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Evaluation of Primary Metabolites Profiling from Alhagi Maurorum (Leaf and Stem)

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Abstract

Alhagi maurorum are perennial herbaceous plant having multiple medicinal health benefits. The traditional herbal medicines are receiving great importance in the health care sector. The experimental plant Alhagi maurorum belongs to Fabaceae family, commonly known as Javasa. It is commonly used in traditional system of medicine. It is a valuable desert plant which is commonly used in traditional system of medicine for glandular tumors and anti-diarrhoeal, as well as in a number of metabolic disorders such as rheumatism and hemorrhoids. In the present study, deals in plant primary metabolites like carbohydrates, lipids, protein, and phenols estimation by using UV spectrophotometer. On quantitative estimation, total levels of primary metabolites compare study to be maximum and minimum in stem and leaf. Finally, primary metabolites (carbohydrates, lipids, protein, and phenols) were a good source of energy for human health and cell repair.

Keywords: Alhagi maurorum; Primary metabolites; UV spectroscopy.

Introduction

Nature has been a supply of healthful agents for thousands of years. Numerous healthful plants are used for years in lifestyle to treat malady everywhere the globe (1). Seasonal medication is predicated on the premise that plants contain natural substances that may promote health and alleviate ill health (2, 3) Natural remedies derived from herbs (4), food or raw materials are employed by pharmaceutical and food industries. It's been calculable that 14-28% of upper plant species are used healthfully and 74% of pharmacologically active plant-derived elements were discovered by following ethano medicinal use of the plants (5). World Health Organization calculable that 80% of the population of developing countries like Asian country and China still trust ancient medicines largely plant medicine, for his or her primary tending wants (6). The healthful worth of those plants lies within the chemical substances that turn out an exact physiological action within the figure.

India is one in all the leading countries in Asia in terms of the wealth of lore systems associated with the utilization of plant species. Asian country has conjointly glorious to harbor a fashionable diversity of upper plant species (about 17000 species) of that 7500 are called healthful plants (7). Such an enormous variety of healthful plant species has allowed the evolution of the many systems of seasonal medication. In India, the majority healthful plants particularly in ancient medication are presently well-acknowledged and established as a viable profession (8). In developing countries like Asian country artificial medicine are not solely valuable and inadequate for treatment of diseases however are usually with adulterations and side-effects. Therefore, it's of nice interest to hold out a screening of those plants, so as to validate their use in people medication and to reveal the active principle by isolation and characterization of their constituents.

Aim of the study

Evaluation of primary metabolite profiling from Alhagi maurorum (Leaf and stem).

Materials and Methods

Collection and Identification of Plant Materials

The plant Alhagi maurorum has been collected from Jaipur – Ajmer road, Jaipur, Rajasthan in India. The stem and leaves of the plant washed in tap water and experimental plant parts were deposit in the

herbarium of Department of Botany, University of Rajasthan, finally were made to shade dried. Whole plant was cleaned, shade dried and pulverized to powder in a mechanical grinder. The powdered materials were stored in air tight containers till use.

Primary Metabolites

Preparation of Plant Extracts

1. Carbohydrates (Total soluble sugar and Starch): - 80% ethanol use for extraction(9, 10).
2. Protein - 10% TCA use for protein extraction (11).
3. Lipid - Distilled water is used for lipid extraction (12).
4. Phenol - 80% ethanol is used for phenol extraction (13).

Estimation of primary metabolites

Secondary metabolites important role play in plant growth and development. They are work as a biocatalyst. Primary metabolites are directly involved in plant growth and development.

Carbohydrate Estimation

Total soluble sugar

80% ethanol use for extraction according protocol was followed using the method of Mc Cready et al, 1950**(10).** 0.1 ml of sample was mixed with 5 ml of 80% ethanol reagent. Centrifuge at 10000 rpm for 20 min then supernatant collects in test tube. Add 5ml H_2SO_4 with 1ml 5% phenol then mix by vortex. Now kept sample at room temperature for 20 minutes. Absorbance was read at (wavelength) 490 nm against a reagent blank. The analysis was performed in triplicates and the results were expressed as mg/gram dry weight sample.

Starch

The protocol was followed using the method of Loomis and Shull, 1973**(9)** for total soluble sugar. Take 5 ml of 80% ethanol in a test and mix with 0.1 ml plant sample, mix properly with the help of vertex and centrifuge at 10000 rpm for 20 minutes, collect pellet and mix with 1ml perchloric acid ($HClO_4$) mix by vertex. Take 1 ml sample in test tube add 5ml H_2SO_4 and 1ml 5% phenol mixing by vortex keep 20 min room temp. The absorbance was read at 490 nm against a reagent blank. The analysis was performed in triplicates and the results were expressed as mg/g dry weight.

