PHARMACOGNOSTIC PROFILES OF LEAVES OF AZADIRACHTA INDICA A.JUSS.

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Summary

Medicinal Plants are considered as part and parcel for human society to combact diseases fom the very beginning of civilization. *Azadirachta indica* (Meliaceae) commonly known as Neem is an important plant used against various disorders in indigenous system of medicine such as anti-inflammatory, antipyretic, hypoglycemic, antifugal, antibacterial and antihistaminic. Thus from the extensive literature survey it was revealed that no reports were available on microscopic evaluation, standardization parameters and chemo profile of *Azadirachta indica* and to check the identity and purity of the drug. The present work embodies the investigations carried out to establish methods for quality control of drugs as per who guidelines which includes macroscopical features, physicochemical parameters like loss on drying, foreign matter, extractive value, ash value and to investigate the phytochemical present in the extract in the preliminary level with respect to thin layer chromatography were also carried out for the quality control of the drug. Thus, it was thought worthwhile to explore this plant on the basis of these standardization parameters. The study will provide referential information for the correct identification of the crude drug.

Keywords: *Azadirachta indica*, standardization, phytochemical studies, extraction

Introduction

Azadirachta indica A. Juss. belonging to the family of Meliacea is an important medicinal plant used in the Traditional System of Medicine to treat various disease for the betterment of mankind. It is commonly known as Indian neem or Margosa Tree which is evergreen and cultivated in various parts of Indian and subcontinent. Almost every part of the tree is used to treat various diseases. (1, 5). The leaves are alternate in arrangement and consists of several leaflets in them with serrated edges. Flowers are small and white in colour. The fruit is oval, round and skinned. (6). Neem is used in the treatment of diabetes, helminthiasis, respiratory disorders, constipation, rheumatism, chronic syphilitic sores, indolent ulcer, biliary afflicitions, skin ulcers, burning sensations, as a good health promoter, insecticidal, tumours, pil and in skin disease activities. The plant contains a number of secondary metabolites namely alkaloids, resins, glycosides, gum (7). Considering the significant of this plant, the present investigation is directed to remain some pharmacognostic parameters of the leaves as a whole and its powdered form.

Materials and Methods

Plant material

The leaves of *Azadirachta indica* A. Juss. (Family: Meliaceae) were collected in the month of April and May from Purnia district, Bihar, India and were authenticated by the botanist of Govt. P.G. College, Uttarkashi, Uttarakhand, India. The herbarium was prepared and kept in the Department for future reference. The collected leaves were washed; shade dried and was pulverized with mechanical pulveriser for size reduction. It was then passed through mesh 40 and the fine powder was collected and used for the experiment and preparation of extract.

Pharmacognostic Studies

Morphological Studies were carried out by using simple determination technique, the shape, size, color, odor, margin and apex.

Leaf constant

Various leaf constant such as vein termination number, vein islet number, palisade ratio, stomatal number and stomatal index were studied with the help of microscope (8).

Physico chemical parameters

The parameter was done to evaluate the percentage of total ash, water soluble acid insoluble ash were calculated as per Indian Pharmacopoeia The extract of the powdered leaves were prepared with the different solvents for the study of extractive value. Fluorescence analysis was also carried out for the powder (9,10).

Preliminary phytochemical analysis

For the Preliminary phytochemical analysis, the extract was prepared by weighing 100gm of dried powdered leaf and were subjected to maceration with different solvents as per the Polarity,

Petroleum ether, Benzene, Chloroform, Ethyl acetate, Ethanol, Methanol and finally with Aqueous. The extracts were filtered in each step, concentrated, and the solvent was removed by rotary evaporator. The extracts were dried over desiccator and the residues were weighed. The presence and absence of the primary and secondary phytoconstituents was detested by usual prescribed methods (11, 12).

Results and Discussion

The macroscopic characters have been shown in Table1.

TABLE 1: MACROSCOPIC CHARACTERS OF AZADIRACHTA INDICA LEAVES.

Constants	**Features**
Shape	Oblique, lanceolate.
Size	3.9-5.1 cm in length and 1-1.4 cm in wide
Colour	Fresh leaves are green and in the dry state green to light brown
Base	Symmetric.
Margin	Serrate.
Apex	Acuminate.
Venation	Pinnate type.
Orientation	Dorsiventral.
Texture	Thin papery.
Taste	Bitter.
Odour	Unpleasent.

