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RESEARCH ARTICLE

MINERAL PROFILE OF EDIBLE GREEN LEAFY VEGETABLE - *SESBANIA GRANDIFLORA* (L.) PERS.

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ABSTRACT

Green leafy vegetables are valuable in maintaining alkaline reserve in the body is valued mainly for their high vitamin, dietary fiber and mineral contents. Dry leaf extract of *Sesbania grandiflora* (L.) Pers was evaluated for mineral compositions like potassium, phosphorus, calcium, magnesium, iron and sodium. The mineral compositions obtained suggests that the leaves as a cheap source of minerals and can be incorporated into human diet to meet their recommended daily allowances.

INTRODUCTION

Leafy vegetables generally a good source of vitamins, mineral and essential micronutrients in human body. Scanty information are available in respect to this important aspect, earlier Gopalan *et al.* (1921-1925) had analyzed some essential micronutrient content in leafy vegetables and also in few wild species of plant in India. Most developing countries depend on starch-based food as the main staple food for the supply of both energy and protein. Green leafy vegetables have been recognized as rich source of micronutrients (minerals and vitamins) and antioxidants (Kala and Prakash, 2004). India being blessed with a variety of natural surrounding and varying climates and seasons have a number of edible green leafy vegetables. Leafy green vegetables are an important component of the human diet, providing fibre, minerals and vitamins (Acikgoz, 2011; Emebu and Anyika, 2011). The high biological value of leafy vegetables depends on the pronounced content of the minerals compound especially, calcium, magnesium, phosphorus and iron (Jaworska and Kmiecik, 1999). These green leafy vegetables are important protective foods and highly beneficial for the maintenance of health and prevention of diseases. Recognizing the need for identification of such green leafy vegetables, which are believed to be nutritious, may help in achieving nutritional security, contains many bioactive compounds and thus serves as an important source of minerals, vitamins and certain hormone precursors in addition to protein and energy sources

(Cho *et al.*, 2004). The diet and the food based approach in combating micronutrient malnutrition is essential for its role in increasing the availability and consumption of micronutrient rich foods. Green leafy vegetables are important component of the dietary regime of humans because they provide the necessary vitamins and minerals (Fasuyi, 2006). The awareness of the popularity on the significance of nutrition in health has resulted to an increasing quest for biochemical knowledge of composition of foods.

Taxonomic Position of *Sesbania grandiflora* (L.) Pers

Division: Magnoliophyta
Class: Magnoliopsida
Order: Fabales
Family: Fabaceae
Genus: *Sesbania*
Species: *Sesbania grandiflora* (L.) Pers

Sesbania grandiflora (L.) Pers (Plate 1) is an open branching tree upto 15 m tall and 30 cm in diameter. Roots are normally heavily nodulated with large nodules. Stems tomentose, unarmed. Leaf pinnately compound, up to 30 cm long including a petiole 7-15 mm long, the rachis is slightly pubescent or glabrous. There are 20-50 leaflets in pairs opposite to alternate on the same leaf, oblong to elliptical, 12-44 mm x 5-15 mm, rounded to obtuse to slightly emarginate at the apex, glabrous or sparsely pubescent on both surfaces. Raceme are in axillary, 2-4 flowered, rachis up to 65 mm long. The flowers are white, yellowish, rose-pink or red, the calyx is 15-22 mm long, closed in young buds, splitting or breaking at

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anthesis and the basal parts are persistent in the fruit. The ovary and style are glabrous. Pods are linear to slightly falcate. Seeds are subreniform, 6.5 x 5 mm x 2.5-3 mm, dark brown.



Plate 1. *Sesbania grandiflora* (L.) Pers.

It is native to Tropical Asia including India, Indonesia, Malaysia, Myanmar and Philippines with possibly Indonesia as the centre of diversity. Leaves used as tonic, diuretic, laxative, antipyretic, chewed to disinfect mouth and throat. The leaves, seed pods and flowers are used as human food in southeast Asia. Hence, the present study was undertaken with the aim to evaluate the mineral profile of green leafy vegetable, *Sesbania grandiflora* (L.) Pers. The result of our study can be used as a fundamental data for dietary recommendation to help the consumer to select appropriate leafy vegetable to meet their nutrient and health needs.

