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PHYSICOCHEMICAL STUDIES OF PLANTS *ALTERNANTHERA FICOIDEA* AND *POLIANTHESIS TUBEROSA*

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ABSTRACT

Throughout the whole study we find the result more satisfying and it is also suggestive for further investigation. 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 formulation 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.

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 (Saxena et al., 2013,). The use of medicinal plants as therapy is increasing day by day that leads to exploration of traditional system of medicine in worldwide.The traditional system of medicines has a hopeful future as the world rich with millions of plants, and most of them have some medicinal values, some are investigated and some are yet to be studied. Further researches are also going on worldwide to explore more medicinal plants having medicinal values for the benefit of human beings. Two medicinal plants, Alternanthera ficoidea and Polianthesis tuberosa were selected for the

research purpose. These two plants have a variety of therapeutic potentiality and both plants are used by local people in Indian subcontinent as traditional medicines.From the literature survey, it was observed that both Alternanthera ficoidea and Polianthesis tuberosa traditionally used for the treatment of diabetes and in central nervous system (CNS) disorders but there is no research article available regarding study about diabetes associated co-morbidities (specifically depression). On the basis of survey, the present study was taken to investigate various parameters to standardized the both plant parts and it hydroalcoholic extract and to evaluate the activity against diabetes and diabetes induced depression of hydroalcoholic extract of *Alternanthera ficoidea* and *Polianthesis tuberosa.*

METHODOLOGY

Collection and Physical Identification of Plant And Taxonomical Classification

The world into which we are born is a booming buzzing confusion, and we only slowly learn to sort out things of like kind. Instinctively in babyhood, and later more self-consciously, we group things together and attach general terms to them; so that instead of a chaos of endless particular things without apparent order, we come to perceive a world with a finite number of classes of things. We thus begin to feel at home, even though the classes may need to be revised (sometimes painfully) and certainly seem to cut across each other so that everything belongs in more than one. We distinguish parts of ourselves from other things, and we then separate things that are accessible from things that are not, like the Moon, for which there is little point in crying. Some classes have sharp lines, and others have fuzzy ones; the division between colours, for example, seem hard to learn and are mastered some time after children have got size relations straight, and differ between cultures. Great scientists are Peter Pans, still anxious to classify and explain at an age

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.

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.

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.

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.

Result and Discussion

Study of physicochemical parameters of drugs

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

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

Table 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 %

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.

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. 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.

REFERENCES

Ackerson, R. C. and V.B. Youngner (1975). Responses of bermudagrass to salinity. Agron J.,67(5):678-681.

Addicott, F. T. and Lynch,R.S.(1955). Physiology of abscession. Ann.Rev.PIant Physiology 6:211-239.

Ahmed, A. M., M.M. Heikal and M. A. Shaddad (1979). Changes in some plant-water relation parameters of some oil producing plants over a range of salinity stresses. Biol.Plant. 2(4):259-265.

Albert, R. and M. Popp (1977). Chemical composition of halophytes from the Neusiedler lake region in Austria. Oecolooia (Berl.), 27(2) : 157-170.

Al-Saidi I. (1980). Influence of different concentrations of sodium chloride and calcium chloride salts on the growth of some grapevine (Vitis vinifera) cultivar transplants. Mesopotamia J.Aoric.. 15(1) : 125-136.

Ambike,V. V. and S.M.Karmarkar (1975). Physiological changes during senescence inKalanchoe pinnata (Larak.): I. Changes in the inorganic ion content of the leaves. J.Biol.Sci.. 18(1) : 33-42.

Andreeva,T. F. and T,A.Avdeeva (1976). Adaptation of the photo-synthesis of Cg and C4 plants to environmental conditions. Fiziol.Biokhim.Kul t Rast: 8(3):236-241.

Bruce,N., Smith and B.L.Tumer (1975). Distribution of Kranz syndrome among Asteraceae. Amer.J.Bot..62(5);541-545.

Bulley ,N.R. and E.B.Tregunna (1971). Photorespiration and postillumination carbondioxide burst. Can.J.Bot..49: 1277-1284.

Burris,R.H., C.C.Black (1976) (ed). COg metabolism and plant productivity - Univ-Park Press, Baltiraore-London-Tokyo, Butler,R.D. and E.W.Simon (1971). Ultrastructural aspects of senescence in plants. Adv.Geront.Res..3:73-129.

Buttery,B.R. and R.I.Buzzell (1957). The relationship between chlorophyll content and rate of potosynthesis in soybeans. Can J Plant Sci. 57(1) : 1-6.

Callow,J.A. (1974). Ribosomal RNA, fraction I protein synthesis and ribulose diphosphate carboxylase activity in developing and senescing leaves of cucumber. New Phvtol.,73(1):13-20.

Calvin,M. and J.A.Bassham (1962). The photosynthesis of carbon compounds, Benjamin, New York. Calvin,M. and A.A.Benson (1948). The path of carbon in photosynthesis. N.The identity and sequence of the intermediates in sucrose synthesis. Science. 109: 140-142.

Carolin,R.C., S.W.L.Jacobs and M.Vesk (1973). The structure of the cells of the mesophyll and parenchymatous bundle sheath of the Gramineae.Bot.J.Linn.Soc., 66 : 259-275.

Carolin,R.C., S.W.L.Jacobs and V.Maret (1975). Leaf structure in Chenopodiaceae. Bot Jahrbsvst Pflanzenqesch Pflanzenbeoar.. 92(2) : 226-255.

Carter,M.R. (1980). Effects of sulfate and chloride soil salinity on growth and needle composition of Siberian larch (Larix sibirica). Can.J.Plant Sci.6Q(3):903-910.

Caswell,A.H. (1979). Methods for measuring intracellular calcium. Int.Rev.Cvtol.. 56 : 145-181.

Catarino,E.M. and A.J.Trewavas (1970). Metabolic changes in nucleic acids associated with the development of succulence. Phytochemistry. 2(8):1807-1809.

Cavalieri,A.J. and A.H.C.Huang (1977). Effect of NaCl on the in vitro activity of raalate dehydrogenase in salt marsh halophytes of the U.S.Physiol.Plant. 41:79-84.

Chang,C.W. (1975). Carbon dioxide and senescence in cotton plants. Plant Physiol.. 55(3):515-519.