World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 6.129

NUTRITIONAL ANALYSIS OF RAW SEEDS OF *CROTALARIA* SPECIES FROM VIDARBHA REGION, MAHARASHTRA

***[1]Priyanka Pandharmise, [2]Dhnyaneshwar Bhadange and [3]Deepak Koche**

Department of Botany, Shri Shivaji College of Arts, Com. and Science, Akola- 444001 (MS).

***Corresponding Author: Priyanka Pandharmise**
Department of Botany, Shri Shivaji College of Arts, Com. and Science, Akola- 444001 (MS).

Article Received on 04/08/2019 **Article Revised on 25/08/2019** **Article Accepted on 15/09/2019**

ABSTRACT

Crotalaria is a herbaceous genus from Leguminosae group (family- Fabaceae), mostly found in wild. Proximate analysis comparising protein, carbohydrate, crude fiber and crude lipid content of five species of Crotalaria was done. It was noted that all samples have significant amount of proximate content, especially protein and carbohydrate. The range of protein content was 16.65±0.15% to 22.15±0.12%) while that of carbohydrate was 52.16± 0.07% to 65.62± 0.09%. The contents of crude fiber and crude lipids were also significant in all analyzed samples. All the seed materials were also found to have sizable amount of minerals, especially *C. juncea* and *C. verrucosa*. Therefore it is suggested that all five species of *Crotalaria* could be used as food or fodder to meet their nutritional needs.

KEYWORDS: *Crotalaria*, Mineral content, Nutrition, Proximate analysis.

INTRODUCTION

Leguminosae comprises a very important group of food plant, particularly in the developing countries. Most of these plant products are considered as a cheap source of protein for livestock. A significant part of human population relies on legumes as staple food particularly in combination with cereals. They are unique foods because of their rich nutrient content like carbohydrate, protein, dietary fibre, and minerals.[1] Their nutritional contents contribute to many health benefits to the humans beings and livestock.[2,3] Most of the research on dry beans has been related to varietal selection. The criteria for selection have always been resistance to diseases or yields but nutritional quality.[4] A study of the composition and nutritive quality of dry beans would therefore be of great interest; it may provided new direction to the work of investigators involved in varietal selection and also reduce or eliminate anti-nutritional factors to make edible and non edible legume seeds more acceptable. This kinds of studies would also help to increase the availability of food by processing underutilized varieties into edible forms. Considering these facts, the present attempt is to analyze the nutritive content of Crotalaria species- a non-edible legume found in Vidarbha region of Maharashtra state, India.

MATERIAL AND METHODS

The seed material of five *Crotalaria* species were collected from different agricultural waste land patches and forest areas of Vidarbha region (MS). After their taxonomic authentication (Naik, 1998), they were further used for experimentation.

The dried seed samples were washed under running water twice. Later after drying, the seed samples of each *Crotalaria* species were ground to a fine powder and stored at 5ºC in air-tight containers prior to further analysis.

AOAC methods were applied to carryout nutritive analysis of the samples crude fiber, crude lipid, proteins and carbohydrates. The determination of proteins in terms of nitrogen was done by micro Kjeldahl method involving digestions, distillation and finally titration of the sample.[5] The nitrogen value was converted to protein by multiplying to a factor of 6.25. The lipid content of the samples was done using Soxhlet type of the direct solvent extraction method. The solvent used was petroleum ether (boiling range 40-60 ºC). The crude fibre was also determined by the method described by ((Haro et al., 1968 and Boussama et al., 1999).[6-7] The total carbohydrates were determined by Anthrone method.[8] All the proximate values were reported in percentage.[9] The mineral content was done using atomic absorption spectroscopy (Elico, model-SL 176).

Table 1: Nutritional analysis of seeds of *Crotolaria* species collected from study area.

Components	*Crotalaria juncea*	*Crotalaria pallida*	*Crotalaria prostrata*	*Crotalaria orixensis*	*Crotalaria verrucosa*
Proteins	20.18± 0.16	17.28±0.09	16.65±0.15	19.28±0.25	22.15±0.12
Carbohydrate	59.16± 0.03	63.18± 0.11	65.23± 0.06	65.62± 0.09	52.16± 0.07
Crude fiber	4.60± 0.11	3.21± 0.25	2.90± 0.12	3.45± 0.11	4.58± 0.19
Crude lipid	1.25± 0.06	0.98± 0.09	0.75± 0.05	0.95± 0.09	1.28± 0.03

- All values are in % .
- All values are average of triplicate analysis ± SD

Table 2: Mineral contents in seeds of *Crotolaria* species collected from study area.

Components	*Crotalaria juncea*	*Crotalaria pallida*	*Crotalaria prostrata*	*Crotalaria orixensis*	*Crotalaria verrucosa*
Calcium	212± 0.18	98± 0.22	75± 0.24	118± 0.28	220± 0.19
Copper	09 ± 0.27	11 ± 0.19	02 ± 0.12	07 ± 0.15	12 ± 0.23
Iron	05 ±0.31	03±0.09	1.5± 0.11	2.5± 0.17	03.5± 0.33
Magnesium	04.5 ± 0.36	01.5± 0.12	0.90± 0.11	03.5± 0.21	04.8± 0.15
Potassium	362± 0.21	240± 0.15	280 ± 0.18	490 ± 0.15	870 ± 0.37
Sodium	345 ± 0.59	192.5± 0.86	125 ± 0.65	265 ± 0.55	634 ± 0.32

- All values are expressed in mg/g sample.
- All values are average of triplicate analysis ± SD.

