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Pharmacognostical, Phytochemical and Ethnobotanical Based Pharmacological Evaluation of Some Indian Medicinal Plants

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Abstract

Medicinal plants are used as medicine for the treatment and management of various diseases from ancient time in all over the world. Medicinal plants are used as fresh, in the form of dried crude powder or in the form of extract. These medicinal plants are rich with multiple phytoconstituents but only rich with few as major phytoconstituents. Mostly by considering the major phytoconstituents adhere to the plants, they are used as medicinal against for the management and treatment of various physiological disorders. Commercially so many synthetic pharmaceutical formulations are available for the treatment of various physiological disorders, but in addition to their therapeutic potential, they have many harmful side effects as compare to the plant originated drug, which have no or less side effect.

Keywords: Phytoconstituents, Physiological, Crude, Formulations, Therapeutic

1. Introduction

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one of the oldest traditional systems of medicines, is based on utilities of medicinal plants. The spine of Ayurveda and other traditional system of medicines is medicinal plants. Human society depends on pants and plants product for their sustainable development and maintenance of good health. Medicial plants are used by humans for both the treatment and prevention of various diseases from ancient time just because they contain medicinal property. The medicinal plants or its specific parts that contain various phytoconstituents are helpful in the treatment as well as management of various chronic diseases (1). The use of medicinal plants as therapy is increasing day by day that leads to exploration of traditional system of medicine in worldwide. The medicinal plant extracts are rich with minerals, primary metabolites and secondary metabolites, which are effective against various diseases. It is surveyed that 80% of the population in the developing countries in continent like Africa, Asia and Latin America are dependent on medication recommended in traditional system of medicine. India has big biodiversity that rich with medicinal plants and near about 2500 medicinal plants of Indian origin are recommended in traditional treatment for various diseases (2). Both herbal and modern pharmaceutical companies are designing various pharmaceutical formulations for various diseases using these medicinal plants. Near about 25000 of pharmaceutical formulations are available in India, which are made from medicinal plants and their derivatives (3). Alternanthera ficoidea (AF) belongs to family Amranthacae has synonym (Alternanthera tenalla colla, Josephs Coat, Parrot Leaf, Calico Plant Party time). The plants and its parts are used as medicine traditionally by the local people of Asian, African and Latin Americana continent (4). The aerial parts as whole of

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the plant traditionally used as diuretic, the leaves extract was used traditionally for anti-pyretic, urinary tract infection. family Asparagaceae. It is used in flower arrangement and individual florets give fragrance to bouquets and boutonnieres (5). Although tuberose spikes have a high economic value and is exported to Arabian countries. They are highly perishable in nature and need to be treated to improve their vase life and postharvest quality. Ethanol and methanol increase the vase life of flowers by inhibiting ethylene biosynthesis and act, also, as an antimicrobial compound to prolong vase life of some cut flowers (6-8).

2. Materials and Methods

Phytochemical screening

Qualitative phytochemical screening of AF and PO extract:

This study was made to identify various phytochemicals or secondary metabolites present in the crude extract of above plant materials and its respective fractionated extract. In this study various chemical test like Mayer's test, Dragendorff's test, Biuret test, Salkowski test and Liberman test were performed to identify the specific class of phytomolecules present in the extract. The study is represented in tabular form, in which positive sign indicate presence of the phytomolecules and negative sign represent the absence of respective phytomolecules on the basis of literature available in pharmacognosy books and journals (9-12).

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Test for Alkaloids

(a) Dragendorff's test:

In this study, the crude hydroalcoholic extract of AF and LO and its each fraction was treated with Dragendorff's reagent (Potassium Bismuth Iodide). It showed that an orange colour precipitate was developed in ethyl acetate fraction of AF and hydroalcoholic extract of LO, it indicated that the presence of alkaloid in these extracts.

(b) Mayer's test:

In this study, the crude hydroalcoholic extract of AF and LO and its each fraction was treated with Mayer's reagent (solution of mercuric chloride and potassium iodide). It showed a pale yellow ppt was developed in ethyl acetate fraction of AF and hydroalcoholic extract of LO, it indicated the presence of alkaloids in these extracts.

Test for Carbohydrates

(a)Benedict's test:

The hydroalcoholic extract of AF and LO and its each fraction was was treated with Benedict's solution and boiled for few minutes, it showed green color ppt was developed in hydroalcoholic extract of AF, its butanolic & aqueous fraction, hydroalcoholic extract of LO, its ethyl acetate, butanolic and aqueous fraction. It indicated the presence of reducing sugars in theses extract.

