

## Determination of ash values of some medicinal plants of genus *Sesbania* of marathwada region in maharashtra

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### Abstract

The seasonal variation of total ash, water soluble ash and water insoluble ash have been investigated leaves, wood and bark of *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina*, which are medicinally important. Comparative account of total ash, water soluble ash and water insoluble ash content of bark of *Sesbania grandiflora* showed high level of total ash (range 11.80 to 12.10 %) and low level of total ash of leaves of *Sesbania cannabina* (range 5.05 to 5.35 %). The water soluble ash showed higher level of wood of *Sesbania grandiflora* (range 4.30 to 4.80 %) and lower in leaves of *Sesbania cannabina* (range 1.5 to 2.05 %). Comparative account of water insoluble ash of bark of *Sesbania grandiflora* showed higher (range 7.20 to 7.35 %) and lower in the leaves of *Sesbania bispinosa* (range 2.9 to 3.1 %).

**Keywords:** Ash, water soluble ash, water insoluble ash, medicinal plant, *Sesbania*

### INTRODUCTION

All human beings require a number of complex organic/inorganic compounds in diet to meet the need for their activities. The important constituents of diet are carbohydrates, fats, proteins, vitamins, minerals and water (Indrayan *et al.*, 2005). Every constituent plays an important role and deficiency of any one constituent may lead to abnormal developments in the body. Plants are the rich source of all the elements essential for human beings. There is a relationship between the element content of the plant and its nutritional status. Some elements are essential for growth, for structure formation, reproduction or as components of biologically active molecules while others have some other beneficial effects (New Wall *et al.*, 1996).

Qualitative or quantitative determination of mineral elements present in plants is important because the concentration and type of minerals present must often be stipulated on the label of a food. The quality of many foods depends on the concentration and type of minerals what they contain, also play a very significant role against a variety of degenerative diseases and processes, they may also prevent and reduce injury from environmental pollutants and enhance the ability to work and learn, some minerals are essential to a healthy diet (e.g. Calcium, Phosphorus, Potassium and Sodium) where as some can be toxic (e.g. Lead, Mercury, Cadmium and Aluminium). It is clear that mineral nutrition is important to maintain good health and because of that determination of As, Ca, Fe, Mg, Na, K, Zn, Ni, Co etc. have been added to *Ayurvedic Pharmacopoeia of*

India (The *Ayurvedic Pharmacopoeia* of India, 1999). The use of mineral element is found to have been developed and used widely to cure several health problems. The amount and composition of ash remaining after combustion of plant material varies considerably according to the part of the plant, age, treatment etc. The constituents of the ash also vary with time and from organ to organ. Ash usually represents the inorganic part of the plant.

*Sesbania grandiflora* (L.) Pers. is a soft wooded tree belonging to the family Papilionaceae. Flowers are rich in nutrients and are used as vegetables in rural area. Bark is used in treating small pox and other eruptive fevers. The juice from the flower is used to treat head ache, head congestion, or stuffy nose. The powdered bark is also recommended for ulcers of the mouth and alimentary canal and infantile disorders of the stomach (Dhiman 2003). The bark is reported to cure diarrhoea, dysentery, paludism, snake bite, malaria, smallpox, eruptive fever, scabies, ulcer, and stomach disorders in children; in high doses it causes vomiting and mild diarrhoea (Kirtikar, 1993).

The seed samples of *S. bispinosa* are found to contain the highest level of total oligosaccharides (M. Pugalenthil, V. Vadive 2004). Leaves and flowers are prepared as poultices for external application or taken as a decoction for internal ailments. Due to *Sesbania bispinosa* astringent properties, preparations made from it can be used against inflammation, bacterial infections and tumours. In traditional medicine, seed mixed with flour is used to treat ringworm and other skin diseases. *Sesbania cannabina* reported to be aperient, diuretic, emetic, emmenagogue, febrifuge, laxative, and tonic, agati is a folk remedy for bruises, catarrh, dysentery, eyes, fevers, headaches, smallpox, sores, sore throat, and stomatitis (Duke and Wain, 1981).

