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Phytochemical analysis of Chloroform, Ethyl Acetate, Ethyl Ether, Ethanol & Aqueous Extract of *Euphorbia hirta*

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Abstract

The manuscript deals with the phytochemical screening of Euphorbia hirta leaf chloroform, ethyl acetate, ethyl ether, ethanol & aqueous extracts. The phytochemical analysis shows the presence of carbohydrates, saponins, flavonoids, quinones, terpenoids & steroids in chloroform extract. The phytochemical analysis shows the presence of carbohydrates, tannins, saponins, flavonoids, quinones & steroids in ethyl acetate extract. The phytochemical analysis shows the presence of carbohydrates, saponins, flavonoids, glycosides, quinones & terpenoids in ethyl ether extract. The phytochemical analysis shows the presence of carbohydrates, saponins, quinones, phenols & terpenoids in ethanolic extract. The phytochemical analysis shows the presence of carbohydrates, tannins, saponins, alkaloids, flavonoids, glycosides, quinones, phenols, terpenoids & steroids in aqueous extract.

Keywords: Euphorbia hirta, Chloroform extract, Ethyl acetate extract, Ethyl ether extract, Ethanolic extract, Aqueous extract and Phytochemicals.

1 Introduction

Euphorbia hirta Linn. is commonly known as milkweed (Dudhy) and an asthma plant. It is known by the different names in different parts of the world [1] [2]. The plant is characterized by the presence of milky white latex, which is more or less toxic. Latices of E. ingens, E. tirucalli, E. mey, and E. triangularis are possible sources of rubber [3] . The plants of this family have been a subject of intense phytochemical examination such as flavonoids, triterpenoids, alkanes, amino acids and alkaloids [4] .Euphorbia hirta is frequently known as “Asthma plant” in English and “Dudhi” in Hindi. The plant is widely distributed throughout the globe, and in Asia, it is mainly found in Yemen, Oman, Palestine, Taiwan, Syria, Lebanon, India, Bhutan, Pakistan, Nepal, Myanmar, Thailand, Sri Lanka, Indonesia, Malaysia, Papua New Guinea and the Philippines [5]. The plant Euphorbia hirta has long served humanity in the form of traditional and folk medicine. In addition to Euphorbia hirta, other species of the genus Euphorbia also show medicinal importance and are being used in traditional medicine. A milky juice comes out of all the species of Euphorbia upon breaking, and this juice is considered to be more/less toxic and hence was used on arrows for hunting purposes in old times [6]. Stem sap of E. hirta is used to cure eyelid styes caused by bacterial infection, and leaves are used against boils and swellings by making their poultice. The plant as a whole is used by humans against different diseases, such as fresh herb decoction in the treatment of thrush by gargling, dry decoction to cure skin disorders and decoction of roots, which is implemented in snake bites and for milk production in nursing mothers [7].

E. hirta has a very high medicinal value. Ethnopharmacologically, E. hirta is used to cure respiratory and bronchial disorders (hay fever, bronchitis and asthma), conjunctivitis and gastrointestinal diseases

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such as intestinal parasitosis, dysentery and diarrhea. Furthermore, E. hirta shows significant tonic and hypotensive properties [8].The plant bears a wide variety of phytochemicals, including reducing sugars, alkaloids, terpenoids, flavonoids, tannins, steroids, fats, proteins, gums, oils, mucilage, saponins, glycosides, cardiac glycosides, coumarins, anthraquinones and phenolic compounds [9]. It is also noteworthy that E. hirta is used as antidiabetic, anti-inflammatory, antispasmodic and as anticancer curative agent [10]. Treatments with medicinal plants and herbs are mostly symptoms and sign based. Herbal medicines with potential efficacy against specified targets against viruses could be evaluated for their activity against SARS-CoV-2, reliant on signs and symptoms [11] [12].

2. Experimental methods

2.1. Collection of plant material

The leaves Euphorbia hirta, I were freshly collected from well matured plant from Aadhiur, a village in Tirupattur District, Tamil Nadu. The leaves are washed with water and dried carefully in the absence of sunlight to remove the water molecule present in the leaves. The dried leaves are made into fine powder using blender. Then the fine powders are stored properly in an airtight container for future purpose.

Fig. 1 Euphorbia hirta plant leaves

2.1.1 Taxonamical classification

Kingdom : Plantae, Plant

Superdivision : Asthma Weed

Division: Tracheophyta

Class : Magnoliosida

Subclass : Rosidae

Order : Malpighiales

Family : Euphorbiaceae (Spurge family)

Genus : Euphorbia

2.2 Extraction of sample

About 5gm of the fine powder of the leaf of Euphorbia hirta are taken in a thimble which is placed in an overnight extractor for the purpose of extraction of phytochemicals present in the leaf. The extraction is carried out using Chloroform, Ethyl acetate, Ethyl ether, Ethanol & Aqueous. The extracts obtained are collected separately and the solvents are evaporated using vacuum distillation and dried. The dried samples are stored in an airtight container for further analysis. [13].

