

## NOTE

## Amino Acid Composition of Some Conventional and Non-Conventional Leguminous Seeds

PUSHPALATA SARJEKAR\* and S.K. SHRIVASTAVA

Department of Applied Chemistry, Jabalpur Engineering College, Jabalpur-482 011, India

Some conventional (*Glycine max* variety Js-80-21 and Fava bean Jv-2) and non conventional (*Albizia procera*, *Acacia auriculiformis* and *Peltophorum ferrugeneum*) legumes were studied for their amino acid composition by amino acid analyzer.

**Key words:** Composition, Amino acids, Conventional non-conventional, Leguminous seeds.

Proteins are compounds of carbon, hydrogen, nitrogen, oxygen, sulphur and phosphorus. Barring water they are the chief substances in the cell of the body and form an important constituent of muscles and other tissues and vital fluids such as blood. They supply the building material to the body and make good the wear and tear of tissues which is a constant feature of the process of life. They are made up of various combinations of substances called amino acids.

There are about 18 amino acids commonly found in dietary proteins. The body is capable of synthesizing some of these amino acids, called “non-essential amino acids”, under proper conditions whereas there are others which cannot be so synthesized and which must be present in the diet called “essential amino acids”.<sup>1</sup>

Recent uses of various analytical methods in the analysis of proteins and amino acids include paper chromatography,<sup>2</sup> thin layer chromatography,<sup>3</sup> electrophoresis,<sup>4</sup> gas chromatography<sup>5</sup> and nuclear magnetic resonance spectroscopy.<sup>6</sup> Automatic amino acid analyzer has been found to be the key instrument in the determination of primary structure of proteins and amino acids.<sup>7</sup>

The leguminous seeds *Glycine max* variety Js-80-21 and Fava bean Jv-2 were procured from Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, whereas *Albizia procera* was collected from Piparia beat, Sihora range of Jabalpur division, *Acacia auriculiformis* from Bilaspur and *Peltophorum ferrugeneum* from Indore.

The samples were hydrolyzed in 6 N hydrochloric acid for 18 h at 110°C. The hydrolysate was filtered and analyzed by amino acid analyzer (JEOL-6 AH). Since tryptophan is destroyed during hydrolysis, so the sample is hydrolyzed by 5 N sodium hydroxide to obtain tryptophan.

The results of amino acid composition are given in Table-1.

*Glycine max* variety Js-80-21 was found to contain the highest amount of

glutamic acid (16.32 g/16 g N) followed by aspartic acid (9.60 g/16 g N). Other amino acids in decreasing order were arginine, leucine, alanine, lysine, cystine, serine, proline, isoleucine, tyrosine, valine, phenylalanine, histidine, methionine, tryptophan and glycine. However, there is not much varietal variation within the reported values.<sup>8-11</sup>

TABLE-1  
AMINO ACID COMPOSITION OF SEED PROTEINS OF *GLYCINE MAX* VARIETY JS-80-21, *VICIA FABA* VARIETY Jv-2, *ALBIZIA PROCERA*, *ACACIA AURICULIFORMIS* AND *PELTOPHORUM FERRUGENUM*

Amino Acid	Amino acid analysis (g per 16 g N)				
	<i>Glycine max</i> variety Js-80-21	<i>Vicia faba</i> variety Jv-2	<i>Albizia procera</i>	<i>Acacia auriculiformis</i>	<i>Peltophorum ferrugenum</i>
Lysine	4.41	3.66	3.10	4.17	3.46
Histidine	1.77	1.88	1.52	2.38	2.19
Arginine	5.64	6.02	3.56	6.03	4.09
Aspartic acid	9.60	5.24	4.38	9.13	5.18
Serine	3.63	2.31	3.23	6.08	3.93
Glutamic acid	16.32	10.23	15.21	17.17	10.36
Proline	3.33	2.34	1.80	1.84	2.22
Glycine	1.14	1.05	1.03	1.02	1.15
Alanine	4.58	3.00	2.81	3.68	2.86
Cystine	3.65	3.97	2.45	4.82	2.00
Valine	2.59	2.53	1.27	2.21	2.20
Methionine	1.47	1.18	1.05	1.04	1.57
Isoleucine	2.82	2.19	2.14	2.54	2.34
Leucine	4.67	4.84	3.85	4.36	3.89
Tyrosine	2.66	2.59	1.69	3.85	2.12
Phenylalanine	2.47	2.88	2.39	2.60	2.80
Tryptophan	1.38	2.10	1.02	1.01	1.14

