



## 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, acid soluble ash and acid 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, acid soluble ash and acid insoluble ash content of bark of *Sesbania grandiflora* showed high level of total ash (range 11.8 to 12.1 %) and low level of total ash of leaves of *Sesbania cannabina* (range 4.9 to 5.6 %). The acid soluble ash showed higher level of bark of *Sesbania grandiflora* (range 8.15 to 8.7 %) and lower in leaves of *Sesbania cannabina* (range 3.75 to 4.05 %). Comparative account of acid insoluble ash of bark of *Sesbania grandiflora* showed higher (range 3.4 to 3.75 %) and lower in the leaves of *Sesbania bispinosa* (range 1.15 to 1.6 %).

**Key Words:** Total ash, acid soluble ash, acid insoluble ash, medicinal plant, *Sesbania*

### Introduction

The phytochemical constituents and medicinal properties of most of the medicinal plants were recorded in the last few decades by a number of workers (Nadkarni, 1976, Joshi, 2000, Nudrat and Usha, 2005). These medicinal plants are subjected to various processes and are then administered to the patients. The survey and documentation of medicinally important plants in each and every place is very much important for easy identification of local traditional healers, conservation and sustainable utilization.

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). Plants are the rich source of all the elements essential for human beings. 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 contains, 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 thstomach (Dhiman 2003).The bark is reported to cure diarrhoea, dysentery, paludism, snake bite, malaria, smallpox, eruptic fever, scabies, ulcer, and stomach disorders in children; in highdosis it causes vomiting and mild diarrhoea (Kirtikar, 1993).

The seed samples of *S.bispinosa* are found to contain the highest level of total oligosaccharieds ( M. Pugalenthil, V. Vadive 2004) . Leaves and flowers are prepared as poultices for external application or taken as a decoction for internalailments. Due to *Sesbania bispinosa*'s 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* resorted 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)

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### 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.

**\*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<sup>o</sup>c. The ash formed was white and free from carbon. It was cooled and weighed on the ash less filter paper.

**\*Determination of Acid-insoluble Ash-** The acid was boiled for 5 minutes with 25ml of dilute hydrochloric acid. Insoluble matter collected in crucible or on an ash less filter Paper and washed with hot water, ignited and weight. Percentage of acid insoluble ash was calculated with reference to the air dried drug.

### Results and discussion

**Sesbania grandiflora** - Total ash of leaves range from 7.5 to 7.75% higher level of total ash show at summer (7.75%) than monsoon (7.65%) winter (7.5%). Bark total ash showing at higher level at winter 12.1% as compared to monsoon 11.85% and summer 11.8%. Total ash of wood content show higher level at winter 10.85% than summer 10.46% and monsoon 10.00% The percentage of total ash were found to be in the increasing order of leaves < wood < bark.

The range of acid soluble ash content of leaves was ranging from 4.65% to 4.9 % among different season tested (Table) Wood show higher level of acid solubility ash content (i.e. 7.15 to 7.75) Higher level show at winter 7.75% than summer 7.65% and monsoon 7.15% Bark show higher level of ash soluble at winter 8.7 as compared to monsoon 8.25% and summer 8.15%. The percentage of acid solubility ash were found to be in the increasing order of leaves < wood < Bark.

Acid insoluble of ash of leaves was higher at monsoon 3.00% as compared to summer and winter 2.85. The range of percentage of acid insoluble ash of wood show higher than leaves (2.85 to 3.00). Bark (3.4 to 3.75%). In Wood acid insoluble ash show higher level at winter 3.1 than summer 2.8% and monsoon 2.85%, while in bark highest acid solubility of ash at summer 3.75% than winter 3.4% and monsoon. 3.6%. The percentage of acid insoluble ash content were found to be in increasing order of leaves < wood < bark (Table.1)

**Sesbania bispinosa** - The percentage of total ash content of leaves show highest level at winter 5.95 as compared to monsoon 5.90% and summer 5.55% in bark total ash content observed higher level at monsoon 11.75 % as compared winter 10.55% and summer 11.15, while in Wood total ash ranges from 11.35% to 12.1% highest level observe at winter 12.1% than monsoon 11.35% and summer 11.6 %. The percentage of total ash content

where found to be in increasing order of Leaves < Bark < Wood.

The acid soluble ash of leaves was measured, summer (4.00%), monsoon (4.1%) and winter (4.2%) and found if maximum in winter. The acid soluble ash of wood was highest at winter (9.00%) than summer (8.85%) and monsoon (8.65%). The acid soluble ash of bark ranges from 8.1 to 8.8 % higher being in monsoon 8.8% as compared to summer 8.5% and winter 8.1%. The percentage of acid soluble of ash were found to be in the increasing order of leaves < bark < Wood.

The acid insoluble ash content of leaf was measured summer (1.55%), monsoon (1.8%) and winter (1.75%) and found its maximum in monsoon. The bark show acid insoluble ash range from 2.45% to 2.95%, higher level being observed in monsoon 2.95 as compared to Summer 2.65 and winter 2.45 %, While in Wood show low acid insolubility of ash it measure at monsoon 2.7% . As compared to other season, the percentage of acid insolubility as were found to be in the increasing order of leaves < Bark < wood. (Table.1)

**Sesbania cannabina**- The total ash content of leaves ranges from 4.9 to 5.6 %, higher level being during season at summer (5.6%) than monsoon 5.55% and winter 4.9%. While in wood total ash ranges from 6.05 to 6.15% and in bark it ranges from 6.55 to 7 % in wood and bark winter shows highest total ash as compared to other season. The percentage of total ash content were found to be in the increasing order of leaves < wood < bark.

The Acid solubility of ash of leaves ranges from 3.75 to 4.05%. In bark acid soluble ash ranges from 4.35% to 4.7%. Maximum solubility observed at winter 4.7 % than monsoon 4.5% and summer 4.35. While in wood observed that monsoon 4.4 % maximum content of total ash as compared to Summer 4.3 and winter 4.2%. The percentage of acid soluble ash content were found to be in increasing order of leaves < bark < Wood.

The acid insoluble ash concentration of leaves show maximum at summer 1.6% than monsoon 1.5% and winter 1.15%. The acid insoluble ash content of bark ranges from 2.2% to 2.35% maximum insolubility observed at monsoon 2.35% while percentage of acid insolubility ash of wood was higher at winter 1.95 as compared to summer 1.75 and monsoon 1.7%. The percentage of acid insoluble ash content were found to be in increasing order of Wood < leaves < Bark. (Table.1)

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

Plant parts	Season	Total ash (%)			Acid soluble (%)			Acid 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	5.6	4.9	4	4	2.85	1.55	1.6
	Monsoon	7.65	5.9	5.55	4.65	4.1	4.05	3	1.8	1.5
	Winter	7.5	5.95	4.9	4.65	4.2	3.75	2.85	1.75	1.15
Wood	Summer	10.45	11.6	6.05	7.65	8.85	4.3	2.8	2.75	1.75
	Monsoon	10	11.35	6.1	7.15	8.65	4.4	2.85	2.7	1.7
	Winter	10.85	12.1	6.15	7.75	9	4.2	3.1	3.1	1.95
Bark	Summer	11.8	11.15	6.55	8.15	8.5	4.35	3.75	2.65	2.2
	Monsoon	11.85	11.75	6.85	8.25	8.8	4.5	3.6	2.95	2.35
	Winter	12.1	10.55	7	8.7	8.1	4.7	3.4	2.45	2.3

**Plant 1-Sesbania grandiflora, **Plant 2-Sesbania bispinosa and **Plant 3-Sesbania cannabina******