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Comparative studies on phamacognostical features of some plants of family Verbenaceae

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ABSTRACT

Evaluation of a drug ensures the identity of a drug and determines the standard and purity of medicine by moisture content for the control of microbial contamination and adulteration of chemicals in crude drugs. Total ash is beneficial in detecting the crude drugs that are mixed with various. this study reveals the various sorts of ash value are important for detecting low grade products like, total ash, acid insoluble ash, water soluble ash. the half of moisture content is highest and same in *Duranta erecta* L. and *Lippia alba* (Mill.) ex N.E .Britton & P.Wilson whereas minimum in *Phyla nodiflora* (L.) Greene followed by Stachytarpheta jamaicensis (L.) Vahl. and therefore the highest total ash prefers to found in *Duranta erecta* and lowest in *Stachytarpheta jamaicensis*.

Keywords: Ash value, moisture content, pharmacognosy

INTRODUCTION

Pharmacognosy is a crucial link between pharmacology and medicinal chemistry. Plants used empirically as drugs for centuries and must be continued focusing on isolating and characterizing the active principles of the crude extract (Chandra *et al*. 2007, Singh and Kumar, 2010). The herbal drugs as the main medicine in traditional system and also use of medicine practices since ancient time (Oraon *et al.* 2020). A systematic study of a crude drug under pharmacognostic scheme involves its description on moisture content and ash value. Drying of the material before packaging is important to attenuate moisture content of a crude drug to guard it from microbial contamination or undesired reaction during storage. The crude drugs can be dried either in sunlight or in shade or shade or by use of artificial heat. In order to maintain high degree of quality in a crude drug, it is necessary to store and pressure it properly. Light adversely effects quality of crude drugs which are highly colored whereas moisture favors enzymatic and facilities fungal growth (Kokate *et al.* 2008) Ash value is helpful in the determination of quality and purity of crude drug in powder form. The ash value is defined as the amount of ash amount of ash obtained by incinerating the powdered drug of known value in a silicon crucible and it represents the amount of inorganic elements such as chloride, calcium and manganese (Kumar , G.S. and Jayaveera, K.K. 2014, Mehta et al. 2010)

MATERIALS AND METHODS

The collected plant materials and ready herbarium were identified and authenticated by Flora of Bihar and Orissa and therefore the Flora of British India (Vol. II, IV and VI) and plant specimens were compared with Botanical Survey of India, Central National Herbarium, Howrah.

Moisture Content

40 gm of the cleaned sample was weighed and dried in an oven at 40ºC for 7hrs and therefore the weight was taken after every 2 hrs. intervals. After 2 hrs. intervals the sample was far away from the oven and placed within the desiccator for 30 mins to chill. it had been then removed and weighed again. the share of moisture content within the seed was calculated by the subsequent formula.

Moisture = 100 (W1 – W2) / W2 %

Where W1 = Original weight of the sample before drying

W2 = Weight of the sample after drying

Ash Value

(i) Total Ash Value

Weigh and ignite flat, thin, porcelain dish or a tarred silica crucible. Weigh about 2 gm of the powdered drug into the crucible. The flame heat till vapors almost cease to be evolved, then lower the dish and warmth more strongly until all the carbon is burnt off. Cool in desiccator. Weigh the ash and calculate the share of total ash with regard to the air dried sample of the crude drug (Kokate, 1995).

Calculation

Weight of the empty dish = M

Weight of the drug taken = N

Weight of dish + ash (after complete incineration) = P

Weight of ash = (P – M) gm.

Y gm of crude drug gives (P – M) gm of ash.

Therefore 100 gm of the crude drug gives 100/Y (P – M) gm of the ash.

Total ash value of sample = 100 (P – M) /N %.

(ii) Acid insoluble ash value

The ash is obtained by following the steps as mentioned within the procedure for determination of total ash value of crude drug. Further using 25 ml of dilute HCl, wash the ash from the dish used for total ash into beaker and boil for five mins. Filter through an ash less paper wash the residue, twice with predicament. Ignite a crucible within

the flame, cool and weigh. Put the paper and residue together into the crucible, heat gently until vapors cease to be evolved and therefore the more strongly until all carbon has been removed. Cool during a desiccator.

