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Assessment of Physicochemical Analysis of Acalypha Indica Linn

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Abstract- The present study of physicochemical parameters like extractive of plant with different Solvents, Determination of moisture content, Analysis of ash values in Acalypha indica. The percentage of extractive values was maximum in ethanol (61%) followed by water (13%) and chloroform (8%). The petroleum ether extract showed low yield (5%). The total ash content was 9.6% and water soluble ash content was more than that of acid insoluble ash. The sulphated ash content was recorded as 10.2%. the ash values and purity of the plant sample.

Keywords- extraction, phytochemical, Acalypha indica physicochemical, medicinal plants

I. INTRODUCTION

India has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants have been used extensively as medicine for the treatment of various ailments throughout human history and even today this trend continues. According to the World Heath Organization (WHO), approximately 75 – 80% of the world's population use plant – based medicines. All plants may not be as useful as claimed, or may have more therapeutic properties than are known traditionally. Therefore, proper scientific knowledge is required to investigate and explore the exact standardization of such medicinally important plants [1].

Higer plants produce both primary and secondary chemical metabolites, the former being vitally important in normal development and reproduction of plants. On the other hand, secondary metabolities are known to play important roles in plants survival as defense mechanisms against adverse biotic and abiotic conditions [2]. Extraction is the separation of medicinally active portion of plant (and animal) tissue using selective solvents through standard procedures. The products so obtained from plants or semisolid state or in dry powder form, and intended for oral or external use, there include classes of preparation know as decoctions, infusions, fluid extracts, tinctures, pillar (semi solid) extracts or powdered extracts [3].

II. MATERIALS AND METHODS

Determination of moisture content (loss on drying) About 2 g of the powdered sample was taken in a weighing bottle and weighed the sample accurately. The sample was then dried at 1050 C for 5 h. and cooled ina desiccator and weighed. The drying was continued at 1050 C and weighed at 1h. interval. When the weight of the sample became constant, the loss in weight and the percentage of loss on drying were calculated [4].

Analysis of ash Values

The ash values were determined by the method of Trease and Evans [5].

Determination of Total Ash

About 2 g of the powdered sample was taken in a silica crucible which was previously ignited and weighed. The ground powder was heated using electrical furnace until the powder turns red, after that cooled and weighed. As carbon free form was

not obtained, the charred mass was digested with hot water and the residue was collected in an ash less filter paper. The residue with the filter paper was incinerated and the filtrate was evaporated to dryness and ignited at a low temperature. The total ash was calculated and expressed as percentage value.

Determination of Acid Insoluble Ash

The total ash obtained was biled with 25 ml of 2 m hydrochloric acid for 5 min. the insoluble ash was collected on an ash less filter paper and transferred into a pre-weighed silica crucible, ignited for 15 min. ar a temperature not exceeding 4500 C, cooled and reweighed. The procedure was repeated until a constant weight was achieved. The acid insoluble ash was calculated and expressed as percentage value.

Determination of Water Insoluble Ash

The ash obtained was boiled for 5 min. in 25 ml of water. The insoluble matter was collected on an ash less filter paper and washed with hot water. The insoluble ash was transferred to a pre – weighed silica crucible and ignited for 15 min. at a temperature not exceeding 4500 C, cooled and weighed. The procedure was repeated until a constant weight was achieved. The weight of the insoluble matter was subtracted from the weight of the total ash. The difference in the weight was considered as the water soluble ash and expressed as percentage value.

Determination of Sulphated Ash

The ash powder was moistened with 1 ml of H2 SO4 and ignited to 800 ± 250C until it reaches a constant weight. The percentage of sulphated ash with reference to the air dried powder was calculated and expressed as percentage value.

Extractive Values and Successive Solvent Extraction

Preparation of Plant Extract

Collected aerial parts of A. indica were air dried, powdered and subjected to successive solvent extraction. The extraction was carried out for 16 h. with the following solvents in the increasing order of polarity namely petroleum ether, chloroform, ethanol and water [5].

Preparation of Petroleum Ether Extract

About 75 g of dried plant material was extracted with 375 ml of petroleum ether by using a separation funnel with occasional shaking for 16 h. The extract was concentrated to 1/4th of its original colume by evaporation at room temperature. Each tie before extracting with the next solvent, the residue was air dried thoroughly to remove the solvent used.

Preparation of Chloroform Extract

The above dried residue was extracted with chloroform by occasional shaking for 16 h.

Preparation of Ethanol Extract

The above dried residue was extracted with ethanol by occasional shaking for 16 h.

Preparation of Water Extract

Finally the above dried residue was extracted with water by occasional shaking for 16 h.

The different solvent extracts were concentrated, vacuum dried and weighed. The percentage yields were expressed in terms of air dried sample. The extracts were dried over anhydrous sodium sulphate, stored in sealed vials in refrigerator (5-80 C) until analysis.

