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21. Proximate Analysis of *Portulacaria afra.* Jacq.

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ABSTRACT

In the present study *Portulacaria afra* was subjected to quality control tests specified by Ayurvedic Pharmacopoeia of India (API), Indian Herbal Pharmacopoeia for proximate analysis of Plant samples. The total ash content of the plant was obtained by incinerating at extremely high temperature. Water-soluble and Ethanol soluble extracts were prepared to check the solubility, to deduce levels of adulteration. Ash values determination constitutes the inorganic matter after incineration of the *afra* leaves. Treatment with hydrochloric acid results in acid insoluble ash, which consists mainly of silica. (Kunle, Oluyemisi Folashade, 2012).

KEYWORDS *Portulacaria afra. Jacq.*, Proximate analysis, Ash Content, Ethanol extract.

INTRODUCTION

Pharmaceutical industries thrive on the right evaluation of crude drugs. Determining the identity, purity and quality of the drug are of great significance. Consistent supply of required quantity and quality medicament and reproducibility of the same drug is the prime most reason for standardization of crude drugs. The purity of any drug is obtained by freeing the drug from any kind of foreign matter. The quality can be achieved by concentrating the active constituents in the drug. Determining the foreign matter, total ash values, solvent extractive values are some of the parameters that are deemed worthy for obtaining the qualitative information regarding the purity and standardization of the drug (Mukherjee,2002).

Different test from the proximate analysis help to understand the crude drug qualities. Ash derived from the carbonates, phosphates, silicates and silica contribute to the physiological ash from the plant tissue itself. While the particles adhered to the plant surface like the sand and the soil residue contribute to the non-physiological ash. Both when considered together, it is denoted as the total ash value. The Higher values of Total ash content indicates contamination in the drug, adulteration, substitution, or carelessness in preparing the crude drug (JohnsonAbah, 2018). Acid insoluble ash is

the residue obtained after extracting the total ash with HCl, concerning 100gm of a drug (UK Essays, November 2018). Acid Insoluble ash value particularly indicates contamination with silicious material e.g., earth and sand, comparison of this with the total ash value of the same sample will differentiate between contaminating materials and natural nature ash of the drug. Water-soluble is that part of the total ash content which is soluble in water. (Arambewela and Arawwawala, 2010). Previous extraction of the water-soluble salts of the drug or faulty preparation of the raw material can be deduced by water-soluble extractive.

Since eternity, plant products have been a source of food and medicine. Raw materials are used for home remedies and in pharma industries. *Portulacaria afra* is one such plant which is been investigated for total polyphenol and total flavonoid content as well as for anti- inflammatory, antioxidant, and glucose utilization activities by using standard methods. (Oyinlola O. Olaokun,2017). So, to in cash on these beneficial properties of any plant, it is necessary to determine these parameters so that purity and quality of raw material are confirmed before using them for further analysis and production.

MATERIAL AND METHOD

A. MATERIAL

Portulacaria afra saplings were collected from a local nursery, and plants were allowed to grow in sandy soil and garden soil mixture of equal proportion. The leaves were collected for performing proximate analysis.

B. METHODOLOGY

1. DETERMINATION OF FOREIGN MATTER

The leaf samples were spread on tissue-paper undisturbed. The sample was examined first with an unaided eye and later with a magnifying lens (5x). The foreign dust particles were separated by brushing, weighed and its percentage was determined (Mukherjee, 2002; Sipahimalani, 2002).Foreign Matter – **[(W1 – W2)/ W3] x 100**

W1- Weight of dish with foreign matter
W2- Weight of empty dish
W3- Weight of sample taken (grams)

2. ETHANOL SOLUBLE EXTRACTIVE

For preparing ethanol extract 5g of dried leaf powder was added to a stoppered conical flask.

100ml ethanol was added to the flask and was kept on a shaker for 6 hours after which it was allowed to stand for 18 hours. The mixture was filtered and 25ml of the filtrate was evaporated to dryness in a preweighed evaporating dish. The percentage of

ethanol-soluble extractive was calculated (Sipahimalani, 2002).
Ethanol Soluble Extractive – **[(W1 – W2)/ W3] x 100 x 4 (for 100 ml)**

W1- Weight of beaker with extract (grams) W2- Weight of empty beaker (grams)
W3- Weight of powder taken (in grams)

3. WATER SOLUBLE EXTRACTIVE

For preparing aqueous extract 5g of dried leaf powder was added to a stoppered conical flask.