### MATERIAL AND METHODS

Method recommended in pharmacopoeia of India (Anonymous, 1966), and British Pharmacopoeia (Anonymous, 1973) were followed for determining Ash value and percentage method and

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t-test comparison (Freund, 1977).

Preparation of Ash: 3gm of drug was incinerated in a Silica crucible over the burner. The charred material was heated in muffle furnace for six hours at 600-650°C. The ash formed was white and free from carbon. It was cooled and weighed on the ash less filter paper.

Determination of Water Soluble Ash: The ash was boiled for 5 minutes with 25ml of distilled water. Insoluble matter was collected in a crucible or ash less filter paper and washed with hot water, ignited and weighed. Weight of the insoluble matter was subtracted from the weight of ash. The difference in weight represent the water soluble ash. Percentage of water soluble ash was calculated with reference to the air dried drug.

## RESULTS AND DISCUSSION

*Sesbania grandiflora* -The total ash content of leaves ranges from 7.5% to 7.75 %. Higher level during Summer (7.75%), than Monsoon (7.65%) and Winter (7.50%). The total ash content of wood was higher level at winter (10.85%) than Summer (10.45%) and

monsoon (10.00%). The total ash content of bark was higher level at winter (12.1%) than monsoon (11.85%) and summer (11.8 %) respectively. The percentage of total ash found to be in the increasing order leaves < wood < bark. The range of water soluble ash content of leaves was ranging from 3.5% to 3.65% highest solubility observed at monsoon 3.65%. Than summer 3.55% than winter 3.5%.

Bark showed higher level of water soluble ash at winter 4.75 % over than summer (4.6 %) and monsoon (4.5%) and wood showed of high water soluble ash at summer (4.8 %) than in monsoon (4.3%) and winter (4.5 %). The percentage of ash solubility in water to be increasing order as leaves < wood < bark.

The range of water insolubility ash content is in wood 5.65% to 6.35%, In wood winter shows higher (6.35%) as compared to monsoon (5.7%) and summer (5.65%). In bark show higher level of water insolubility at monsoon 7.35% than winter 7.25% and summer 7.2%. In leaves water insolubility is low as compared to other season it range from 4 to 4.2 % respectively. The percentage of water insolubility to be in the increasing order of leaves < wood < bark. (Table.1)

Table 1. Determination of Ash Values of *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina*

Plant parts	Season	Total ash (%)			Water soluble (%)			Water insoluble (%)		
		Plant 1	Plant 2	Plant 3	Plant 1	Plant 2	Plant 3	Plant 1	Plant 2	Plant 3
Leaves	Summer	7.75	5.55	5.05	3.55	2.65	2.05	4.20	2.9	3
	Monsoon	7.65	5.65	5.35	3.65	3.5	1.75	4.00	2.25	3.1
	Winter	7.50	6.2	5.05	3.50	3	1.5	4.00	3.1	3.55
Wood	Summer	10.45	11.4	5.75	4.80	5.3	2.7	5.65	6.1	3.05
	Monsoon	10.00	12	6.1	4.30	5.6	2.7	5.70	6.4	3.4
	Winter	10.85	12.25	6.15	4.50	5.75	2.75	6.35	6.5	3.4
Bark	Summer	11.80	10.95	6.55	4.60	4.75	3.6	7.20	6.2	2.95
	Monsoon	11.85	11.35	6.85	4.50	4.4	3.5	7.35	6.45	3.35
	Winter	12.10	10.7	7.15	4.75	5.2	3.6	7.25	5.5	3.65

*Sesbania bispinosa* - Total ash content in leaves it ranges from 5.55% to 6.2% highest being observed in winter 6.2% than monsoon 5.65% and summer 5.55%. The bark had higher total ash content at monsoon 11.35% as compared to summer 10.95% and winter 10.7%. In Wood total ash content higher at winter 12.25% than monsoon 12.00% and summer 11.4%. The percentage of total ash were found to be in the increasing order of leaves < bark < wood. The water solubility of ash in leaves ranges from 2.65 to 3.5. Monsoon (3.5%) show high ash solubility in water as compared to winter 3.00% and summer 2.65% respectively.