Calculation

Residue weight = "M" gm

"M" gm of acid insoluble ash = "N" gm of the air dried drug gives.

Therefore 100 gm of the air dried drug give = 100 × M/ N gm of acid insoluble ash.

Acid insoluble ash value of the sample = 100 × M / N %.

(iii) Water soluble ash value

The ash is obtained by following the steps as mentioned within the procedure for determination of total ash value of crude drug. Further using 25ml of water, wash the ash from the dish used for total ash into beaker and boil for five mins. Filter through an ash less paper wash the residue, twice with predicament. Ignite a crucible within the flame, cool and weigh. Put the paper and residue together into the crucible, heat gently until vapours cease to be evolved and therefore the more strongly until all carbon has been removed. Cool during a desiccator. Weigh the residue and calculate acid insoluble ash of the crude drug with regard to the air dried sample of the crude drug.

Calculation

Residue weight = "M" gm

"M" gm of water soluble ash = "N" gm of the air dried drug gives

Therefore 100 gm of the air dried drug give = 100 × M/ N gm of water soluble ash.

Water soluble ash value of the sample = 100 × M / N %.

RESULTS

Moisture content

The moisture content of plant leaves is highest in *Lippia alba* also as also found in *Duranta erecta* which was 74.0 ± 0.152 and 74.0 ± 0.10 respectively and lowest in *Stachytarpheta jamaicensis*. the half of moisture content is highest and same in *Duranta erecta* and *Lippia alba* whereas minimum in *Phyla nodiflora* followed by *Stachytarpheta jamaicensis* shown within the (Table 1, Graph 1)

Ash value

The ash value of *Duranta erecta, Phyla nodiflora, Stachytarpheta jamaicensis* and *Lippia alba* were recorded. the entire ash prefer to of above mentioned plants were 11.2%, 9.86%, 9.33% and 10.66% respectively and therefore the highest total ash prefer to found in *Duranta erecta* and lowest in *Stachytarpheta jamaicensis*.

Acid insoluble ash value of *Duranta erecta* is 3.2%, *Phyla nodiflora* is 2.66%, *Stachytarpheta jamaicensis* is 2.33% *Lippia alba* is 2.76% and greatest common divisor acid insoluble ash value in *Duranta erecta* although lowest in *Stachytarpheta jamaicensis.*

Water soluble ash value of *Duranta erecta, Phyla nodiflora, Stachytarpheta jamaicensis* and *Lippia alba* 7.6%, 8.1%, 7.43% and 8.53% respectively and eight .1% is that the highest water soluble observed in *Phyla nodiflora* whereas 7.43%, rock bottom water soluble ash value found in *Stachytarpheta jamaicensis* and therefore the results were shown in (Table 2 and 3, Fig. 1-4, Graph 2).

DISCUSSION

The Pharmacognostic studies provide useful information to identifying and authenticating of medicinal plants. Amongst four plants the upper moisture content observed in both *Lippia alba* and *Duranta erecta* are 74.0 ± 0.152 and 74.0 ± 0.10 respectively which is extremely on the brink of the leaf moisture content of mulberry varieties 74.54 and 70.67. a complete of 72-74% dried leaves were obtained after drying with laboratory at 50ºC – 60ºC is best suitable temperature for Stevia leaves (Shivashankar, M. 2015). also found that the moisture content of Chopped alfalfa, initially at 70% moisture content. feather palm frond which contains leaves (57% moisture content –wet basis and stem 70% moisture content –wet basis) are dried separately in swirling fluidized bed dryer is on the brink of lowest and highest moisture content in *Duranta erecta* is 74.0 ± 0.10 and *Stachytarpheta jamaicensis* is 60.0 ± 0.057 respectively. Some differences in moisture content caused by seasonal (Samsudin et al. 2013)

The residue remaining after incernation is ash content of drug. Acid insoluble ash value represents detecting presence of silica and oxalates in drugs. The acid insoluble ash as limit test is meant to live the quantity of ash insoluble to diluted acid. the entire ash value of *Duranta erecta* is analogous to the ash contents in Alexandria senna which is 11.2%. the entire mountain oak value of leaves of *Phyla nodiflora* is 9.52 which is nearer to the ash value of bark of *Sesbania sesban*. Water soluble ash value of *Phyla nodiflora* is 8.1% shows close similarity with the aerial parts of *Lippia nodiflora* water soluble ash content which is 7.5% observed by researcher (Sudha, A. and Srinivasan, P. 2013). the entire ash value of *Duranta repens* is 11.2% which resembles the ash content found by another researcher which is 11.49%.

