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Phytochemical Screening of Valuable Herb Eclipta alba (L.)

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ABSTRACT:

Eclipta alba is a perineal weedy plant grown in wet lands in Sri Lanka. (Sanskrit name- Bringaraja, Sinhala name- Keekirindiya). This is a well-known medicinal plant used in Ayurveda as well as Sri Lankan Indigenous Medicine. Fresh juice of this whole plant is used as a home remedy for liver disorders. The objective of this study is to provide an overview of the chemical constituents present in the crude dried whole plant extract of *Eclipta alba*. Phytochemical screening of *Eclipta alba* was done by extracting the powder of whole plant with four different solvents; water, ethanol, hexane and ethyl acetate. Preliminary phytochemical screening revealed the presence of Carbohydrates, Aminoacids, Alkaloids, Tannis, Phenolic compounds, Terpenoids, Steroids, Flavanoids Cardiac glycosides, Saponins. Phytochemical analysis of *Eclipta alba* reveals absence of Resins. *Eclipta alba* plant contains medicinally important bioactive compounds and this finding justifies the ethnomedical use of this plant for various diseases of human.

KEYWORDS : *Ecliptaalba*, Phytochemical analysis, Indigenous Medicine; Ethno medicine, Bhringraj.

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INTRODUCTION:

Eclipta alba is an erect or prostrate annual herb commonly found in marshy lands, abundant paddy fields and road sides. The *Asteraceae* is the largest flowering plant family in the world. (Priya et al 2018) It is very common weedy plant used as a home remedy for different types of diseases by Sri Lankan indigenous medical practitioners. (Silalahi Marina 2022). Eclipta alba (L) is a small branched annual herbaceous folk medicinal plant which provides essential properties against several disease. The plant has been drawn much attention for owing the existence of significant organic compounds for the treatment of many infections and disease(Khan et al 2006).

Although the world has so many medicines to treat each disease, they owe some side effects which is much alarming for health. But metabolites isolated from Eclipta alba used to treat different disease dos not have any side effect as these components are organic(Herapathdeniya et al 2020). Clinical investigations have been done on different pharmacological activities like diabetic, proliferative, hypolipidemic, hepatotoxicity etc. This plant also has a greater potential to inhibit bacterial and fungus growth(Khan et al 2020). At the end, further investigation of the plant can open the door of modern medicine by isolating new bioactive molecules which will be helpful for the investigation of different pharmacological activities against uncurable human diseases and will prevent the world from the economic and environmental losses (Rani et al 2020).

OBJECTIVE:

The objective of this study was to screen phytochemical constituents present in *Eclipta alba (L.)* whole plant by using aqueous and different solvent extracts.

MATERIAL AND METHODS :

Fresh plants of *Eclipta alba* was collected randomly from Chitrakoot. Plants were washed with tap water to remove soil and dust particles Than dried under laboratory condition for three weeks. Sequentially hexane, ethylacetate, ethanol extracts and the aqueous extract of *Eclipta alba* were subjected to phytochemical analysis.

One gram of extract of *Eclipta alba* was mixed with 100 ml of each solvent (hexane, ethyl acetate, ethanol and water) separately to obtain stock solutions (1% w/v). All samples were analyzed for phytochemical study using accepted methods (Ramawat et al 2013).

TESTS FOR ALKALOIDS:

Mayer's Test: A few drops of Meyer's reagent was added to 2 ml of each aqueous solution (test solution). The appearance of pale yellow/ white colour precipitate indicates the presence of alkaloids (Roopalatha et al 2012).

TESTS FOR TANNINS AND PHENOLIC COMPOUNDS :

Ferric Chloride Test: 2 ml of each aqueous solution (test solution), was mixed with a few drops of 5% $FeCl_3$. The appearance of deep blue/dark green precipitate indicates the presence of tannins and phenolic compounds. (Saklani et al 2012).

TESTS FOR TERPENOIDS AND STEROIDS:

Salkowski Test: 2 ml of each aqueous solution (test solution) is added to 1 ml of concentrated H_2SO_4. The appearance of red colour in lower layer indicates the presence of steroids and yellow colour in the lower layer indicates the presence of triterpenoids. (Joshi et al 2013).

TESTS FOR FLAVONOIDS :

Alkaline Test: A few drops of 5% NaOH solution and drops of dilute HCl were added to 2 ml of each aqueous solution (test solution). The appearance of an intense yellow colour with the addition of few drops of 5% NaOH solution and the disappearance of that colour with the addition of few drops of dil. HCl indicates the presence of flavonoids (Roopalatha et al 2012), (Vimalakumar et al 2014).

TESTS FOR CARDIAC GLYCOSIDES:

Legal Test: 2 ml of each aqueous solution (test solution) was added with 2 ml of pyridine and 1 ml of alkaline sodium nitroprusside solution. The appearance of pink to red colour in the solution indicates the presence of glycosides (Joshi et al 2013).