RESULT AND DISCUSSION

The nutritive values in terms of protein, carbohydrate, crude fiber and crude lipid content was analyzed in seed samples of five *Crotalaria* species namely- *C. juncea, C. pallida, C. prostata, C. orixensis* and *C. verrucosa*. The results (Table-1) showed that the highest content of protein was found in seed samples of *C. verrucosa* (22.15±0.12%) , followed by in sample of *C. juncea* and *C. orixensis*; the least protein content was reported in seeds of *C. prostrata*. *C. orixensis* seeds revealed highest amount of carbohydrate (65.62± 0.09%) closely followed by *C. prostrata* and *C. pallida*, while *C. verrucosa* seeds had least carbohydrate. The amount of crude fiber and crude lipid was noted nearly equal in *C. verrucosa* and *C. juncea* while their least amounts were recorded in seeds of *C. prostrata*. Thus *Crotalaria* seed samples found to be rich in protein, carbohydrate, crude fiber and crude lipids. Earlier workers also reported nutritional values of different plant materials.[9-11] and demonstrated that respective plants species could be incarportated as food or fodder.

The results also indicate that the *Crotalaria* seeds are the good source of minerals like Calcium, Copper, Iron, Magnesium, Potassium and Sodium (Table-2). The availability of minerals in the seed samples could be compared with recommended diatary values.[12] The Na/K ratio of each species was found to be less than one which is good for controlling blood pressure.[13] Similarly, Ca/ P ratio is also noted as significant and could contribute the bone health,[14-16] and Kathirvel and Kumudha,[17] made similar recommendations based on seed analysis of some other *Crotalaria* species.

CONCLUSION

In the present study, it was quite evident that other species of *Crotalaria* selected for this study also have sizable amount of nutrients and minerals content and thus could be also used as food or fodder; however their toxicity testing should be necessary.

AKNOWLEDGEMENT

The authors extends sincere grattitute towards Principal, Shri Shivaji College of Arts, Commerce and Science, Akola for provided necessary facilities from CIC of the college.

REFERENCES

1. Borade, V.P., Kadam, S.S. and Salunkhe, D.K., Changes in phytate, phosphorus and minerals during germination and cooking of horse gram and moth bean. Qual. Plant. Pl. Food Hum. Nutr., 1984; 34: 151-156.
2. Burbano, C., Mazquiz, M., Ayet, G., Cuadrado, C. and Pedrosa, M.M., Evaluation of antinutritional factors of selected varieties of Phaseolus vulgaris, J.Sci.Food. Agric, 1999; 79: 1468-1472.
3. Young, V.R. Soy protein in relation to human protein and amino acid nutrition. J.Am. Diet Assoc., 1991; 91: 828-835.
4. Aboh, H.A., Muzquiz, M., Burbano, C., Cuadrado, C., Pedrosa, M.M., Ayet, G. and Osagie, A.U, Antinutritional constituents of six underutilized legumes grown in Nigeria., J.Chromatogr A., 1998; 828: 307- 312.
5. Pearson, D., Chemical Analysis of Foods. 7th Edn., Church Hill Livingstone, London, UK., 1976; 72-73,138-143, 488-496.

6. Haro, R.T., Furst, A. and Falk, H.L., Studies on the acute toxicity of nickelocene. Proc West Pharmocol Soc., 1968; 11: 39-42.
7. Boussama, N., Ouariti, O., Suzuki, A. and Ghorbal, M.H. Cd-stress on nitrogen assimilation, J. Plant Physiol., 1999; 155: 310-317.
8. Sadasivam, S. and Manickam, A. Biochemical methods. 3rd edn. New Age International Publishers, New Delhi, India, 2008.
9. Hassan, L.G. and Umar, K.J. Nutritional Value of Balsam Apple (Momordica balsamina L.) Leaves. Pak. J.Nutrition, 2006; 5: 522-529.
10. Akinlade, J.A., Farinu, G.O., Taiwo, A.A., Aderinola, O.A., Adebayo, T.A., Ojebiyi, O.O. and Olaniran, O.A.) Agronomic and Nutritive Evaluation of Jack Bean (Canavalia ensiformis) for Fodder in the Derived Savannah Zone of Nigeria. International Journal of Agricultural Research, 2007; 2: 1059-1063.
11. Alalade, J.A., Akinlade, J.A., Akingbade, A.A., Emiola, C.B. and Adebisi, I.A. Proximate Composition and Phytochemical Screenings of *Crotalaria retusa* Leaves and Seeds. Open Access Library Journal, 2019; 6: 1-9.
12. NRC / NAS National Research Council Committee on Dietary Allowances. Recommended Dietary Allowances 9th edn. National Academy of Science Press. Washington, DC. USA, 1980.
13. Shills, M.E.G. and Young,V.R. Modern nutrition in health and disease. In Nutrition, D.C., 1988.
14. Nieman, D.E. Buthepodorth and C.N. Nieman (eds). WmC. Brown publishers Dubugue, USA. Nieman, D.C., 276-282.
15. Butterworth & Nieman, C.N., Nutrition, WmC. Brown publishers. Dubugue, USA., 1992; 237-312.
16. Rajyalakshmi, P. and Geervani, P. Nutritive value of the foods cultivated and consumed by the tribals South India. Plant Foods Hum. Nutri., 1994; 46: 53 - 61.
17. Kathirvel, P. and Kumudha, P. Comparative analysis and nutritional assessment of raw seeds of Crotalaria species. Int. J. Plant, Animal and Env. Sci., 2012; 2(1): 87-98.