*Vicia faba* variety Jv-2 was found to contain highest amount of glutamic acid (10.23 g/16 g N) followed by arginine (6.02 g/16 g N). Other amino acids in the decreasing order were aspartic acid, leucine, cystine, lysine, alanine, phenylalanine, tyrosine, valine, proline, serine, isoleucine, tryptophan, histidine, methionine and glycine.

The highest amount of glutamic acid (15.21 g/16 g N) followed by aspartic acid (4.38 g/16 g N) was found in *Albizia procera*. Other amino acids in diminishing order were leucine, arginine, serine, lysine, alanine, cystine, phenylalanine, isoleucine, proline, tyrosine, histidine, methionine, glycine and tryptophan.

*Acacia auriculiformis* was found to contain highest amount of glutamic acid (17.17 g/16 g N) followed by aspartic acid (9.13 g/16 g N). Other amino acids

in decreasing order were serine, arginine, cystine, lycine, leucine, tyrosine, alanine, phenylalanine, isoleucine, histidine, valine, proline, methionine, glycine and tryptophan.

The highest amount of glutamic acid (10.36 g/16 g N) followed by aspartic acid (5.18 g/16 g N) was found in *Peltophorum ferrugeneum*. However, other amino acids in decreasing order were arginine, serine, leucine, lysine, alanine, phenylalanine, isoleucine, proline, valine, histidine, tyrosine, cystine, methionine, glycine and tryptophan.

From the quantitative estimation of the amino acids it has been found that in the seed proteins of all the legumes, the amount of glutamic acid was maximum. The legumes, *Glycine max* variety Js-80-21, *Vicia faba* variety Jv-2 contain minimum amount of glycine while rest of the three legumes contain tryptophan as the least present amino acid. However, the amino acid composition of seed protein of all the legumes under study was found to be in good accordance with the reported values.<sup>9</sup>

The amino acids like lysine, histidine, arginine, cystine, serine and glutamic acid contents in the legume seeds of *Acacia auriculiformis* was found to be more appreciable than that of the other legume seeds. Hence it is observed that amino acid composition of *Acacia auriculiformis* is much better than the rest of the legume seeds.

#### ACKNOWLEDGEMENT

We are grateful to the Director of Punjab Rao Krishi Vidyapeeth, Akola for providing the laboratory facilities and his cooperation during the progress of the work.

#### REFERENCES

1. R. Rajalakshmi, *Applied Nutritic*, 9 (1969).
2. K. Hanumantha Rao and N. Subramanian, *J. Food Sci. Technol.*, 7, 31 (1970).
3. W. Tangheroni and B. Brunelli, *Minerva Pedial.*, 22, 386 (1970).
4. L.E. Seloveva and N.G. Klimenko, *Rast. Belki*, 9, 60 (1970).
5. G. Valmelee, *Rev. Fr. Crops Gras.*, 17, 303 (1970).
6. G.C.K. Roberts and O. Jardetez, *Advan. Protein Chem.*, 24, 447 (1970).
7. S.K. Shrivastava and R.K. Bajpai, *Scientist of Phyl. Sci.*, 4, 82 (1992).
8. S. Kuppaswamy, M. Srinivasan and V. Subramanian, Protein in Foods, Indian Council of Medical Research, Special Report Series No. 33, pp. 68-69 (1958).
9. C. Gopalan, B.V. Ramasastri and S.C. Balasubramanian, Nutritive Value of Indian Foods, National Institute of Nutrition, Hyderabad, pp. 140-41 (1980).
10. M.N. Islam and R.A. Lea, *J. Food Sci.*, 46, 658, 663 (1981).
11. Harsha, P. Saxena and S.K. Shrivastava, *Acta Cienc. Indica.*, 23C, 99 (1997).