MATERIALS AND METHODS

Collection and preparation of sample

The green leaves of *Sesbania grandiflora* were harvested. The leaves were destalked, washed and shade dried to avoid destroying active compounds.

The dried leaves were then ground to homogenous powder using wiley mill grinder and then stored in an air tight container for further analysis. The sample was then subjected to biochemical analysis.

Mineral Analysis

Mineral analysis were carried out according to the procedure of Association of Official Analytical Chemist, 1976. Distilled water and acid washed glasswares were used throughout the analysis.

RESULTS AND DISCUSSION

The green leafy vegetable is a good source of minerals as shown in Table 1. The highly soluble minerals Calcium, Magnesium, Phosphorus, Iron and Potassium help in the maintenance of acid base balance of the hydrogen ion concentration of the body tissues. They complete the absorption of vitamins, proteins, fats and carbohydrates of the food (Islam *et al.*, 2004). Calcium and Iron furnish all the cells and tissues of the body with the elements and the nutritional enzymes which they need. The calcium content in *S.grandiflora* leaf is 989mg/100g which was less when compared with *Moringa oleifera*, 1402mg/100g (Ibok *et al.*, 2008). Calcium is required for bone and teeth formation and in the proper functioning of the nervous system. It has been suggested that commonly consumed leafy vegetable are a superior source of calcium to milk (Miller *et al.*, 1947; Oke, 1966). Magnesium and potassium are essential for acid base and electrolyte balance in the body. The magnesium content of *S.grandiflora* is 131mg/100g which is less when compared with *Amaranthus caudatus*, *Amaranthus spinosus* and *Amaranthus hybridus* with 320mg/100gm, 380mg/100g and 460mg/100g (Charles and Jonathan, 2010) respectively. Potassium is required in muscle and nerve function. *S.grandiflora* gave the value of 690mg/100g which is high when compared with *Celosia argentea*, 62.34mg/100g (Goebel *et al.*, 2010). Phosphorus is important in the energy transfer of nucleic acids. Its value in *S.grandiflora* is 679mg/100g which is high when compared with phosphorus content in *Celosia argentea*, 38.01mg/100g (Goebel *et al.*, 2010).

Table 1. Mineral composition of *Sesbania grandiflora* (L.) Pers. Leaf

Mineral Element	Concentration mg/100g dry matter
Calcium	989
Potassium	690
Sodium	66
Phosphorus	679
Magnesium	131
Iron	18

Table 2. Comparison of Mineral Profile of *Sesbania grandiflora* (L.) Pers leaves with recommended dietary allowance (RDA)

Mineral Element	Concentration mg/100g dry matter	Recommended Dietary Allowance (RDA)			
		Adult (Male)	Adult (Female)	Children (7-10 years)	Pregnant and Lactating mothers
Calcium	989	800	800	800	1200
Potassium	690	2000	2000	1600	2000
Sodium	66	500	500	400	500
Phosphorus	679	800	800	800	1200
Magnesium	131	350	280	170	375
Iron	18	10	15	10	13

Iron is an essential trace element for haemoglobin formation, normal functioning of the central nervous system and in the oxidation of carbohydrates, proteins and fats (Adeyeye and Otikiti, 1999). Iron content in *S.grandiflora* is 18mg/100g which is low in *Celosia argentea*, 15.25mg/100g (Goebel *et al.*, 2010). Sodium prevents chronic disease particularly hypertension. Sodium content in *S.grandiflora* is 66mg/100g which is low in *Celosia argentea*, 35.25mg/100g (Goebel *et al.*, 2010). The mineral composition of *Sesbania grandiflora* leaf (Table 2) unravels a high concentration of calcium and iron in comparison with RDA values. Children, women of reproductive age and pregnant women are most vulnerable to micronutrient deficiency and anaemia. Hence they need food with high iron content. When the *Sesbania grandiflora* leaves with high calcium and iron content are taken in dishes, there is no need to supplement calcium and iron. In conclusion, the study has revealed that leaves of *Sesbania grandiflora* is potential source of some macro and micronutrient needed by man. Since leafy vegetables contain appreciable level of nutrients and are readily available, they could be consumed to supplement the scarce or non-available sources of nutrients for adults, children, pregnant and lactating mothers.

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