Water solubility of ash content of bark was ranging from 4.75% to 5.2%. Highest being observed at winter season compared to summer 4.75% and monsoon 4.4 %. In Wood winter show water solubility of ash at high level 5.75% as compared to monsoon 5.6% and summer 5.3%. The percentage of water solubility of ash were found to be in the increasing order of leaves < bark < Wood (Table .1).

The water insolubility of ash in leaves show higher level in winter 3.1% as compared to summer 2.9% and monsoon 2.25%. The bark water insolubility of ash in leaves ranges from 5.5 to 6.45%. Higher insolubility observed at monsoon 6.45 % than summer 6.2% and winter 5.5%. The bark show highest water insolubility of ash as compared to wood and leaves it ranges from 6.1 to 6.5%. Higher insolubility observed in winter 6.5% than other season. The percentage of water insolubility of ash is increasing order of leaves < wood < bark. (Table.1)

*Sesbania cannabina* -Total ash content of leaves was ranging from 5.05% to 5.35% among different season tested while monsoon leaves show high level of total ash 5.35% as compared to both season summer and winter i.e. (5.05%). While in bark total ash ranges from 6.55% to 7.15%. Highest level of total ash observed at winter 7.15% than monsoon 6.85% and summer 6.55%. The Wood total ash ranges from 5.75% to 6.15%. Higher level of total ash observed at winter 6.15% than monsoon 6.1% and summer 5.75%. The percentage of total ash were found in the increasing order leaves < wood < Bark Table. 1).

The range of water solubility of ash content of leaves ranging from 1.5 to 2.05% highest level of water solubility observed at summer 2.05% as compared to monsoon 1.75% and winter 1.5%. Wood ash show lower level of water solubility ash in both season i.e. summer and monsoon 2.7% to 2.75% in winter. While Bark show highest level of water solubility ash 3.65% in summer as well as in winter than monsoon (3.55). The percentage of water solubility of ash were found to be in the increasing order of leaves < Wood < bark.

The water insolubility of ash of leaves ranging from 3.00 to 3.55% .winter show highest water insolubility of ash 3.55% than monsoon 3.1% than summer 3.00% .Bark show highest level of water insolubility of ash in winter 3.65% than monsoon 3.35% than summer 2.95%. Wood ash water insolubility show ranges from 3.05 to 3.4% higher level observed at monsoon and winter 3.4% than summer 3.05%. The percentage of water insolubility of ash were

found be in the increasing order of leaves< Bark<wood. (Table.1)

## REFERENCES

- [1] Anonymous, (1973). British Pharmacopoeia. By Her Majesty's stationary office, London,U.K
- [2] Anonymous.(1999). The *Ayurvedic Pharmacopoeia* of India, 1999: Government of India, Ministry of health and family welfare, *Department of Indian system of medicine and homeopathy* Vol 1, Ed 1st.
- [3] Dhiman AK. (2003). Sacred plants and their medicinal uses. Daya publishing house, Delhi, 17, 2.
- [4] Duke, J.A. and Wain, K.K. (1981). *Medicinal plants of the world*. Computer index with more than 85,000 entries. 3 vols
- [5] Freund, J.E. (1977). Modern Elementary Statistis.Edition 4, Prentice Hall of Indian Private Limited, New Delhi.
- [6] Indrayan, A.K., Sharma, S., Durgapal, D., Kumar, N. and Kumar, M., (2005). Determination of nutritive value and analysis of mineral elements for some medicinally valued plants from Uttaranchal. *Current Sci* 89, 1252-1255.
- [7] Kirtikar, K. R.(1993). *Indian Medicinal Plants*. Allahabad: *Leader Press*, p. 735.
- [8] Pugalenth,M., V. Vadive (2004). Comparative Nutritional Evaluation of Little Known Legumes, *Tamarindus indica*, *Erythrina indica* and *Sesbania bispinosa* Tropical and Subtropical AgroecosyWoods, 2004(4): 107 – 123.
- [9] New Wall, C.A., Anderson, L.A. and Phillipsan, J.D., (1996). Herbal medicines- A guide for healthcare professionals. The Pharmaceutical Press, *London of Clinical Pathology*, 45: 493-496.