

Proximate compositional analyses of seeds of some wild legumes of Chhattisgarh

SOURABHI BARMAN¹, KIRAN VAJPAI² and SHARAD K. VAJPAI^{1*}

¹Department of Chemistry, C.M. Dubey Postgraduate College, Bilaspur - 495 001 (India).

²Department of Chemistry, Government Bilasa Girls' Postgraduate College, Bilaspur - 495 001 (India).

(Received: July 06, 2010; Accepted: August 01, 2010)

ABSTRACT

Seeds of five wild plants of Leguminosae family growing in the Chhattisgarh state viz. Australian Babool (*Acacia auriculiformis*); Pancha Sunkesula (*Peltoforum ferrugineum*); Kasood (*Cassia siamea*); Vilayati Kikkar (*Parkinsonia aculeate*) and Mesquite (*Prosopis juliflora*) were analysed for their proximate composition and micro-nutrient contents in them. Moisture, Ash, Total Organic Matter, Proteins, Fats, Crude Fibre, Carbohydrates, Nitrogen and Calorie contents of the five seeds are reported in this communication. Results of micro-nutrient (Fe⁺⁺⁺, Mn⁺⁺, Zn⁺⁺ and Cu⁺⁺) analyses are also given.

Key words: Wild legumes, Leguminosae, Chhattisgarh.

INTRODUCTION

The population of the developing countries relies to about 80% on traditional medicines for their primary health needs and 85% of these traditional medicines involve use of plant extracts. This means that about four billion people depend on natural products as the primary source of medicine ¹. Chhattisgarh is one of the largest tribal states of India situated between 17° – 23° 7' North latitude and 80° 40' – 83° 38' East longitude. It receives annual average rainfall of 60". The Chhattisgarh was declared a herbal state as 44% of the total geographical area of the state is covered by forest ². These forests contain an incredible number of plant species and these plants find applications in the treatment of many ailments and nutrition. In this communication we are reporting the results of proximate compositional analyses and micro-nutrient analyses of seeds of five plant species of leguminosae family growing in Chhattisgarh state.

EXPERIMENTAL

The seeds of plants were collected, cleaned and dried in shade. The cleaned seeds were then crushed mechanically. Proximate analyses of the seeds were determined using ³⁻⁴. Moisture ⁵, Ash ⁵, Total Organic Matter ¹ were calculated with methods reported in literature. Fat contents of the seeds were estimated by refluxing the crushed seeds with petroleum ether (60°-80°) in a soxhlet extractor for 8-10 hours. Crude fibre was determined by method mentioned in literature ⁶. Nitrogen was estimated in the samples using Kjelteltech system 1002 making use of instructions in the manual.

Calorific value of the original and defatted seeds was determined using Julius – Peter Bomb Calorimeter. Micronutrients in the seeds were determined by preparing acid extracts of seed samples by the method of Jackson and read on Perkin-Elmer atomic Absorption Spectrophotometer model 3110. The calculations were made as per dilution⁷.

RESULTS AND DISCUSSION

The results of the analyses of seeds for Moisture, Ash, Total Organic Matter, Proteins, Fats, Crude Fibre and Carbohydrates are recorded in table 1.

Percentage of nitrogen and calorific value determined in the original seeds and defatted seeds are recorded in table - 2 below.

Table - 3 gives the results of micro nutrient compositional analyses of the seed ash.

A perusal of table – 1 reveals that all the seeds have moisture contents H⁵ percent, which is much below 15 percent level, hence all these five seeds are capable for storage for long durations^a. Ash, which is a measure of total mineral matter. Was maximum in the seeds of *A. Auriculiformis* (10.69%). In all other four seeds it was around or below 5%, which indicate that all the seeds except *A. Auriculiformis* have very little mineral matter in them. Total Organic Matter in all the seeds were above 95% in all the seeds leaving alone *A. Auriculiformis* which has 89.31% total organic matter, thus all the five seeds may be considered to be

Table 1: Proximate analyses of seeds

S. No.	Name of the Seed	Moisture (%)	Ash (%)	Total Organic Matter (%)	Proteins (%)	Fats (%)	Crude Fibre (%)	Carbohydrates (%)
1	<i>A. auriculiformis</i>	5.68	10.69	89.31	25.06	12.98	32.8	18.47
2	<i>P. ferrugineum</i>	4.93	5.11	94.89	24.31	3.14	5.87	56.57
3	<i>C.Siamea</i>	5.96	4.66	95.34	21.93	7.72	10.13	55.56
4	<i>P. aculeate</i>	5.8	2.12	97.88	18.31	5.31	8.89	63.96
5	<i>P. juliflora</i>	5.59	3.53	96.47	15.62	2.51	3.01	76.74

Table 2: Calorific value and Nitrogen % in the Seeds

S. No.	Name of the Seed	Calorific Value (calorie per gm sample)		Nitrogen %	
		Original Seeds	Defatted Seeds	Original Seeds	Defatted Seeds
1	<i>A. auriculiformis</i>	4155	3736	2.86	4.01
2	<i>P. ferrugineum</i>	3856	3654	2.22	3.89
3	<i>C.Siamea</i>	4046	3986	1.52	3.51
4	<i>P. aculeate</i>	4260	4016	1.3	2.93
5	<i>P. juliflora</i>	3766	3376	1.4	2.5

Table 3: Micro nutrient composition of the seeds (ppm)

S.No.	Name of the Seed	Fe ⁺⁺⁺	Mn ⁺⁺	Zn ⁺⁺	Cu ⁺⁺
1	<i>A. auriculiformis</i>	1239	53	39	14
2	<i>P. ferrugineum</i>	63	131	52	12
3	<i>C.Siamea</i>	101	19	65	20
4	<i>P. aculeate</i>	51	17	31	7
5	<i>P. juliflora</i>	4982	37	75	19

highly nutritious⁸. Proteins were found to be in fairly large amounts in all the five seeds ({" 15%), hence, these seeds can be good source of proteins and in turn of essential amino acids.

Seeds of *A. Auriculiformis* and *P.juliflora* were found to be having fairly large amount of Fe⁺⁺⁺. Iron is a trace element for haemoglobin formation, normal functioning of central nervous system and oxidation of carbohydrates, proteins and fats in the metabolic process⁹.

REFERENCES

1. Anhwange, B.A.; Ajibola, V.O. and Oniye, S.J. *Chem. Class J.*, **19**(5): 9 -13 (2004).
2. Chandrakar, P.L. and Tripathi, K. Chhattisgarh Atlas, Sharda Publications, Bilaspur, 45 (2003).
3. A.O.A.C. Associan of Official Analytical Chemists, Washington D.C Official Methods of Analysis, 13th Edition (1980)
4. Wilton, A.L. And Wilton K.B. Analysis of Food, Chapman and Hall Ltd., London, 143 (1968).
5. Allen, E.S.; Grimshaw, H.M and Parkinson, J.A., Chemical Analysis of Ecological Material, Blackwell Scientific Publications, Oxford, pp 80 – 81
6. Hassan, L.G. and Umar, K.J. *Pak. J. Nutrition*, **5**(6): 522-529 (2006).
7. Jacbron, M.C., Soil Chemical Analysis, 2nd Edition, 1979, PHI Pvt. Ltd, New Delhi.
8. Sena, L.P.; Rivera, C.; Tsin, A.T., Millson, M. and Glew, R.H. *Plant Food for Human Nutrition*, **52**(1): 17-30 (1998).
9. Adeyeye, E.I. And Otokiti, M.K.O., *Discovery and Innovation*, **11**: 75-81 (1999).