(c) Fehling test:

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The hydroalcoholic extract of AF and LO and its each fraction was treated with mixture of equal parts of Fehling solution (A+B), boiled for few minutes and a brick red ppt was developed in hydroalcoholic extract of AF, its butanolic & aqueous fraction, it indicated the presence of carbohydrate in these extract.

Test for Proteins:

(a) Biuret s test:

The hydroalcoholic extract of AF and LO and its each fraction was treated with few drops of 10 % w/v NaOH solution followed by 2 drops of 3% w/v copper sulphate solution. A violet colour was developed in hydroalcoholic extract of LO and butanolic fraction of AF, it indicated the presence of proteins in this extract.

(b) Millions test:

The hydroalcoholic extract of AF and LO and its each fraction was dissolved in distilled water followed by 5- 6 drops of Millions reagent and a white ppt was formed in butanolic fraction of AF, which turn red on heating. It confirmed the presence of protein butanolic fraction extract of AF.

TLC Studies of drugs Althenthera and Polianthesis

The TLC study of the hydro-alcoholic extract of AF and its successive fractioned extracts were tried with various solvent systems and best solvent system were selected to separate the

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phytoconstituents with define Rf value. The hydro-alcoholic extract and its fractionated petroleum ether, chloroform, ethyl acetate and butanolic extract of AF were screened in describing solvent system as Hexane: Chloroform: Ethanol (6:3.5:0.5) for hydro-alcoholic extract, Hexane: Chloroform: Ethyl Acetate (7:2:1) for fractionated petroleum ether extract, Hexane: Ethyl Acetate (3:1) for fractionated chloroform extract, Hexane: Chloroform: Ethanol: Acetic acid (5:3:2:0.1) for fractionated ethyl acetate extract and Chloroform: Methanol (9:1) for fractionated butanolic extract. The chromatograms and Rf value of the phytochemicals were represented

***In-Vitro* Antioxidant Study by DPPH Method**

DPPH free radical scavenging assay were used for determining antioxidant activity of HAF/HLO as mentioned by Nithianitham et al and Zuraini et al with some modifications. 10mg/mL stock solution of HAF/HLO was prepared. Different dilution of HAF /HLO (20 µLto 100 µL) was taken and was diluted up to 1 mL with methanol. Then 1mL of each dilution was added with 2 mL of 0.004% (w/v) DPPH solution. This mixture was vortexed, kept inside the incubator for 30 minutes in dark, and spectrophotometric absorbance was measured at 517 nm. 80% (v/v) methanol was used as blank solution. Ascorbic acid was used as the standard compound for comparative study. All measurements were done in triplicate. Following formula was used to calculate DPPH free radical scavenging activity:

Scavenging activity (%) =

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Here, control =0.004 % (w/v) DPPH solution; sample = HAF/HLO

3. Result and Discussion

Phytoconstituent	*Altenthera ficoidea*	*Polianthes tuberosa*
Alkaloid	+	+
Carbohydrate	–	+
Protein	–	–

TLC study

The TLC study of the hydro-alcoholic extract of AF and its successive fractioned extracts were tried with various solvent systems and best solvent system selected to separate the phytoconstituents and define Rf value were determined. The solvent system used for hydro-alcoholic extract and its fractionated extracts of AF and PT were as Hexane: Chloroform: Ethanol (6:3.5:0.5) for hydro-alcoholic extract, Hexane: Chloroform: Ethyl Acetate (7:2:1) for fractionated petroleum ether extract, Hexane: Ethyl Acetate (3:1) for fractionated chloroform extract, Hexane: Chloroform: Ethanol: Acetic acid (5:3:2:0.1) for fractionated ethyl acetate

