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Pharmacognostical Evaluation of Indian Medicinal Plant *Altenthera Ficoidea* and *Polianthes Tuberosa* for Anti-Diabetic Activity.

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Abstract

In the given article we had done the *in-vitro* anti-diabetics analysis of the plant *Alternanthera ficoidea* and *Polianthes tuberosa* with their phytochemical analysis we had first of all collected the plant and washed it properly with water then after we had washed several times with different solvent after that we had taken its ash value and foreign mater then after we had investigated it**.** Throughout the whole study we find the result more satisfying and it is also suggestive for further investigation.

Keywords: Anti-diabetics, *Polianthes tuberosa, Alternanthera ficoidea, In-vitro,* Phytochemical.

1. Introduction

The Ayurveda, 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. Medicinal 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 [1-3]. 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

2. Material and Methods

Powder microscopy study:

The powder microscopy study was performed by taking 2-gm dried powder of whole plant of AF and treated with chloral hydrate solution, followed by washed with distilled water. The treated plant powder drug of both plants were stained in a slide and mounted with glycerin. The photographs of powder microscopic study were taken to find microscopical components present in the plant drug by Dewinter Binocular electronic digital microscope [4-6].

Physicochemical studies

In this study physicochemical parameters were evaluated as per the guidelines recommended by WHO and illustrations made in previous research papers. The whole plant materials of both plants AF were dried at room temperature, under shade for two weeks. The dried plant material of both plants were made to reduced size and

converted into course powder by grinder. Physicochemical parameters like various ash values, loss on drying, swelling index, foaming index, extractive values and fiber content were carried out on powdered plant material of AF and PT to standardized the raw material. This study will be useful for authentication of raw material [7-8].

Ash value

(a) **Total ash:**

It is the value obtained for a crude drug after igniting the raw materials. 2 gm powder drug of the plant material of AF were placed in furnace with a silica crucible and incinerated at temperature near about 450 °C until it become free from carbon. Before placing the raw material, the crucible was ignited and tarred for accurate measurement. The ignited materials were cool down in a desiccator and weighted in an electronic balance to get % of total ash content (in w/w) with respect to the total raw material of individual plant.

(b) **Acid insoluble ash:**

In this study, the half quantity of the total ash of the raw material of both plant AF were boiled with 25 ml HCl (2N) for 5 minutes, that covered with watch glass and insoluble inorganic material was collected by an ash less filter paper by filtration technique. Then hot water was used to wash the material, to make the residue neutral and the residue was ignited at 450 °C in a furnace after placing the ash less filter paper in a tarred crucible. Finally, the inorganic remains after cooling were measured for both plant measured to determine the percentage of acid insoluble ash[9-10].

%Acid insoluble ash value = weight of insoluble ash X 100/weight of crude drug

(c) **Water soluble ash:**

The rest half of the total ash of the crude powder drug was dissolved in distilled water (25 ml) by gentle heat for 5 minutes and insoluble components of powder crude drug was collected by filtering with an ash less filter paper[11]. Then the residue was ignited at 450 °C and the quantity of material leftover was used to determine the % of water soluble ash after coooling.

% of water-soluble ash value = (weight of total ash – weight of water insoluble ash) X 100/weight of crude drug.

Loss on drying

10 gm powder of the crude drug of AF without preliminary drying was placed on a tarred evaporating dish and dried at 105 °C for 6 hours and weighed. The drying was continued until two successive reading matches each other or constant weight reached. The weight was taken immediately after 30 minutes cooling in desiccator. The difference in two consecutives weight after drying should not be more than 0.01 gm.

Average loss on drying was calculated by the following formula.

% loss on drying = (loss in weight formula X100) / weight of crude drug.

Swelling index:

This study was performed to estimate hemicellulose, pectin, mucilage etc. In this process 1 gm of plant material of the drug was taken in a 50 ml volumetric flask and 25 ml of water was added and shacked in an upward direction for 10 minutes with gap for a period of 1 hour and kept aside for 3 hrs. Finally, the volume in ml occupied by the extract was measured to represent the swelling index.

Foaming index:

Medicinal plant materials contain saponins can cause a persistent foam when an aqueous

decoction of plant extract is shaken. The foaming ability of an aqueous decoction of the plant drug was measured in terms of a foaming index. Foaming index is calculated by using following formula.

Foaming index = 1000/a

Where a = the volume in ml of the decoction used for preparing the dilution in the tube, where foaming to a height of 1 cm is observed.

