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Research Article

PHYTOCHEMICAL EVALUATION OF *CALOTROPIS PROCERA GYMNEMA SYLVESTRE HEMIDESMUS INDICUS*

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Abstract: A phytochemical profile of three selected plants species *Calotropis procera, Gymnema sylvestre* and *Hemidesmus indicus* was carried out.Crude dry powder analysis, ash value, solubility, extractive value,fluorescence analysis,qualitative analysis of phytochemicals and mineral contents of the chosen plants were studied using various solvents.
Key words: Phytochemical profile,Plant extracts.*C.procera G.sylvestre H.indicus*

INTRODUCTION

A knowledge of the chemical constituents of plants is essential not only for the discovery of therapeutic agents, but also such information discloses the new source of economic materials such as tannins, oils, gums, precursors for the synthesis of complex chemical substance of different values.In addition, the knowledge of the chemical constituents of plant would further be valuable in discovering the actual value of folkloric remedies .Several phytochemical surveys have been carried out, including the random sampling approach, which involved some plant accessions collected from through out the world. The major chemical substance of interest in these surveys have been the alkaloids and steroidal sapogenins , however, other diverse groups of naturally occurring phytochemical such as favonoids, tannins, unsaturated sterols, tritrpenoids, essential oils .Have also be reported . The present study was undertaken to determine the biologically active compounds that contribute to the flavor, colour and other characteristic of the chosen plant.

MATERIALS AND METHOD

Three plant speciesof roots of *Calotropis procera*, stem of *Gymnema sylvestre* and stem of *Hemidesmus indicus* were collected from coastal, Andhra Pradesh and it was Authentified. The air dried plant material was made into fine powder in Willey Mill. The crude dried powder materials are separately extracted with ethanol and water to small bulk order reduced pressure at 50^0C was suspended in water.Further fractionated with solvents like hexane, benzene, chloroform, methanol and water were subjected to chemical evaluation, phytochemical analysis and fluorescence analysis. Ash value, extractive value of benzene, chloroform, hexane, water and ethanol soluble extractive values are also determined

Phytochemical screening

Alkaloid determination: Around 5g of sample was weighed into a 250 mL beaker and 200 ml of 10% acetic acid was added. The mixture was covered and allowed to stand for 4 hours. Then filtered and extract was concentrated on a water bath to one-quarter of the original volume. Concentrated ammonium hydroxide was added drop by drop to the extract until the precipitates completely dissolved. The whole solution was allowed to settle and collected precipitates were washed with dilute ammonium hydroxide and filtered. The residue was dried and weighed

Tannin determination: Around 500 mg of the sample was weighed into a 50 mL plastic bottle. To this, 50 mL of distilled water was added and shaken for 1 hour in a mechanical shaker. This solution was filtered into a50 mL volumetric flask and make up to the mark. Then 5mL of the filtered was pipette out into test tube and mixed with 2mL of 0.1 M. $FeCl_3$ in 0.1N HCl and 0.008 M potassium ferrocyanide, The absorbence was measured at 420 nm with in 10 min

Saponin determination: The samples were ground and 20g of each were taken in a conical flask and 100mL of 20% aqueous ethanol was added. The samples were heated over a hot water bath for 4 hours with continuous stirring at about 55^0C. The mixture was filtered and residue was re extracted with another 200mL of 20% ethanol. The combined extracts were reduced to 40mL over bath at about 90^0C. The concentrate was transferred into 250ml separator funnel and 20mL of diethyl ether was added and vigorously shaken. The aqueous layer was recovered while the ether was discarded. The purification process was repeated. Then 60ml of n-butanol was added. The combined n-butanol extracts were washed twice with 10ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation the samples were dried in an oven to constant weight and the saponin content was calculated as percentage

Flavoniod determination: About 10g of the plant sample was extracted repeatedly with 100mL of 80% aqueous methanol at room tempertature. The whole solution was filtered through Whatman filter paper no.42(125mm) and the filtrate was transferred to acrucible and evaporated to dryness over a water bath and weighed to a constant weight .

Determination of total phenolic compound: The fat free sample was boiled with 50ml of ether for extraction of the phenolic component for 15min. From this 5ml of the extract was pipette in to a 50mL flask, then 10mL of distilled water was added. Then 2ml of ammonium hydroxide solution and 5 ml of concentrated amylalcohol were also added. The samples were make up to the mark and left to react for 30min for colour development. This was measured at 505nm in a spectrophotometer .

RESULTS AND DISCUSSION

The present study carried out on the three plant samples revealed the presence of medicinally active constituents. Table 1 presents the chemical composition of the *Calotropis procera, Gymnema sylvestre and Hemidesmus indicus*. Among the three plants studied, H. indicus has the highest amount of total ash, but the water soluble ash value is highest in *C. procera*. The maximum and minimum the alkalinity for water-soluble ash found in *G.sylvestre* was (0.51) and in *H.indicus* (0.2), respectively.

Tough minerals such as sodium, magnesium, chloride and sulphate are present in all the studied plant species but no traces of iron was found (Table 2)

Quantitative estimations of the percentage of carbohydrates, total polysaccharides and tannic acid of these plants studied are summarized in Table 3. Among the studied plants *C.procera* shows high tannic acid content (67 mg), *H.indicus* shows high polysaccharide content (15.4) and in *G.sylvestre*, carbohydrates content is high.

