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Pharmacognostical and Physico-chemical studies of few herbs used in the treatment of liver disorders

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Abstract

Liver disorders are very common now-a-days due to social and status life style of human beings. A number of modern medicines are available in the market but have various adverse effects. Traditional system of medicine is so ingrained in our culture that, about 80% of the Indian population depends on this system for relief. With such a huge section of an ever increasing population relying on herbal remedies, it is imperative that the plant products which have been in use for such a long time be scientifically supported for their efficacy. The present paper deals with the investigation of pharmacognostical and physicochemical parameters of AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb). In these study physicochemical parameters, extraction and preliminary photochemical screening was reported.

Key words: Herbs, Liver disorders, Pharmacognostical studies

Introduction

In the last few years there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter. A number of medicinal plants, traditionally used for over 1000 years named rasayana are present in herbal preparations of Indian traditional health care systems. In Indian systems of medicine most practitioners formulate and dispense their own recipes. The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. Among these 2500 species are in India, out of which 150 species are used commercially on a fairly large scale. India is the largest producer of medicinal herbs and is called as botanical garden of the world.[1-3] The present work was aimed on study of pharmacognostical and physic-chemical parameters of few herbs used in the treatment of liver disorders.

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Material and Methods

Collection of herbs and their authentication

The plant parts viz., AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb) were collected in the months of October-December 2018 from the various local sites of Malwa region of Madhya Pradesh and identified & authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in our Laboratory.

Pharmacognostical Evaluation[4-7]

Macroscopic studies

The macroscopy of different parts of the plant such as color, odor, size, shape, taste, surface characters and fractures were carried out.

Physicochemical Evaluation

The dried parts were subjected to standard procedure for the determination of various physicochemical parameters.

Determination of foreign organic matter (FOM)

Accurately weighed 100 g of the drug sample and spread it out in a thin layer. The foreign matter should be detected by inspection with the unaided eye or by the use of a lens (6X). Separate and weigh it and the percentage present was calculate.

Determination of moisture content (LOD)

Place about 10 g of drug (without preliminary drying) after accurately weighing in a tared evaporating dish and kept in oven at 105^0 C for 5 hours and weigh. The percentage loss on drying with reference to the air dried drug was calculated.

Determination of ash value

The determination of ash values is meant for detecting low-grade products, exhausted drugs and sandy or earthy matter. It can also be utilized as a mean of detecting the chemical constituents by making use of water-soluble ash and acid insoluble ash.

Total ash

Accurately about 3 gms of air dried powder was weighed in a tared silica crucible and incinerated at a temperature not exceeding 450^0C until free from carbon, cooled and weighed and then the percentage of total ash with reference to the air dried powdered drug was calculated. The percentage of total ash with reference to the air-dried drug was calculated.

Acid insoluble ash

The ash obtained in the above method was boiled for 5 minutes with 25ml of dilute HCl. The residue was collected on ash less filter paper and washed with hot water, ignited and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water soluble ash

The ash obtained in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited to constant weight at a low temperature. The weight of insoluble matter was subtracted from the weight of the ash. The difference in weights represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was calculated.

Determination of swelling index

Swelling index is determined for the presence of mucilage in the seeds. Accurately weigh 1 g of the seed and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept aside for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.

Determination of extractive value

This method determines the amount of active constituents extracted with solvents from a given amount of medicinal plant material. It is employed for materials for which as yet no suitable chemical or biological assay exists.

Cold maceration

Place about 4.0g of coarsely powdered air-dried material, accurately weighed, in a glass-stoppered conical flask. Macerate with 100ml of the solvent specified for the plant material concerned for 6 hours, shaking frequently, then allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent, transfer 25 ml of the filtrate to a tared flat-bottomed dish and evaporate to dryness on a water bath. Dry at 105°C for 6 hours, cool in a desiccator for 30 minutes and weigh without delay. Calculate the content of extractable matter in mg per g of air dried material. For ethanol-soluble extractable matter, use the concentration of solvent specified in the test procedure for the

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plant material concerned; for water-soluble extractable matter, use water as the solvent.

Successive Extraction of selected herbs[4-7]

Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant matertial (250gms) were loaded in Soxhlet apparatus and was extracted with petroleum ether (60-62°C), Chloroform, ethanol and water until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined.

