstituents	Test Name	CI	MD	PF	TD
1	Alkaloids	Mayer's Test	**(+ve)**	**(+ve)**	**(+ve)**	(-ve)
		Wagner's Test	**(+ve)**	(-ve)	(-ve)	(-ve)
2	Carbohydrates	Benedict's Test	(-ve)	(-ve)	(-ve)	(-ve)
3	Glycosides	Killer Killani Test	(-ve)	**(+ve)**	(-ve)	**(+ve)**
4	Flavonoids	Lead acetate test	**(+ve)**	**(+ve)**	**(+ve)**	**(+ve)**
5	Proteins & Amino acids	Biuret Test	**(+ve)**	(-ve)	(-ve)	(-ve)
		Ninhydrin Test	(-ve)	**(+ve)**	(-ve)	(-ve)
6	Resins	Turbidity Test	(-ve)	(-ve)	**(+ve)**	(-ve)
7	Steroids	Libermann- Bur chard Test	(-ve)	(-ve)	(-ve)	(-ve)
8	Tannins	Gelatin Test	**(+ve)**	(-ve)	**(+ve)**	**(+ve)**

CI = *Coccinia indica*, **MD =** *Momordica dioica*, **PF=** *Praecitrullus fistulosus*, **TD=** *Trichosanthes dioica*

CONCLUSION

Preliminary screening of phytochemicals is a valuable step in the detection of the bioactive principles present in medicinal plants and subsequently may lead to drug discovery and development. Hence, selected plant extracts could be explored for its highest therapeutic efficacy by researchers in order to develop secure drugs for different ailments. Efforts should be geared up to utilize the biomedical applications of these screened plants due to the presence of definite class of phytochemicals for their complete utilization.

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