Protein Estimation

10% TCA use for protein extraction according here methodology of Osborne, 1962(11) was followed. Take 0.1 ml of sample mixed it with 3ml 10% TCA, centrifuge at 15000 rpm for 10 minutes, now take pellet add 10 ml 5% TCA mix it by vortex. Now take in a test tube and incubate at 80 ^oC for 30 minutes, after incubation cool it and take 1 ml sample from it and add 5 ml alkaline solution with 1 ml Folin & Ciocalteu's reagent and incubated again for 10 minutes at 37 ^oC or room temperature. Absorbance was read at 750 nm (wavlength) against 10% TCA reagent blank. The analysis was performed in triplicates and the results were expressed mg/g dry weight sample.

Lipid Estimation

Distilled water is used for lipid extraction according extraction methodology of Jay ram, 1981(12) will be followed. Take 0.3 gm sample with 10 ml distilled water and crush it with the help of mortar and pestle. Add 20 ml chloroform ($CHCl_3$) with 10 ml methanol (CH_3OH) for 20 min kept on room temperature will filter it after 20 min. Now add 20 ml $CHCl_3$ with 2ml distilled water then proper mixing. Take in separating flask and collect lower layer. Dry it here blank weight less in dry weight take result. The analysis was performed in triplicates and the results were expressed mg/g dry weight sample.

Phenol Estimation

80% ethanol is used for extraction total phenol content in each sample was estimated by spectrophotometer method of Bray and Thorpe 1954(13). Take 0.2 gm sample with 4 ml 80% ethanol crush it with the help of mortar and pestle. Centrifuge at 10000 rpm for 10 minutes and collect supernatant and take 1 ml of sample added 1 ml of Folin & Ciocalteau reagent and incubated at room temperature for 3 minutes. After three minutes 2 ml of 20% sodium carbonate (Na2CO3) was added, mixed well and incubated the tubes in boiling water bath for 1minute. Cooled rapidly and read absorbance at 750 nm (wavlength) against reagent blank. The analysis was performed in triplicates and the results were expressed as mg/g sample.

Result and Discussion

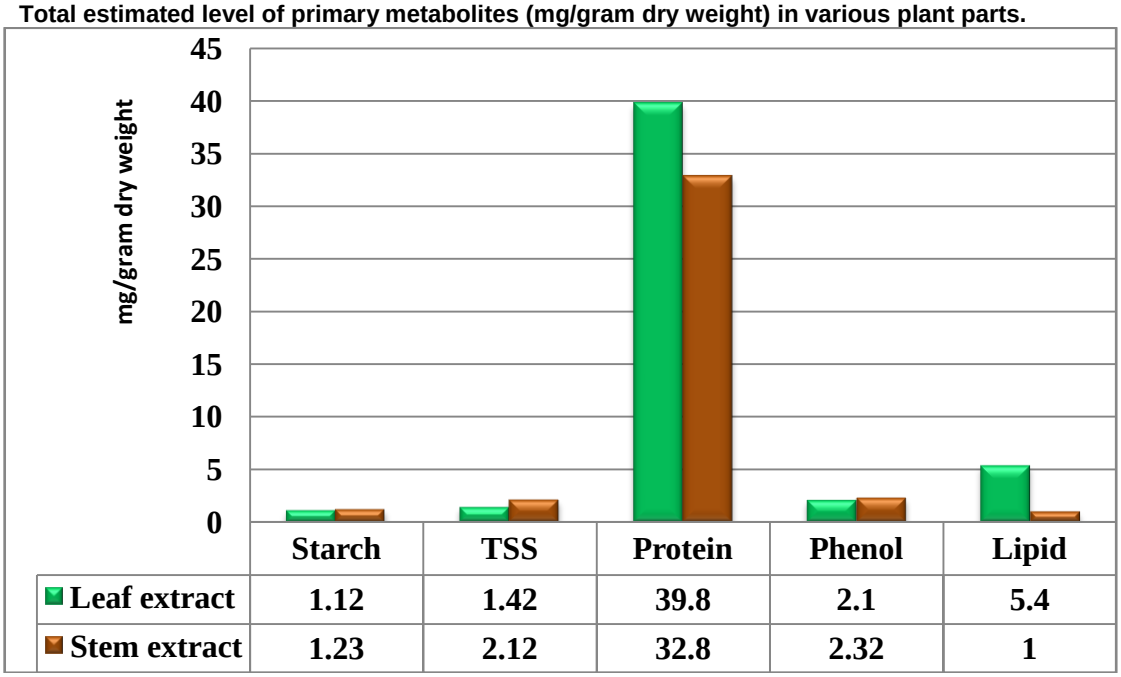
Medicinal plants are morehelpful to health of individual and communities. The medicinal values of a plant lie in some chemical substances that produce a definite physiological action on the human body. Phytochemicals analysis is of paramount importance in identifying a new source of therapeutically and industrially valuable compounds having medicinal plants have been chemically investigated. In the present investigation primary metabolites was qualitatively and quantitatively analyzed using Alhagi maurorumleaves and stems.

