Preliminary phytochemical investigation of extract of leaves and stem of *Euphorbia hirta*

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Abstract

The leaves and stem ethanolic extracts of *Euphorbia hirta* were examined for the preliminary evaluation of phytochemical screening, antibacterial and antioxidant activates. The observed antibacterial activities were believed to due to the presence of tannins were identified in the extract. The result is of significance in the health care delivery system and apparently justifies the use of the plant in the treatment of sores, boils. Preliminary evaluation of *Euphorbia hirta* leaves a and stem indicate the presence of protein, steroids, tannins, glycosides, Carbohydrates, Saponins. Leaves and stem of *Euphorbia hirta* used in traditional medicine for the treatment of asthma, wounds and control of diarrhoea and dysentery. It was concluded that infected wound would benefit from treatment with ethanolic extract of *Euphorbia hirta* and its use in surgical site preparation is thus recommended and  leaves of *Euphorbia hirta* village people’s uses as a traditional medicine. *Euphorbia hirta* it’s showing very good antioxidant activity. These results suggest that *Euphorbia hirta* have strong antioxidant potential. Further study is necessary for isolation and characterization of the active antioxidant agents, which can be used to treat various oxidative stress-related diseases.

Keywords: *Euphorbia hirta*; ethanolic extract; canine wounds; asthma; medicinal properties

Introduction

*Euphorbia hirta* from the family of Euphorbiaceae. It is a small annual herb common to tropical plants (Soforowa, 1982). It can grow to a height of 35 cm. The stem is slender and often reddish in color, covered with yellowish bristly hairs especially in the younger parts. The leaves are oppositely arranged, lanceolate and are usually greenish or reddish underneath measuring about 6 cm long. The axils appear very small dense round clusters of flowers. The small green flowers constitute the inflorescence characteristic of the euphobias. The stem and leaves produce white or milky juice when cut. In South India village peoples extracts of the plant are used in treatment of asthma and respiratory tract inflammations. It is also used for coughs, chronic bronchitis and other pulmonary disorders. The plant is also widely used in Angola against diarrhea and dysentery, especially amoebic dysentery. In the extracts of the plant are used as ear drops and in the treatment of boils, sore and promoting wound healing. Personal communications with some traditional medical practitioners revealed that the plant is very popular amongst village peoples, thus there is used to determine it’s antibacterial potentials.

Asthma medications are mostly taken with an inhaler which allows the medicine to reach the lungs effectively. The cornerstone of modern asthma therapy is the regular use of inhaled corticosteroids (ICS) (Angus, 2002). Many plants have been alleged to have curative properties for asthma. Among these plants is *Euphorbia hirta* (Sonibare and Gbile, 2008). The plant *E. hirta* is commonly called asthma plant because of its alleged efficacy in south india village in the treatment of asthma and various respiratory ailments. The plant is used as a diuretic, febrifuge, galactagogue, purgative and vermifuge. It is reported as medication for intestinal amoebic dysentery. Traditionally, the plant is squeezed in water and the extract taken orally as a remedy for asthma. The phytochemicals in *E. hirta* include volatile oil, alkaloids, tannins, saponins and steroids (Hashemi et al., 2008).

Materials and methods

Collection of samples

The leaf and stem samples of *Euphorbia hirta* collected at periodic field surveys for ethnobotanical exploration were undertaken during July 2011 to December 2011 in Rasipuram region of Namakkal District. During the
surveys personal interviewed were conducted with the village peoples, the herbal medicine practioners, village dwellers and other traditional healers. *Euphorbia hirta* plant material was assigned field book number and documented as to family, botanical name, local name (Tamil), part used and Medicinal uses. Plant species collected were identified with the help of flora books.

**Sample preparation and extraction procedure**

The fresh leaves and stem were air dried for about one week and grind into fine powder using a mechanical grinder. 50 g of the fine powder was weighed into 500 ml of ethanol (95%) in a conical flask. This was covered, shaken every 30 min. for 6 hrs. and then allowed to stand for about 48 hrs. The solution was subsequently shaken and filtered using Whatman filter paper. The filtrate was evaporated to dryness using a rotary evaporator (Model type 349/2, Corning Ltd.). A yield of 8.5% was obtained. It was stored in refrigerator in amber colored bottle to avoid degradation.

**Phytochemical Screening**

Phytochemical screenings were performed using standard procedure (Sofowora, 1931; Trease and Evans, 1989).

**Test for Tannins**

0.5 g of the extract was taken in a boiling tube and boiled with 20 ml of distilled water and the filterer added few drops of 0.1% ferric chloride was added mixed well and allowed to stand few seconds. Observed for brownish green or a blure-black color.

**Tests for glycosides-keller-killiani test**

0.5 ml of alcoholic extracts was taken and subjected to the following test, 1 ml of glacial acetic acid containing traces of ferric chloride and 1 ml of con. Sulphuric acid was added to extract and observed for the formation of reddish brown color at the junction of two layers and the upper layer turned bluish green in the presence of glycosides.