CONCLUSION

Physicochemical characteristics like total ash vale, water soluble and acid soluble ash decided to gauge the purity of the crude drug. Moisture content of a drug should be minimized so as to stop decomposition of crude drugs either thanks to chemical process or thanks to microbial contamination. The residue remaining after incineration is that the ash content of the drug, which simply represents the inorganic salts present in drug and adhering thereto and deliberately added thereto as a sort of adulteration. Therefore, it's a criterion to gauge the identity or purity of crude drugs.

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Table 1: Moisture content of plant leaves

Plant name	Y1 (g) in triplicate			Y2 (g) in triplicate			(Y1 – Y2) g	% Moisture content
Duranta erecta L.	5.0	5.0	5.0	1.3	1.2	1.4	11.1	74.0 ± 0.10
Phyla nodiflora (L.) Greene	5.0	5.0	5.0	1.6	1.9	1.7	9.8	65.33 ± 0.152
Stachytarpheta jamaicensis (L.) Vahl	5.0	5.0	5.0	1.4	1.3	1.3	9.0	60.0 ± 0.057
Lippia alba (Mill.) N.E. Br. ex Britton & P. Wilson	5.0	5.0	5.0	1.5	1.6	1.7	10.2	74.0 ± 0.152

Table 2: Ash Values of the plants

Ash Value	Total Ash Value			Acid insoluble ash value			Water soluble ash value		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
Duranta erecta L.	0.36	0.33	0.32	0.11	0.10	0.08	0.23	0.24	0.23
Phyla nodiflora (L.) Greene	0.30	0.29	0.30	0.09	0.08	0.07	0.22	0.26	0.25
Stachytarpheta jamaicensis (L.) Vahl	0.29	0.28	0.27	0.08	0.07	0.06	0.24	0.23	0.20
Lippia alba (Mill.) N.E. Br. ex Britton & P. Wilson	0.32	0.31	0.33	0.10	0.07	0.08	0.28	0.26	0.23

Table 4 :Mean table of Ash Value

Ash Value		*Duranta erecta*	*Phyla nodiflora*	*Stachytarpheta jamaicensis*	*Lippia alba*
Total ash value	% (w/w)	11.2	9.86	9.33	10.66
	Mean	0.336	0.296	0.28	0.32
	S.D.	0.336 ± 0.0208	0.296 ± 0.0057	0.28 ± 0.01	0.32 ± 0.01
	S.E.	0.336 ± 0.0120	0.296 ± 0.0033	0.28 ± 0.0057	0.32 ± 0.0057
Acid insoluble ash value	% (w/w)	3.2	2.66	2.33	2.76
	Mean	0.096	0.08	0.07	0.083
	S.D.	0.096 ± 0.0152	0.08 ± 0.01	0.07 ± 0.01	0.083 ± 0.02
	S.E.	0.096 ± 0.008	0.08 ± 0.0260	0.07 ± 0.0057	0.083 ± 0.0115
Water soluble ash value	% (w/w)	7.6	8.1	7.43	8.53
	Mean	0.23	0.243	0.223	0.256
	S.D.	0.23 ± 0.0057	0.243 ± 0.0208	0.223 ± 0.0208	0.256 ± 0.0251
	S.E.	0.23 ± 0.0033	0.243 ± 0.0120	0.223 ± 0.0120	0.256 ± 0.0145

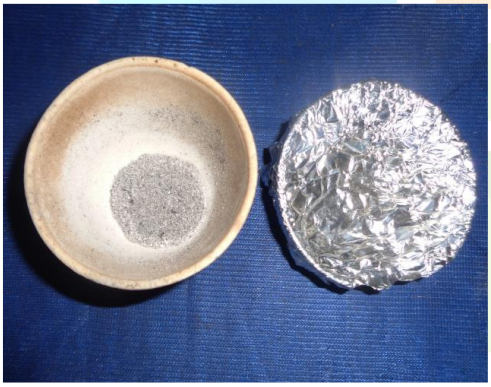


Fig. 1: Ash of *Duranta erecta* L.