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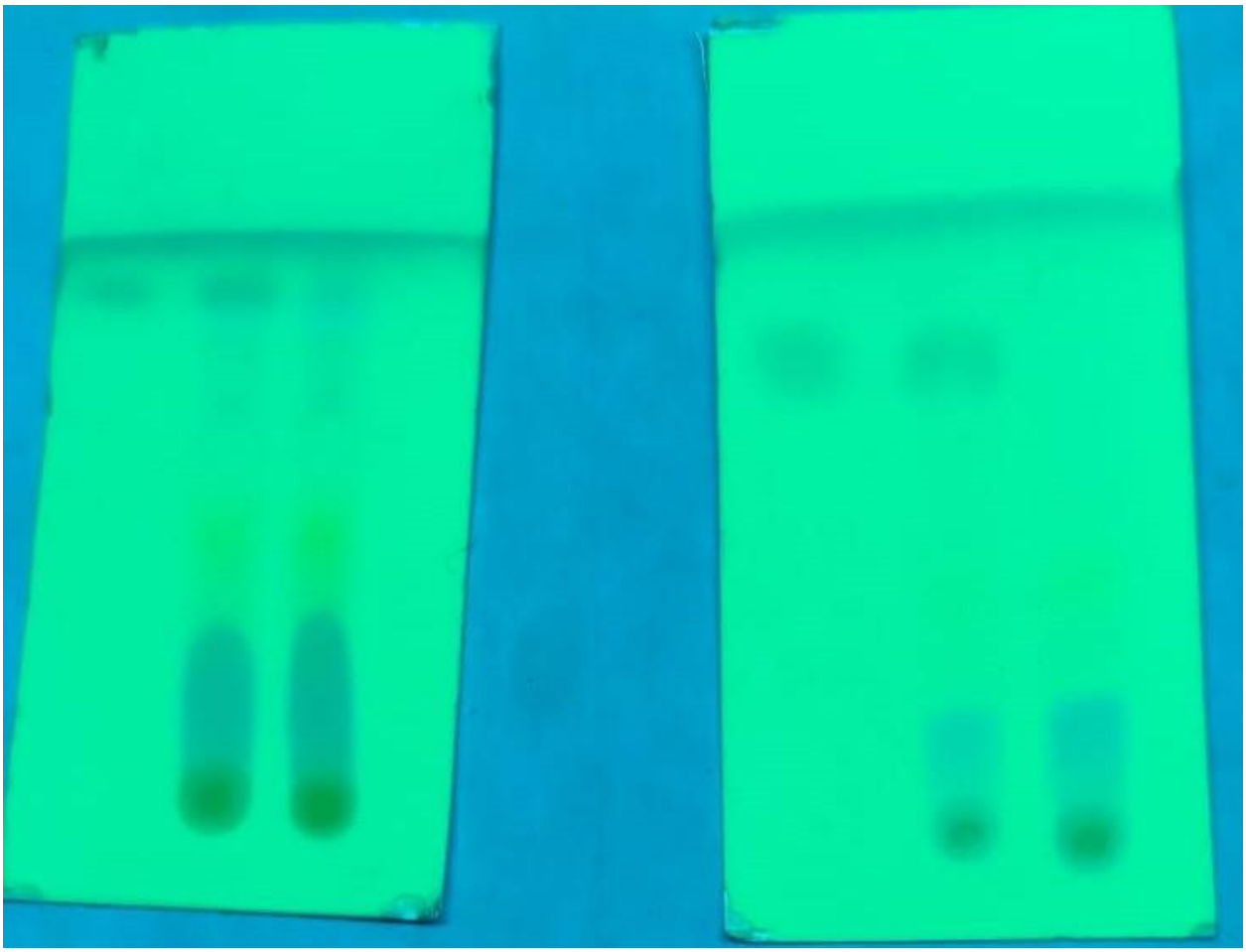
extract and Chloroform: Methanol (8:2) for fractionated butanolic extract. The chromatograms and Rf value of the both extract is given in the attached figure 1.

Fig 1. TLC study of the hydroalcoholic extract of the *Alternanthera ficoidea* and *Polianthes tuberosa*