2.3 Qualitative Phytochemical Screening

The qualitative tests were carried out in leaf of Euphorbia hirta by adopting standard procedure [14] [15]. The Chloroform, Ethyl acetate, Ethyl ether, Ethanol & Aqueous extracts were screened for the presence of phytochemicals.

1. Test for alkaloids

Mayer's test: small portion of solvent free extract was stirred with few drops of diluted HCl and filtered. The filtrate was then tested for following colour test. (a) 1.36 gm of mercuric chloride was dissolved in 60 ml distilled water. (b) 5gms of potassium iodide was dissolved in 20 ml of distilled water (a) and (b) was mixed and the volume adjusted to 100ml with distilled water. Appearance of

cream colour precipitate with Mayer's reagents showed the presence of alkaloids.

2. Test for flavonoids

Shinoda's test: 5 ml of 20% sodium hydroxide was added to equal volume of the extract. A yellow solution indicates the presence of flavonoids.

3.Test for steroids

Liebermann Buchard test: A small amount of sample is treated with 2ml of acetic an-hydride followed by the addition of 3ml of H2SO4 Solution. Color changes from violet to

green or blue indicates the presence of steroids.

4.Test for terpenoids

Salkowski Test: To 1ml of extract add 0.5ml of chloroform followed by a few drops of concentrated sulphuric acid, formation of reddish-brown precipitate indicates the presence of terpenoids.

5.Test for Saponins

Froth test: 5ml of extract is diluted with 20ml of distilled water and agitated for 10 minutes. Foam is formed which indicates the presence of saponins.

6.Test for Carbohydrates

Fehling test: Two milliliters of each plant extract were hydrolyzed with dilute HCl, neutralized with alkali, and then heated with Fehling's solution A and B. The formation of a red precipitate was an indication for the presence of a reducing sugar.

7.Test for tannins and phenolic compounds

Lead Acetate test: 10% lead acetate solution, 0.5g of the extract was added and shaken to dissolved. A white precipitate observed indicate the presence of tannins and phenolic compounds.

8.Test for glycosides:

Keller-Killani test: To 2ml of extract, glacial acid, one drop 5% ferric chloride and concentrated sulphuric acid were added. Appearance of reddish-brown color at the junction of the two liquid layers indicates the presence of glycosides.

9.Test for Quinones

Sulfuric acid test: One drop of concentrated sulfuric acid was added to 5 ml of each extract dissolved in isopropyl alcohol. Formation of red color indicates the presence of quinones.

10.Test for Phenols

The sample solution is treated with few drops of 10% ferric chloride. Formation of blue or green colour indicates the presence of phenols.

11.Test for saponins

To 2ml of distilled water was added with the sample solution and shakes well. Formation of foams indicates the presence of saponins.

3. Result and Discussion

3.1. Phytochemical analysis of Euphorbia hirta

The analysis of preliminary phytochemical screening using Chloroform extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins,

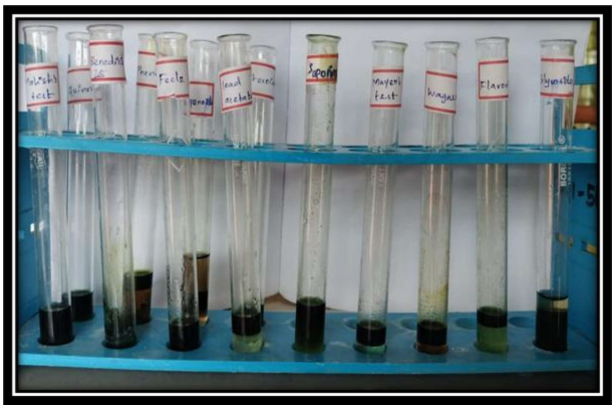

Figure 2. Photochemical analysis of Chlorofrom extract of Euphorbia hirta leaf

Flavonoids, Quinones, Terpenoids, Steroids. The analysis of preliminary phytochemical screening using chloroform extract of Euphorbia hirta leaf concludes that absence of Tannins, Alkaloids, Glycosides & Phenols.

The analysis of preliminary phytochemical screening using Ethyl acetate extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Tannins, Saponins, Flavonoids, Quinones & Steroids. The analysis of preliminary phytochemical screening using ethyl acetate extract of Euphorbia hirta leaf concludes that absence of Alkaloids, Glycosides, Terpenoids & Phenols.