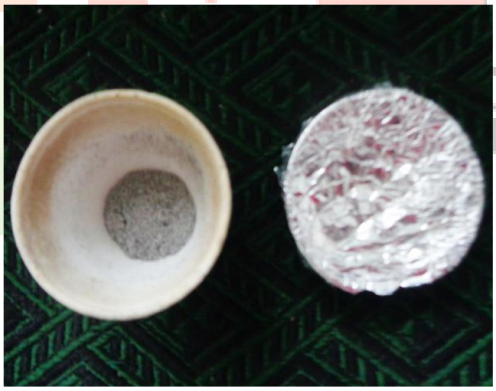


Fig. 2: Ash of *Phyla nodiflora* (L.) Greene

Fig. 3: Ash of *Stachytarpheta jamaicensis* (L.) Vahl.

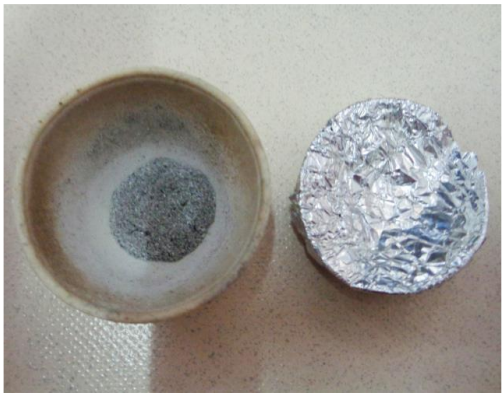
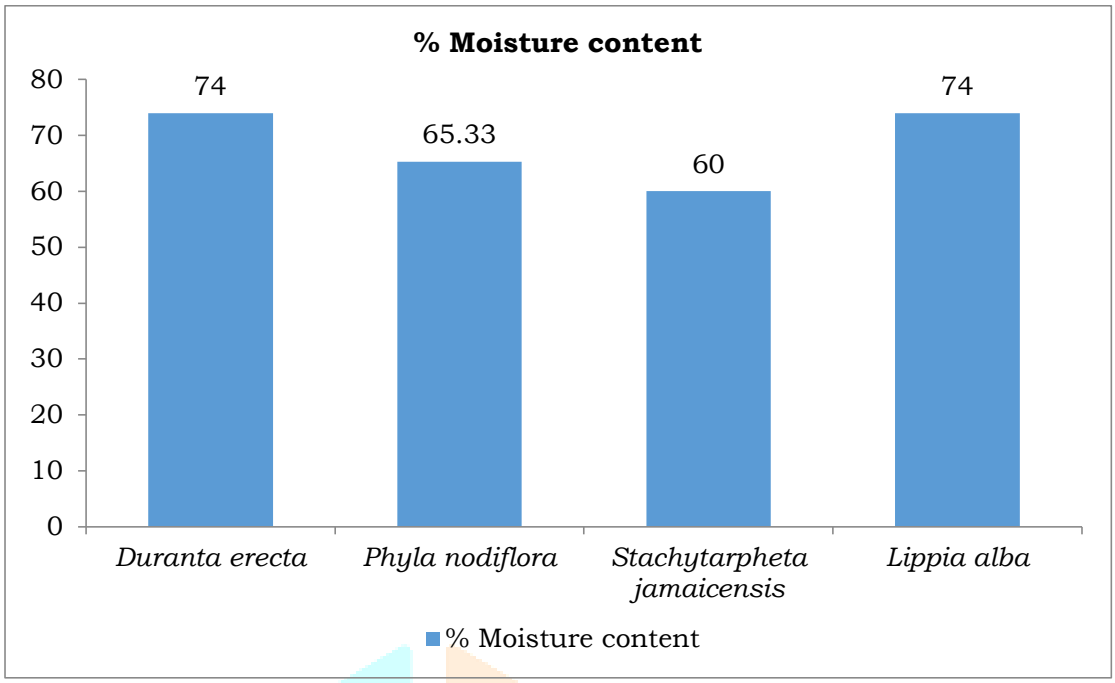


Fig. 4: Ash of *Lippia alba* (Mill.) N.E.Br. ex Britton & P.Wilson

Graph 1: Graph shows the moisture content of plants



Graph 2: Graph shows the ash value of plants