Preliminary phytochemical screening of extracts[4-7]

The various extract obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedure were adopted to perform the study.

Results and Discussion

The plant parts viz., AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb) were collected from local sites of Malwa region of Madhya Pradesh, India and identified morphologically, microscopically and compared with standard pharmacopoeial monograph.The macroscopy of different parts of the plant such as color, odor, size, shape, taste, surface characters and fractures were carried out. The results were presented in table 1

Table 1: Morphological characters of selected plant material

S/No.	Parameters	AIL	PNF	EAL	ASB
1.	Color	Light green	Light green	Light green	Cream
2.	Odor	Characteristics	Sweet	Characteristics	Peculiar
3.	Taste	Bitter	Sweet	Acrid	Astringent
4.	Shape	Ovate	Oval	Oblong	oblong
5.	Size	L=4-5 cm B:1-2 cm	L=1-2.5 cm B: 0.8-1.5 cm	L= 3-7 cm B= 1-2.5 cm	L=2-5 cm B=0.5-1.5 cm
6.	Surface character	Rough	Smooth	Smooth	Smooth
7.	Fractures	Absent	Absent	Absent	Absent

Fig. 1: AI: Abutilon indicum (Leaves)

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Fig. 2: PN: *Phyllanthus niruri* (Fruits)

Fig. 3: EA: *Eclipta alba* (Leaves)

Fig. 4: AS: *Allium sativa* (Bulb)

The dried plant parts of AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb) were subjected to standard procedure for the determination of various physicochemical parameters. The results were presented in table 2.

Table 2: Physicochemical Evaluation of selected plant material

S/No.	Parameters	AIL	PNF	EAL	ASB
1.	FOM	1.09±0.01	2.67±0.28	0.88±0.03	1.03±0.30
2.	LOD	4.22±0.22	3.89±0.02	4.08±0.21	1.03±0.01
3.	TA	7.03±0.20	6.19±0.02	4.12±0.00	3.10±0.04
4.	AIS	1.08±0.00	1.37±0.92	1.10±0.12	1.07±0.01
5.	WSA	2.19±0.82	2.89±0.06	2.11±0.02	1.12±0.00
6.	SI	6.35±0.16	4.82±0.18	3.66±0.10	4.00±0.01
7.	WSEV	18.10±1.08	17.85±1.02	13.00±0.02	10.01±1.00
8	ESEV	8.10±1.12	10.35±1.27	10.10±1.01	7.01±1.07

Note: All values are expressed as Mean±SEM, n=3

The shade dried coarsely powdered plant material of AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb) and was extracted with water. The extracts obtained were evaluated for pH, color and % yield. The results are presented in table 3

Table 3: Estimation of % yield of various extract of selected plant material

S/No.	Extract	Parameters			
		Nature of Extract	Color	pH	% Yield
1.	AEAIL	Solid Powder	Dark green	6.99	18.29
2.	AEPNF	Solid Powder	Brown green	7.01	14.91
3.	AEEAL	Solid Powder	Light green	7.14	10.43
4.	AEASB	Solid Powder	Creamish white	7.02	8.29

The extract obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedure was adopted to perform the study.

Table 4: Preliminary phytochemical screening

S/No.	Constituents	Extract			
		AEAIL	AEPNF	AEEAL	AEASB
1.	Carbohydrates	+	+	+	+
2.	Glycosides	+	-	-	+
3.	Alkaloids	+	+	+	+
4.	Protein & Amino acid	-	-	+	+
5.	Tannins & Phenolic compounds	-	-	-	-
6.	Flavonoids	-	-	-	-
7.	Fixed oil and Fats	-	-	-	-
8.	Steriods & Triterpenoids	+	+	+	+
9.	Waxes	-	-	-	-
10.	Mucilage & Gums	-	-	-	-

Abbr.: +=Present; -=Absent

Conclusion

The prevalence of liver disorders are very common and alarming. In traditional system of medicine herbal healers treat these diseases using the plants which have immense medicinal potentiality. Despite various available allopathic formulations, the relief from the disease is temporarily and has some side effects if used for the longer duration. The present work was undertaken to revel the pharmacognostical and physicochemical parameters of few herbs viz., AI: Abutilon indicum(Leaves), PN: *Phyllanthus niruri* (Fruits), EA: *Eclipta alba* (Leaves) and AS: *Allium sativa* (Bulb)

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