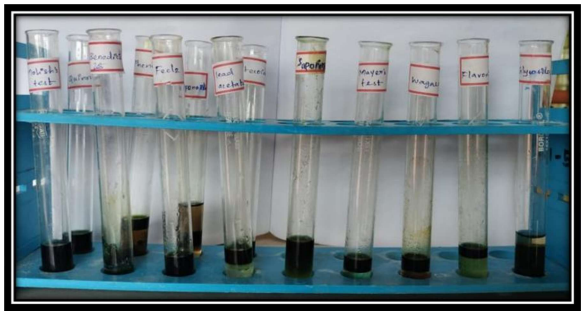

Figure 3. Photochemical analysis of Ethyl acetate extract of Euphorbia hirta leaf

The analysis of preliminary phytochemical screening using Ethyl ether extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins, Flavonoids, Glycosides, Quinones & Terpenoids. The analysis of preliminary phytochemical screening using ethyl ether extract of Euphorbia hirta leaf concludes that are absence of Tannins, Alkaloids, Phenols & Steroids

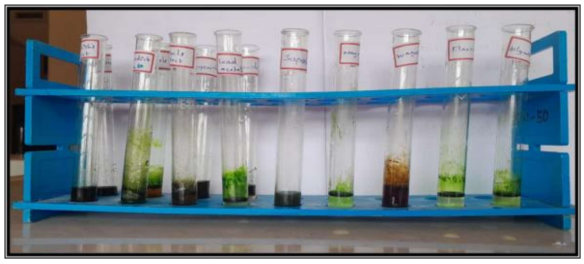

Figure 4. Phytochemical analysis of Ethyl ether extract of Euphorbia hirta leaf

The analysis of preliminary phytochemical screening using Ethanolic extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins, Quinones, Phenols & Terpenoids. The analysis of preliminary phytochemical screening using ethanolic extract of Euphorbia hirta leaf concludes that absence of Tannins, Alkaloids, Flavonoids, Glycosides & Steroids.

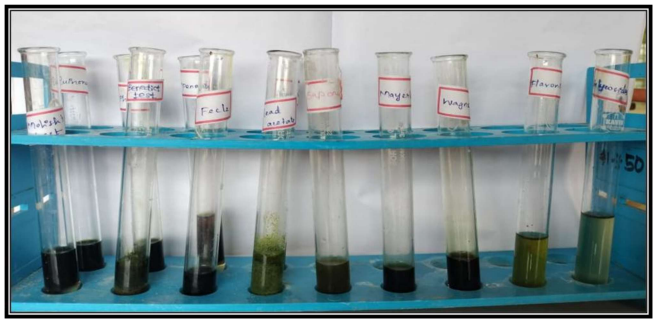

Figure 5. Phytochemical analysis of Ethanolic extract of Euphorbia hirta leaf

The analysis of preliminary phytochemical screening using Aqueous extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Tannins, Saponins, Alkaloids, Flavonoids, Glycosides, Quinones, Phenols, Terpenoids & Steroids.

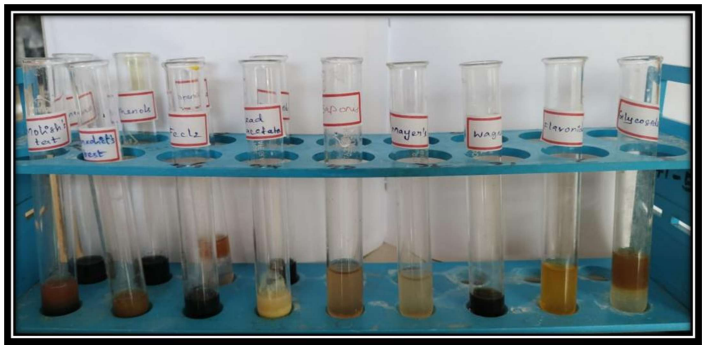

Figure 6. Phytochemical analysis of aqueous extract of Euphorbia hirta of leaf

Table 1. Phytochemical analysis of Chloroform, Ethylacetate, Ethyl ether, Ethanol & Aqueous extract of Euphorbia hirta leaf

S.NO.	PHYTOCHEMICAL COMPOUNDS	*Euphorbia hirta* leaf Chlorofrom extract	*Euphorbia hirta* leaf Ethyl acetate extract	*Euphorbia hirta* leaf Ethyl ether extract	*Euphorbia hirta* leaf Ethanol extract	*Euphorbia hirta* leaf Aqueous extract
1	Carbohydrate	+	+	+	+	+
2	Tannins	-	+	-	-	+
3	Saponins	+	+	+	+	+
4	Alkaloids	-	-	-	-	+
5	Flavonoids	+	+	+	-	+
6	Glycosides	_	-	+	-	+
7	Quinones	+	+	+	+	+
8	Phenols	-	-	-	+	+
9	Terpenoids	+	-	+	+	+
10	Steroids	+	+	-	-	+

Symbol (+) indicates positive and (-) indicates negative

4. Conclusion

The analysis of preliminary phytochemical screening using chloroform extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins, Flavonoids, Quinones, Terpenoids, Steroids. Ethyl acetate extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Tannins, Saponins, Flavonoids, Quinones & Steroids. The analysis of preliminary phytochemical screening using ethyl ether extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins, Flavonoids, Glycosides, Quinones & Terpenoids. Ethanolic extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Saponins, Quinones, Phenols & Terpenoids. The analysis of preliminary phytochemical screening using aqueous extract of Euphorbia hirta leaf concludes that presence of Carbohydrates, Tannins, Saponins, Alkaloids, Flavonoids, Glycosides, Quinones, Phenols, Terpenoids & Steroids. There are many other traditional uses of E. hirta in Ayurveda which serves as the basis for further studies.

Conflict of Interest: Nil

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