TESTS FOR SAPONINS:

Two different tests were performed (Foam test and olive oil test) to identify saponins.

Foam Test: 5 ml of each aqueous solution (test solution) was shaken vigorously until a stable persistent foam.

TESTS FOR CARBOHYDRATES:

To identify carbohydrates, Fehling test were performed

Fehling's Test: Fehling's A-1 ml and Fehling's B- 1 ml was heated for 1 minute. Heated Fehling's solution was added to 2 ml of each aqueous solution (test solution). Then this setup was heated for 2 minutes in a water bath. The appearance of brick red precipitate indicates the presence of carbohydrate. (Joshi et al 2013), (Saklani et al 2012).

TESTS FOR AMINO ACIDS :

Millon's test: 2 ml of each aqueous solution (test solution) and 1 ml of Millon's reagent was mixed. Then it was heated for 2 minutes. The appearance of white colour precipitate with the addition of 1ml of Millon's reagent and the colour turn to red with heating indicates the presence of amino acid (Yadaw et al 2011).

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RESULTS AND DISCUSSION:

The phytochemical analysis was done on aqueous extracts and solvent extracts of dried whole plant of *Eclipta alba* and the result is given in Table 1. Importance of various phytochemicals is given in Table 2.

Dried whole plants of *Eclipta alba* with four different solvents, aqueous(water), ethanol, Hexane and ethyl acetate revealed that the number of primary and secondary phytochemicals such as alkaloids, tannins & phenolic compounds, terepenoids and steroids, flavonoids, cardiac glycosides, saponins, carbohydrates, amino acids, antraquionone Glycosides present in different concentrations. *Eclipta alba* aqueous extract and other solvent extracts were not positive for the resins. According to table mentioned below, aqueous extract and different solvent extracts of dried whole plant of *Eclipta alba* contains alkaloids, tannins, phenolic compounds, terpenoids, steroids, flavonoids, cardiac glycosides, saponins, carbohydrates. Terpenoids, steroids, flavonoids and cardiac glycosides in aqueous extract were present in high concentrations in comparison to that of ethanol, hexane and ethyl acetate extracts. Tannin and phenolic compounds were present in high concentration in ethanolic and hexane extract in comparison to aqueous extract.

Table1:Phytochemical screening of aqueous and different solvent extracts of dried whole plant of Eclipta alba (L.).

Phytochemical	Tests	Aqueous extract	Ethanole xtract	Hexane extract	Ethylacetateextract
Alkaloids	Mayer'sTest	+	++	++	+
TanninsandPhenoliccompounds	$FeCl_3$Test	+	+++	+++	+
	GelatinTest	±	++	++	±
TerpenoidsandSteroids	SalkowskiTest	+++	+	+++	+
Flavonoids	AlkalineTest	+	+	+	+
CardiacGlycosides	LegalTest	+	++	+	++
Saponins	FoamTest	++	++	++	++
Carbohydrates	Fehling'sTest	++	++	++	++
AminoAcids	MillonsTest	++	–	++	–

Table 2:Importance of different phytochemicals present in *Eclipta alba (L.)*.

Phytochemicals	Importance	Reference
Alkaloids	Anti-malarial,Anti-cancer	Kittakoop et al 2014
Carbohydrates & protiens	Play a vital role in satisfying humanneedsforenergyandlifeprocesses	Novak et al 2000
Cardiac glycosides	Treatmentofcongestivecardiacfailureduetoitsdirectactionwhichincreasesthe force of myocardial contraction. Also,itactsdirectlyonthesmoothmuscles.	Paranjpe et al 2005
Flavanoids	Anti-oxidanteffect,Inhibittheinitiation,promotionandprogressionoftumours	Kim et al 1991
Phenolic compounds	Delayed aging, Decreased riskofchronicdiseasedevelopmentE.g.Cardiovascular diseases, Arteriosclerosis,Cancer, Diabetes, Cataract, Disordersofcognitivefunctionand Neurologicaldiseases.	Derong et al 2016
Steroids	Anti-inflammatory	Patel et al 2015
Tannins	Anti-viral,Anti-bacterial	Haslam et al 1996

CONCLUSION:

These phytochemicals having specific therapeutic effects to the human body. Therefore, due to presence of these phytochemicals *Eclipta alba* whole plant possess Anti-malarial, anti-cancer, anti-microbial, anti-fungal, anti-hyperglycemic, anti-inflammatory, anti-oxidant as well as cardiac protective action. Presence of this phytochemical compounds suggests that the whole plant of *Eclipta alba* is rich in primary and secondary metabolites which are directly responsible for its effecton different disorders.This study reveals that *Eclipta alba* should be considered as a useful source for herbal medicine. The difference in medicinal activities between organic extracts suggests that for the isolation and characterization of the active compounds in *Eclipta alba*, a comparative metabolic activity of whole plant would be needed.

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