TABLE 2: MICROSCOPIC CHARACTERS OF AZADIRACHTA INDICA LEAVES

Parameters	**Range**	**Average**
Vein-islet number	12-16	14.9
Palisade ratio	3.2-3.6	3.4
Stomatal index	9.1-9.8	9.4

TABLE 3: PHYSICO-CHEMICAL CHARACTERS OF AZADIRACHTA INDICA LEAVES

Constant	% Yield (w/w)*
Total ash	11.68
Acid soluble ash	10.60
Acid insoluble ash	1.02
Water soluble ash	4.04
Water insoluble ash	7.64
Drying on loss	1.20
Foreign matter	1.84

*Each value is an average of three determinations

Table 4: EXTRACTIVE VALUES OF AZADIRACHTA INDICA *A* LEAVES WITH DIFFERENT SOLVENTS BY MACERATION METHOD

Solvent	% Yield (w/w) *	Colour of extractive
Pet ether (60-80 ˚C)	0.53	Light yellow
Benzene	1.25	Greenish brown
Chloroform	2.93	Dark green
Acetone	3.22	Light green
Ethanol	7.39	Green
Methanol	9.39	Dark green
Water	13.02	Brownish green

*Each value is an average of three determinations

The extractive values with different solvents are shown in Table 4. The value increases with the increase of solvent polarity.

The behaviour of the powdered leaves on treatment with different chemical reagents and the fluorescence character of the same under visible and ultra violet light are shown in Table 5 and Table 6 respectively.

Table 5: BEHAVIOUR PATTERN OF POWDERED AZADIRACHTA INDICA LEAVES ON TREATMENT WITH DIFFERENT CHEMICAL REAGENTS.

Reagents	**Observation**
Powder as such	Greyish green
Powder with acetic acid	Light green
Powder with conc. sulphuric acid	Blackish green
Powder with conc. nitric acid	Deep brown
Powder with conc. hydrochloric acid	Blackish green
Powder with ferric chloride solution	Blackish green
Powder with 5% iodine solution	Yellowish green
Powder with ammonia solution	Light green
Powder with aqueous sodium hydroxide solution (I N)	Brownish green
Powder with picric acid solution	Greenish yellow

TABLE 6: FLUORESCENCE ANALYSIS OF LEAVES POWDER OF AZADIRACHTA INDICA WITH VARIOUS CHEMICAL REAGENTS UNDER UV AND VISIBLE LIGHT

Reagents	**UV Shortlight (254 nm)**	**UVLonglight (366 nm)**	**Visible light**
Powder as such	Greyish green	Light green	Green
Powder with (IN) NaOH sol.	Greenish brown	Greenish black	Brownish green
Powder with picric acid	Bluish green	Dark green	Yellowish green
Powder with acetic acid	Light blue	Very light green	Very light green
Powder with (IN) HCl solution	Dark blue	Very light green	Very light green
Powder with 5% $FeCl_3$ solution	Blackish blue	Light green	Reddish green
Powder with HNO_3 and NH_3	Dark blue	Light brown	Coffee brown

solution			
Powder with IN NaOH in methanol	Greenish red	Blueish red	Brownish green
Powder with methanol	Deep green	Blackish brown	Very dark green
Powder with 50% HNO_3 solution.	Bluish black spot	Light brown	Light brown

The results of preliminary phytochemical tests for the presence of active constituents are reported in Table 7.

Table 7 : PHYTOCHEMICAL SCREENING OF EXTRACTIVES FOR THE PRESENCE OF ACTIVE CONSTITUENTS IN AZADIRACHTA INDICA LEAVES.

Extract	***Amino acid***	***Alkaloids***	***Steroids***	***Tri-terpenoids***	***Saponin***	***Flavo-noids***	***Tannins***	***Anthra-quinone***	***Reducing sugar***
Petroleum ether	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-
Chloro form	-	-	-	+	-	-	-	-	+
Ethyl acetate	-	-	-	+	-	-	-	-	+
Ethanol	-	+	-	+	-	-	-	-	+
Methanol	-	+	-	+	-	-	-	-	+
Water	-	+	-	+	-	-	-	-	+

+ indicate presence, - indicate absence.

Conclusion

Neem considered as scared and versitle medicinal plant is the unique source of various components with very dynamic constituents. Thus nowa days a time of revolution has come were we can make use of the ancient old knowledge through modern approaches of drug development, Thus in this aspect standardization and authentication is very necessary for finding out the adulteration and the novel drug. The results of different pharmacognostic analysis (macroscopic and microscopic studies, physical constant values and extractive values determination, powder analysis with different reagents, fluorescence analysis and preliminary phytochemical screening have been done; will help in future for proper identification of *Azadirachta indica* A. Juss in intact form or in a powdered form.

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