Successive Solvent Extraction

The air dried, powdered plant material was extracted in Soxhlet apparatus successively with different solvents in the increasing order of polarity [Petroleum ether (0.11), Chloroform (4.1), Ethanol (5.2) and Water (8.0)]. Each time, before extracting with the next solvent, the powdered material was dried in a hot air oven at 400 C. Finally, the material was macerated using hot water with occasional stirring for 16 h. and the water extract was filtered. The different solvent extracts were concentrated, vaccum dried and weighed. The percentage yields were expressed in terms of air dired sample. The ethanolic extract was dried over anhydrous sodium sulphate, stored in sealed vials in refrigerator (5-80 C) until analysis[6].

III. RESULTS AND DISCUSSION

The physico-chemical properties such as moisture and ash contents of serial parts of A. indica are presented in Table 1. The results showed that the selected plant sample contained a moderate amount (51.3%) of moisture.

The total ash content was 9.6% and water soluble ash content was more than that of acid insoluble ash. The sulphated ash content was recorded as 10.2 % . The ash values are useful in the determination of quality and purity of the plant sample.

The extractive values of selected plant sample are given in Table 2. The percentage extractive value was maximum in ethanol (16%) followed by water (13%) and chloroform (8%). The petroleum ether showed low yield (5%).

The preliminary phytochemical screening presented in Table 3 revealed the presence of alkaloids, glycosides, flavonoids, saponins, phenols and tannins in ethanol extract. The results showed that the ethanol extract was more efficient than other extracts. Hence the ethanolic extract of plant sample was selected and used for further study.

The moisture content of aerial parts of A. indica was measured as 51.3% (Table 10. Moisture content (loss on drying) determinues the water drying off form the drug.

Drug containtin excess moisture will lead to the activation of enzymes and give suitable condition for the proliferation of living microorganisms. Higher water content indicates the presence of large amount of mucilage or starch and paves way for more chances for microbial degradation and if the value is not too high, it indicates less chances of microbial degradation[5].

The presence of ash content in plant material was determined as total ash, acid insoluble ash, water soluble ash and sulphated ash (Table 1). The determination of ash value is useful for detecting exhausted drugs and excess of sandy and earthy matter. The total ash usually consist of carbonates, phosphates and silicates of silica. Ash value determination is a good index of quality and is useful in the dectection of adulteration. An increase in the ash value when compared with standard value id an indication of contamination or adulteration(5).

In the present study, the plant sample contains total ash value of 9.6%, acid insoluble ash value of 12.9%, water soluble ash value of 34.8% and sulphated ash value of 10.2%. Acid insoluble ash value can be used to determine the silica impurities mixed with the drug during collection. Water soluble ash value helps in determining the added mineral matter and quality of the powdered drug(7).

In the present study, the extractive values are depicted in Table 2. The percentage of extractive value was maximum in ethanol (16%) followed by water (13%), chloroform (8%) and petroleum ether (5%).

The determination of extractive value refers to the amount of constituents present in given amount of raw material extracted with suitable solvents. These values provide an indication of the extraction of polar and non-polar components present in the sample and are useful in the evaluation of plant drugs.

Table 1: Physico-Chemical properties of aerial parts of A. indica

Parameters	Values (%)
Moisture content (loss on drying)	51.3 ± 1.22
Total Ash	9.6 ± 4.76
Acid insoluble ash	12.9 ± 2.75
Water soluble ash	34.8 ± 3.33
Sulphated ash	10.2 ± 3.26

Mean value of triplicate determination expressed as % on dry weight basis.

± = Standard deviation.

Table 2: Extractive values of A. indica in different solvents

Solvents	Yield (%)
Petroleum ether	5
Chloroform	8
Ethanol	16
Water	13

Table 3: Qualitative phytochemical screeing of aerial parts of A. indica

Plant constituents	Petroleum ether extract	Chloroform Extract	Ethanol Extract	Aquenous extract
Alkaloids	-	+	+	-
Glycosides	-	+	+	-
Carbohydrates	-	-	-	+
Phytosterols	+	-	-	-
Steroids	-	-	-	-
Flavonoids	-	+	+	-
Saponins	-	+	+	-
Phenols	-	-	+	-
Tannins	-	-	+	+
Proteinsandamino acids		-	-	+
Terpenoids	-	-	-	-
Fixed oils and fats	-	-	-	-

\+ = Indicates the presence of the constituents.
\- = Indicates the absence of the constituents.

IV. CONCLUSION

The Preliminary phyto chemical screening revealed the presence of alkaloids, glycosides, flavonoids, saponins, phenolic compounds and tannins, the physio-chemical analysis conducted in the selected plant sample recorded 51.3% moisture, 9.6% of total ash, 12.9% of acid insoluble ash and 34.8% of water soluble ash which determines the quality and purity of the plant drugs. Ethanolic extrat of Acalypha Indica was used in the present study as it provided high extract value.

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