Crude extract of the test samples in five different extracts were analyzed and presented in table 4. Among these plants, in *C. procera* ethanolic exhibits highest extractive value (14.766), in *G. sylvestre* species, water extracts shows highest extractive value (19.671) and in *H. indicus* species, ethanol shows the highest extractive value (13.697).

Phytochemical screening of the three chosen plants extracted in the following solvents; hexane, chloroform , ethanol, and water analyzed and presented in Table 5. Among the five solvents used in present study, ethanol exhibits a good response over hexane and benzene. Among the three plant species *H. indicus* showed a low phytochemical composition in all the five selected solvents. The phytochemical screening of the plants studied showed that the plants were rich in alkaloids, tannins, flavonoids, and saponin. They were know to show medicinal activity as well as exhibiting physiological activity .

Table 1:Crude dried powder analysis of the chosen plants

Plant	Total ash	water soluble ash	Alkalinity for water soluble ash	Acid insoluble ash	PH 1% Aqueous solution	Loss on drying 110^0C
C. procera	NTL 6.01	NTL 2.96	0.36	NTL 0.71	6.7	NMT 6%w/w
G. sylvestre	NLT 6.23	NTL 1.95	0.51	NTL 0.67	6.8	NMT 12%w/w
H. indicus	NTL 7.06	NLT 2.83	0.2	NTL 0.51	6.7	NMT 6%w/w

NLT= Not less than; **NMT**=Not more than

Table 2: Minerial composition of the selected plant species

Plant	Calcium	Sodium	Iron	Magnesium	Chloride	Sulphate
C. procera	+	+	NT	+	+	+
G. sylvestre	+	+	NT	+	+	+
H. indicus	+	+	NT	+	+	+

NT- Not traceable

Table 3: Percentage of crude polysaccharide, carbohydrate and tannin in the plants

Plant	Polysaccharide (%)	Carbohydrate (%)	Tannin (%)
C. procera	9.3mg	11.7mg	67mg
G. sylvestre	12.4mg	14.7mg	28.3mg
H. indicus	15.4mg	13.9mg	29mg

Table 4: Extractive value of the chosen plants in various solvents

Plants	Benzene extractive values (%)	Chloroform extractive values (%)	Hexane extractive values (%)	Water soluble extractive values(%)	Ethanol soluble extractive values(%)
C. procera	NMT 2.1467	NMT 3.0834	NMT 2.0491	NMT 10.228	NMT 14.766
G. sylvestre	NMT 10.213	NMT 12.694	NMT 9.236	NMT 19.671	NMT 4.769
H. indicus	NMT 3.079	NMT 3.420	NMT 5.423	NMT 7.553	NMT 13.697

NMT=Not more than

Table 5:Qulitative analysis of the phytochemicals of selected plants under various solvents

Plant	Extracts	saponin	anthra-Quinine	Flavonoid	Tannin	Protein	Carbo-hydrate	Terpene	Sterol	Alkaloid	Phenolic compound
C. procera	Hexane	-	-	+	-	-	-	+	+	-	-
	Benzene	-	-	++	-	-	-	+	+	-	-
	$CHCl_3$	-	++	+ ++	-	-	-	-	-	+	-
	Ethanol	++	++	+	+	+	+	+	+	+	+
	Water	+	-	-	+	+	+	-	-	-	+
G. sylvestre	Hexane	-	-	+	-	-	-	+	+	-	-
	Benzene	-	-	++	-	-	-	+	+	-	-
	$CHCl_3$	-	++	+ ++	-	-	-	-	-	+	-
	Ethanol	++	++	+	+	+	+	+	+	+	+
	Water	+	-	-	+	+	+	-	-	-	+
H. indicus	Hexane	-	-	-	-	-	-	+	+	-	-
	Benzene	-	-	-	-	-	-	-	+	+	-
	$CHCl_3$	-	-	+ ++	-	-	-	-	-	+	-
	Ethanol	+	+	++	+	+	+	-	-	+	+
	Water	+	-	-	+ +	+	+	-	-	-	+

(+) Found; (-) Not found

Table 6: Flourescence analysis of the chosen plants under different solvents

Plant	Hexane extract		Benzene extract		Chloroform extract		Methanol extract		Aceton extract		Water extract	
	Day Light	U.V light	Day light	U.V light	Day light	U.V light	Day light	U.V light	Day light	U.V light	Day light	U.V light
C. procera	Brown	Green	Colour less	Green tint	Colour less	Green tint	Pale orange	Pale green	Brown	Green	Dark brown	Dark green
G. sylvestre	Green	Dark Green	Bluish green	Blackish green	Green	Dark green	Dark green	Brownish green	Dark green	Brown ish green	Green ish yellow	
H. indicus	Pale Yellow	Pale green	colour less	Green tint	Green ish Yellow	Green	Pale yellow	Pale green	Yellow ish green	Dark green	Pale brown	Dark green

The plants studied here can be seen as potential source of useful drugs. Further studied are going on these plants in order to isolate, identify, characterize and elucidate the structure of the bioactive compounds.

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