Primary Metabolites

Total estimated level of primary metabolites (mg/gram dry weight) in various plant parts.

S. No.	Parameters	Alhagi maurorum in (mg/gram dry weight)	
		Leaf	Stem
1	TSS	1.42	2.12
2	Starch	1.12	1.23
3	Proteins	39.8	32.8
4	Phenols	2.1	2.32
5	Lipids	5.4 %	1.0 %

Graphical Presentation
Total estimated level of primary metabolites (mg/gram dry weight) in various plant parts.



	Starch	TSS	Protein	Phenol	Lipid
Leaf extract	1.12	1.42	39.8	2.1	5.4
Stem extract	1.23	2.12	32.8	2.32	1

Conclusion

In the present study, quantitative analysis of primary metabolites of stem and leaves ethanolic extract of Alhagi maurorum was investigated. The extract was found to possess more primary metabolites and it exhibit radical scavenging activities, based on the results it can be concluded that, the stem and leaves ethanolic extract of Alhagi maurorum which contains high amount of primary metabolites. In future this plant extract are significant sources of natural supplement which may be use cell repair and cell growth, which may be helpful and as a possible food supplement or in pharmaceutical industry.

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References

1. *Nair R., Kalariya T.and Sumitra C. Antibacterial activity of some selected Indian Medicinal Flora. Turk J Bot 2005; 29:41-7.*
2. *Balakumar S., Rajan S., Thirunalasundari T. and Jeeva S. Antifungal activity of Ocimum sanctum Linn. (Lamiaceae) on clinically isolated dermatophytic fungi. Asian Pac J Trop Med 2011;4(8):654-7.*
3. *Rajan S., Thirunalasundari T.and Jeeva S. Anti-enteric bacterial activity and phytochemical analysis of the seed kernel extract of Mangifera indica Linnaeus against Shigella dysenteriae (Shiga, corrig.) Castellani and Chalmers. Asian Pac J Trop Med 2011;4(4):294-300.*
4. *Faodun A. Herbal medicines in Africa - Distribution, standardization and prospects. Res J Phytochem 2010; 4:154-61.*
5. *Nube N.S, Afolayon AJ, Oksh AI. Assessment techniques of antimicrobial properties of natural compounds of plant origin. Afr J Biotechnology 2008;7(12):1797-806.*
6. *Mohanasundari C., Natarajan D., Srinivasan K., Umamaheswari S. and Ramachandran A. Antibacterial properties of Passiflora foetida L. A common exotic medicinal plant. Afr J Biotechnology 2007;6(23):2650-3.*
7. *Shiva V. Protecting our Biological and Intellectual Heritage in the Age of Bio piracy. New Delhi, India: The Research Foundation for Science, Technology and Natural Resources Policy; 1996.*
8. *Kafaru E. Immense help from nature's workshop. Guidelines on How to Use Herbs to Achieve Healthy Living. Nigeria: Elikaf Health Services; 1994. p. 6-10.*
9. *Loomis W. E., Shull C.A., Methods in Plant Physiology, (McGraw Hill Book Co., New York,), 1973.*
10. *Mc Cready R M, Guggolz J, Silviera V, Owens H S, Determination of starch and amylose in vegetables. Anal. Chem, 1950; 22:1156.*
11. *Osborne D.J., Effect of kinetin on protein and nucleic acid metabolism in Xanthium leaves during senescence. Plant Physiol, 1962; 37: 595-602.*
12. *Jayrama J., Laboratory Manual in Biochemistry, (Wiley Eastern Limited, New Delhi, 1981), 1980 & 1981; pp. 96-97.*
13. *Bray H. G., Thorpe W V, Analysis of phenolic compounds of interest in metabolism. Meth Biochem Anal, 1954; 1: 27-52.*