**Tests for saponins**

To 0.5 g of extracts was added to 5 ml of distilled water in a test tube. The solution was shaken vigorously and observed for a stable persistent froth. The frothing was mixed with three drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

**Tests for carbohydrates-molisch test**

Small portion of ethanalic extracts was dissolved in 5 ml of distilled water and filtered. To this solution three drops of alpha-naphthol was added and 1 ml of con. Sulphuric acid was added along the sides of inclined test tube so as to form two layers and observed for formation of violet coloured ring at the interface to detect the presence of carbohydrates.

**Tests for reducing sugar-felings reagent**

Few drops of felings solution A and B in equal volume were added in dilute extracts and heated for 30 min and observed for the formation fo brick red colored precipitate.

**Tests for acidic compounds**

To the alcoholic extract sodium bicarbonate solution was added and observed for the production of effervescences.

**Test for cardiac glycosides (Keller Killiani’s).**

100 mg of extract was dissolved in 1 ml of glacial acetic acid containing 1 drop of ferric chloride solution. This was then underlayer with 1 ml of concentration of sulphuric acid. A brown ring obtained at the interface indicated the presence of ade-oxy sugar characteristics of cardenolides.

**Tests for steroids**

2 ml of acetic anhydride was was added to 0.5 g of extract and 2 ml of sulphuric acid was added by the sides of the test tube and observed the colour change from violet or blue-green.

**Tests for proteins-Xanthoprotein test**

To 1 ml of extract few drops of nitric acid was added by the sides of the test tube and observed for formation of yellow color.

**Tests for antioxidant activity**

**DPPH radical scavenging activity method**

The free radical scavenging activity of the extract, based on the scavenging activity of the stable 1, 1-diphenyl-2-picyrylhydrazyl (DPPH) free radical, was determined by the method described by Braca etal. (2001). Plant extract (0.1 ml) was added to 3ml of a 0.004% methanol solution of DPPH. Absorbance at 517nm was determined after 30 min, and the percentage inhibition activity was calculated from [(A0–A1)/A0] x100, where A0 is the absorbance of the control, and A1 is the absorbance of the extract.

**Results and discussion**

The phytochemical active compounds of *Euphorbia hirta* leaf and stem were qualitatively analyzed and the results are presented in Table 1 and 2. that is indicate that the ethanalic extraction of *Euphorbia hirta* leaf showed the presence of phytochemical active compounds such as Tannins, Glycosides, Saponnins, Carbohydrates, Reducing sugar, Cardiac glycosides,
Steroids, Proteins. But acidic compounds were absent.

Table 1. Identity, purity and strength of *Euphorbia hirta* ethanolic extract

<table>
<thead>
<tr>
<th>Ethanolic extract test Parameters</th>
<th>Test results</th>
</tr>
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<tbody>
<tr>
<td>Foreign matter</td>
<td>0.02 %</td>
</tr>
<tr>
<td>Total Ash</td>
<td>2.0 %</td>
</tr>
<tr>
<td>Acid-Insoluble ash</td>
<td>2.5%</td>
</tr>
<tr>
<td>Alcohol-soluble extractive</td>
<td>5.0 %</td>
</tr>
<tr>
<td>Water-soluble extractive</td>
<td>15.0 %</td>
</tr>
</tbody>
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Table 2. Qualitative analysis of Phytochemical Components

<table>
<thead>
<tr>
<th>Qualitative analysis of Phytochemical Components parameters</th>
<th>Ethanolic extraction</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Leaf extraction</td>
</tr>
<tr>
<td></td>
<td>Stem extraction</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>+</td>
</tr>
<tr>
<td>Reducing sugar</td>
<td>+</td>
</tr>
<tr>
<td>Acidic compounds</td>
<td>-</td>
</tr>
<tr>
<td>Cardiac glycosides</td>
<td>+</td>
</tr>
<tr>
<td>Steroids</td>
<td>+</td>
</tr>
<tr>
<td>Proteins</td>
<td>+</td>
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</table>

In the same way ethanolic extraction of *Euphorbia hirta* stem showed the presence of phytochemical active compounds such as Tannins, Glycosides, Saponins, Carbohydrates, Reducing sugar, Cardiac glycosides, Steroids, Proteins. But acidic compounds were absent. In DPPH radical scavenging assay, the extract of leaf and stem showed dose dependent scavenging of DPPH radical as was with the reference ascorbic acid; the IC50 value of the extract of leaf and stem was 33.54 μg/ml, 30.21 μg/ml while the IC50 value for the reference ascorbic acid was 12.46 μg/ml.

Conclusions

The results of the present study led us to the inference that the plant extract possess modest medicinal and antioxidant properties. Since the extract is reported to contain a range of phytochemical components, it is difficult to ascribe these observed activities to any specific group of compounds. Hence, further studies are suggested to be undertaken to pin point the exact compound(s) and to better understand the mechanism of such actions of *X*. These results suggest that *Euphorbia hirta* have strong antioxidant potential. Further study is necessary for isolation and characterization of the active antioxidant agents, which can be used to treat various oxidative stress-related diseases.

References


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