



ISSN (E): 2320-3862
ISSN (P): 2394-0530
<https://www.plantsjournal.com>
JMPS 2023; 11(6): 26-28
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Received: 17-09-2023
Accepted: 23-10-2023

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Journal of Medicinal Plants Studies

www.PlantsJournal.com

Phytochemical study of some weeds of family Euphorbiaceae

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Abstract

Members of the Euphorbiaceae family were tested phytochemically for their solvent solubility. A qualitative analysis of secondary metabolites was performed to determine the presence of alkaloids, tannins, proteins, flavonoids, phenols, steroids, saponins, kinins, glycosides, carbohydrates and amino acids. The results showed that all species examined (e.g., *Euphorbia tirucalli*, *Chrozophora rotleri* and *Phyllanthus reticulatus*) responded negatively to steroids; this shows that these plants can be used as food and feed. From the results and data it appears that the presence of phenol indicates the benefits of this herb. The results also showed that members of the Euphorbiaceae family contain phytochemicals that are soluble in organic solvents.

Keywords: Phytochemical screening, euphorbiaceae members, solvent solubility

Introduction

Plants are the source of many medicines and have many medicinal properties for different groups. These chemicals are called phytochemicals. According to the World Health Organization (2002) [1], traditional medicine using plant extracts in developing countries continues to provide health care to more than 80% of the world's population. Extraction is the process of separating active compounds from tissues using solvents using standard techniques. We used four different solvents in this study; Distilled water, alcohol, chloroform and acetone to determine the solubility of solvents used in phytochemical analysis. For this we have selected common weed species viz. *Euphorbia tirucalli*, *Chrozophora rotleri* and *Phyllanthus reticulatus*. These plants were screened for its active chemical ingredients.

Euphorbia belongs to the Euphorbiaceae family and there are more than 8,000 species worldwide. *Euphorbia tirucalli* L. is one of them and is famous for its many uses such as treatment of asthma and cough, earache, rheumatism, cancer, epithelioma, sarcoma, as a folk remedy against skin cancer and syphilis (Betancur-Galvis *et al.*, 2002) [2]. Sugumar *et al.* (2010) [3] reported the presence of phytochemicals in Euphorbia root extract. However, in this article, leaves are used by phytochemicals. The phytochemical composition of the *Chrozophora rotleri*, another species of Euphorbiaceae, was studied by Narmadaa *et al.* (2012) [5]. Plant composition was also reported by Begum *et al.* (2006) [4]. Although all these plants have been studied, we also chose these plants to study the best solvents for the production of phytochemicals. In India, this plant grows as a weed and therefore provides a lot of biomass for research.

Material and Methods

Plant material

The fresh plant was collected from campus surrounding S.G.S. Govt. P.G. Collage, Sidhi. The fresh leaves of *Euphorbia tirucalli*, *Chrozophora rotleri* and *Phyllanthus reticulatus* were washed with water and cut into small pieces. These materials were subjected for extractions in different solvent.

Preparation of extracts

Fresh leaves were also subjected to Chloroform, alcohol, acetone and aqueous extraction. About 5 g of each studied euphorbiaceae member were immersed in different solvent and after hour that was kept for splitting entire cell on sonicator. The clear filtrate was obtained by filtering through a Buchner funnel. The filtrates were used for further studies.

Qualitative phytochemical analysis

Preliminary photochemical testing for the presence of various compounds by standard methods like Steroids (Gibbs, 1974) [6], Benedict's test for reducing sugar (Ramakrishnan *et al.*

1994) [7], Alkaloid tests by Wagner *et al.* (1996) [8], Tannins (Treare *et al.* 1985) [9], Saponins by Kumar *et al.* (2009) [10] and compounds like Phenols, Flavonoids, Glycosides by Khandelwal (2000) [11] were conducted.