HPTLC study of extracts

HPTLC studies were carried out by using Camag HPTLC system equipped with Linomat V sample applicator, Camag n TLC scanner 3 CATS 4 software were used for interpretation of data. An aluminum plate (20 Cm x10 Cm) precoated with silica gel 60 F 254 (E Merck) was used as absorbent. The hydro-alcoholic extract and its fractionated petroleum ether, chloroform, ethyl acetate and butanolic extracts of both drugs extracted were dissolved with HPLC grade methanol. Then each solution was sonicated then centrifuged at 3000 rpm for 5 minutes and used for HPTLC analysis. 5 µl of each sample loaded as 6 mm bend length using Hamilton syringe and CAMAG LINOMAT 5 instrument. The sample loaded plate was kept in TLC twin through developing chamber (after saturation with solvent vapor) with respective mobile phase that used in TLC up to 80mm. The developed plate was dried using hot air, to evaporate solvents from the plate. The plate was kept in photo documentation chamber (CAMAG REPROSTAR 3) and captured the images at UV. The plates were fixed in scanner stage and scanned images were captured. The peak table, peak display and peak densitogram were identified.

HPTLC study was performed to represent a reference data on the basis of phytochemicals present in the hydroalcoholic extract and its fractionated extracts of both extracted materials [12].

In-vitro release study

In vitro release of drugs release were studied by using dialysis tube. 5ml of drugs were placed into dialysis bag of MWCO 1200KDa (Himedia, Mumbai India), tied at both the ends are placed in a beaker containing (100ml) of phosphate buffer (pH < 7.4). The beaker was placed over a magnetic stirrer at 1000rpm and the temperature maintained at 37±1℃ throughout the procedure. At specific time intervals, the dissolved medium (5ml) was taken and was replaced with an equivalent volume of fresh buffer solution and sink condition was maintained [13].

3. Result and Discussion

Total amount ash, acid insoluble ash and water-soluble ash was calculated and it is represented within the given table as follows-

Table 4.2 Ash determination of the given samples

Name

Alternanthera ficoidea

Polianthes tuberosa

Total ash

28± 1.2 (%)

32.4 ±.89

Acid insoluble

2.68 %

4.5 %

Water Soluble

3.56 %

5.1 %

Microscopic Study

Microscopic study was performed for both drugs, by preparing thin hand section of plant parts and photographs were taken to record the data with Dewinter Binocular' electronic digital microscope.

A

B

Study of physicochemical parameters of drugs

The physicochemical study of the crude drugs was made on the basis of WHO guidelines and results are

Loss on drying

Loss on drying was found to be 9.8% w/w and 8.7% w/w. Insufficient drying favors spoilage by moulds and bacteria and makes possible the enzymatic destruction of active principles. The rate at which the moisture is removed and the condition under which it is removed is of utmost important as determination of moisture content provide the method of preparation of drug.

Swelling Index

The swelling index was calculated to know that how much plant material can swell after putting in water and also to know that the plant material contains some mucilaginous content. After adding water in the plant material two reading was taken, initial reading and final reading after 3 hours. The swelling index of *Alternanthera ficoidea* was found to be 1.69 and *Polianthes tuberosa* 2.12

Foaming index

The water and decoction of plant material was put in ten tubes in ratio and after shaking the test tubes, foam was measured with the scale. Height of forth measured was less than 1 cm in every test tube. Therefore, the foaming index of both drugs were found to be less than 100.

HPTLC

Preliminary chromatographic profiling using HPTLC technique showed the presence of various compounds among which Tannic acid, lupeol, Quercetin, Gallic acid and stigmasterol was almost prominent in hydroalcoholic extract of whole plant of both drugs. HPTLC profiling has been done by comparing Rf of hydroalcoholic extract with standard Tannic acid. The Rf values are tannic acid is 0.11 and drug *Alternanthera ficoidea* was found to be 0.69 and *Polianthes tuberosa* 0.21 respectively.

Table 1 In vitro drug release of pure compound extracted.

Conclusion

In the above work we did the standard procedure to find the different physiochemical parameter of the extracted crude drug like its ash value and also, we did the foaming index and swelling index of the extracted drug. We also measure the qualitative analysis of the extracted sample. Further we seen the release study of the both the samples and concluded that the drug release very fast and more than 80 percent within six hours. We recommended that sample drug were further analyzed for antidiabetic activity.

Conflict of interest- The authors showed no conflict of interest

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