100ml D.W was added to the flask and was kept on a shaker for 6 hours after which it was allowed to stand for 18 hours. The mixture was filtered and 25ml of the filtrate was evaporated to dryness in a preweighed evaporating dish. The percentage of water-soluble extractive was calculated (Sipahimalani, 2002).

Water Soluble Extractive – **[(W1 – W2)/ W3] x 100 x 4 (for 100 ml)**

W1- Weight of beaker with extract (grams) W2- Weight of empty beaker (grams)
W3- Weight of powder taken (grams)

4. DETERMINATION OF TOTAL ASH

A pre-weighed empty crucible was taken and 1 gram of sample was weighed and added to it. It was kept in mufflefurnaceatatem perature of 550 for 4 hours. After complete incineration, the crucible was cooled, weighed and the percentage of total ash was determined and documented as the mean of three readings (Sipahimalani, 2002).

Determination of Total Ash: **[(W1 – W2)/ W3] x 100**

W1- Weight of crucible with ash
W2- Weight of empty crucible
W3- Weight of powder taken (grams)

5. ACID INSOLUBLE ASH

Total ash of sample was obtained using the procedure described earlier. 25mL of 3N HCl was added to the ash and the mixture was mixed for 5 minutes. The mixture was filtered through Whatman filter paper No.41 and washed with hot water. This filter paper (with insoluble matter i.e., the acid insoluble ash) was transferred through a pre-weighed crucible and ignited till constant weight was obtained. The crucible was cooled in a desiccator, weighed and the percentage of acid-insoluble ash of was calculated.

Acid Insoluble Ash: **[(W1 – W2)/ W3] x 100**

W1- Weight of crucible with ash
W2- Weight of empty crucible
W3- Weight of powder taken for obtaining total ash.

6. WATER SOLUBLE ASH

Total ash of leaf powder of sample was obtained using the procedure described earlier. 25mL of D.W was added to the ash and the mixture was boiled for 5 minutes. The mixture was filtered through Whatman filter paper No.41 and washed with hot water. This filter paper (with insoluble matter i.e., the water-insoluble ash) was transferred through a pre-weighed crucible and ignited at a temperature not exceeding 450 till constant weight was obtained. The crucible was cooled, weighed and the percentage of water-soluble ash was calculated.Total Ash **W4: [(W1 – W2)/ W3] x 100**

W1- Weight of crucible with ash

W2- Weight of empty crucible

W3- Weight of powder taken for obtaining total ash.

Water Insoluble Ash **W7: W5 – W6**

W5- Weight of crucible with ash

W6- Weight of empty crucible

Water Soluble Ash: **[(W4 – W7)/ W3] x 100**

7. LOSS ON DRYING

500mg of *Portulacaria afra* leaf powder sample were weighed in a wide-mouthed stoppered bottle separately. The bottle was then placed with the lid open in an air oven maintained at 100 ± 2 . The sample was kept for drying in a hot air oven for 2 hr. The bottle was then removed from the oven, covered with a lid and placed in a desiccator for cooling. After cooling the bottle was weighed. The bottle was again kept in the oven for 2 hours and the above procedure was repeated (heating, cooling and weighing) till the difference in the weight between two successive weighing was less than 1 mg.

RESULTS

Quantitative measurement and Data analysis

All experiments were repeated thrice, result was documented as the average of three readings.

Table 1: Observed values for Proximate study of *Portulacaria afra*

Parameters	Observed Values %
Foreign matter	0.012 ± 0.01
Ethanol Soluble extractive	29.657 ± 0.23
Water Soluble extractive	33.482 ± 0.33
Total Ash	10.300 ± 0.12
Acid Insoluble Ash	3.468 ± 0.31
Water Soluble Ash	0.634 ± 0.20
Loss on Drying	1.45 ± 0.18

CONCLUSIONS

Minute dust residue was seen on the leaves, more so on the adaxial surface and a small number of soil particles on the leaves growing towards the basal region of the plant, collectively contributing to the foreign matter.

Higher ethanol-soluble extractive value is indicative of no adulteration and correct processing during drying of plant sample.

Total ash % which is 10.300 ± 0.12 % is closer to the 11% Total Ash content for *Portulacaria afra* (R. J. Baran), thus indicative of no contamination of the sample.

The acid-insoluble ash value 3.468 ± 0.31 is indicative of siliceous content, whose source can be the oxalates present in *P. afra*.

These parameters along with their modifications specific to *Portulacaria afra* can be used to carry out further research.

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