Table 1: Assessment of solvent solubility by using phytochemical screen of some weeds

Test conducted	<i>Euphorbia tirucalli</i>				<i>Chrozophora rotterli</i>				<i>Phyllanthus reticulatus</i>				
	DW	Acetone	Alcohol	Chloroform	DW	Acetone	Alcohol	Chloroform	DW	Acetone	Alcohol	Chloroform	
Alkaloids	Mayer's test	-	+	+	+	-	-	+	+	+	+	-	+
	Wagner's test	-	-	-	-	-	+	+	-	+	+	+	+
Tannin by 1% lead acetata	-	+	-	+	-	+	+	+	+	+	+	+	+
Tannin by FeCl ₃ and KOH method	-	-	-	+	-	-	-	+	-	-	-	-	+
Protein	-	-	+	+	+	+	-	-	+	+	+	+	+
Flavonoid	-	+	+	+	+	-	-	-	-	-	-	-	-
Phenol	+	+	+	-	-	+	-	+	+	+	+	+	+
Steroid	-	-	-	-	-	-	-	-	-	-	-	-	-
Saponin	+	-	-	-	+	+	-	-	-	-	-	-	-
Quinine	-	+	+	+	-	+	+	+	-	+	+	+	+
Glycoside	-	+	-	-	+	-	-	-	-	+	-	-	-
Carbohydrate	Benedict's test	-	+	+	+	-	-	+	+	+	+	-	+
	Fehling's test	-	-	-	-	-	-	-	-	-	-	-	-
Amino acid													

Result and Discussion

Water is the only universal solvent used in extracting botanicals. Many doctors often use water for extraction, but most plant extracts in organic solvents have chemical properties similar to water extracts. The same results were obtained in the current experiment; This suggests that most phytochemicals are more soluble in organic solvents than in water. The results revealed the presence of Alkaloids, Carbohydrate, Glycosides, Tannins, Steroids, Flavonoids and Saponins (Table 1) in chloroform extract of studied Euphorbiaceae members *viz.* *Euphorbia tirucalli*, *Chrozophora rotterli* and *Phyllanthus reticulatus*. When compared all studied species for their extraction it is found that *Phyllanthus reticulatus* contains higher water-soluble bioactive compounds. Similar kind of results was observed in case of acetone and chloroform extraction of these plants. While in case of alcohol extraction, *Euphorbia tirucalli* shows maximum solubility of phytochemicals than other studied species. Same kind of study has been reported by Kharade *et al.*, (2013) [12] in Commelinaceae members and Tupe *et al.* (2013) [13] in Cucurbitaceae members.

It is evidence from the result that Tannin by FeCl₃ and KOH method shows same correlation that shows positive response for chloroform solvent for all studied species. In case of organic solvent flavonoid compound shows positive response for *Euphorbia tirucalli* species. While it is presented only in aqueous extract of *C. rotterli*. In *P. reticulatus* species flavonoids are totally gives negative response for all solvent. Chloroform and methanol extract of all studied species shows same percent positive response which is higher than that of other solvent studied. Many workers study on many groups of plants for screening of their secondary metabolites as medicinal plants (Thite *et al.* 2013) [14], Gymnosperm (Gurav *et al.* 2013) [15], Weeds (Chavan *et al.* 2013) [16] and Filicales (Patil *et al.* 2013) [17].

This study may be helpful to isolate and characterize the chemical constituents present in those plant extracts which would be helpful in discovering the actual value of folkloric medicines.

Conclusion

The fact that the examined members of the Euphorbiaceae family responded positively to the presence of secondary

metabolites suggests that these species can be used in on-demand medicine. From the results and data it appears that the presence of phenol indicates the benefits of this herb. According to the results, it can be concluded that most of the phytochemicals, which are members of the Euphorbiaceae family, can be dissolved in organic solvents. Chloroform and acetone are the best solvents for phytochemical analyzes and further research.

Acknowledgement

The authors express their sincere thanks to authority of S.G.S. Govt. P.G. College, Sidhi (M.P.) India for providing necessary faculties & cooperation during this research work.

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