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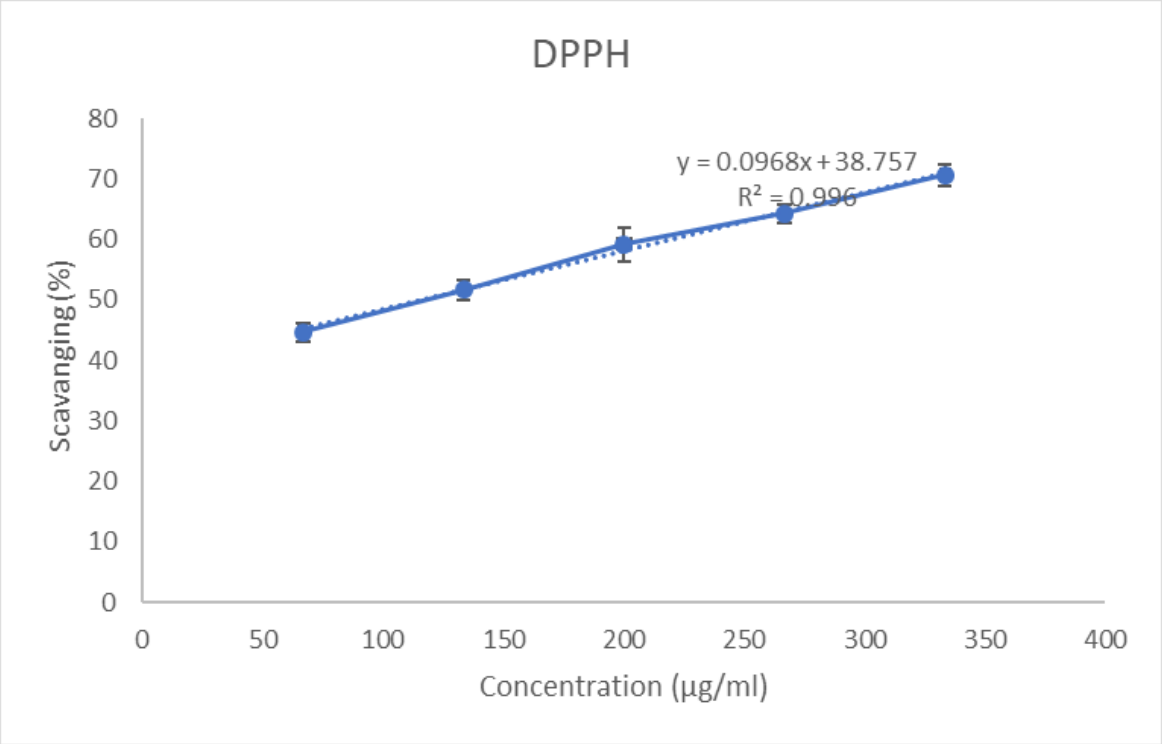
The observed values of HAF's scavenging activity at different concentrations were depicted as the plotted graph. IC50value of HAF and ascorbic acid were calculated as 115.14 µg/mL and 29.86 µg/mL respectively.

Fig 2. Representation of Graphical DPPH activity of *Alternanthera ficoidea* and *Polianthes tuberosa*



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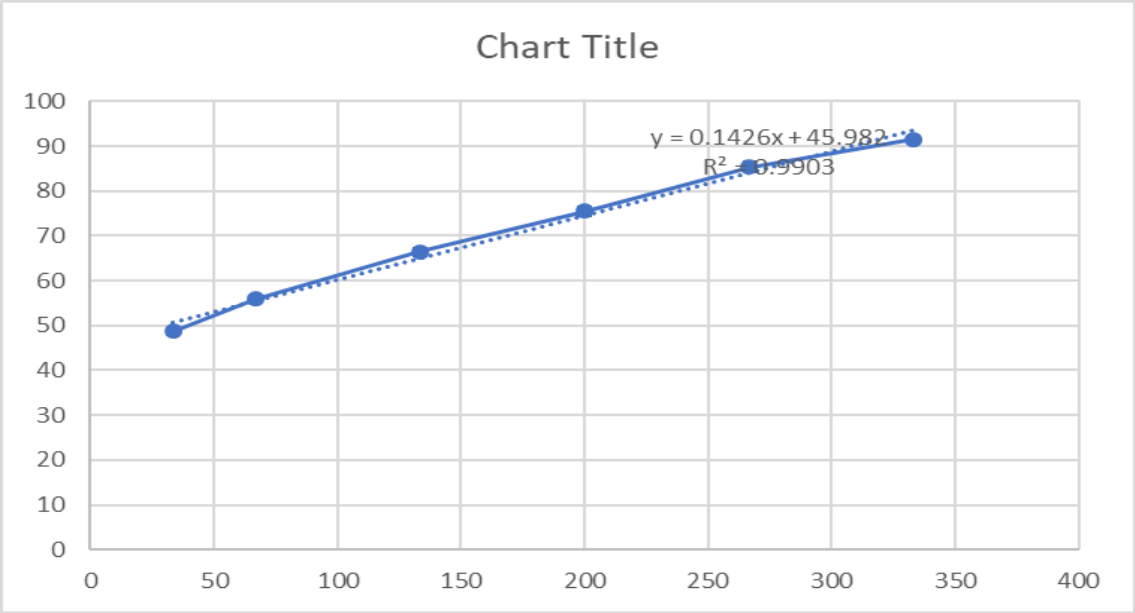

4. Conclusion

phytochemical standardization of a crude extract is essential to predict the biological activity of the plant material. This study confirmed that the extract contains major bioactive components like steroids, tannins, phenols and flavonoids. The quantitative estimation of these phytochemicals was made to know the therapeutic potential of the crude extract and its fractionated extracts**.** Taken hydroalcoholic extract of AF and PO, the current findings suggest that both dose therapies could be a competent, economical medicinal agent for the treatment and management of comorbid depression along with hyperglycemia in future. Further, this study showed that both the extract of AF and PO exhibited protection against disease.

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