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# Amino Acid Composition of Some New Varieties of Oil Seeds

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The amino acid composition of some new varieties of oil seeds (*Arachis hypogaea* JGN-3, *Brassica campestris* VARUNA, *Carthamus tinctorius* JSF-1, *Glycine max* JS-90-41 and *Helianthus annus* KBSH-1) were analyzed by high performance liquid chromatography.

**Key Words: Amino acid composition, High performance liquid chromatography, *Arachis hypogaea* JGN-3, *Brassica campestris* VARUNA, *Carthamus tinctorius* JSF-1, *Glycine max* JS-90-41 and *Helianthus annus* KBSH-1.**

## INTRODUCTION

Food consists of three main classes of natural products: carbohydrates, proteins and fat, apart from the essential ingredients such as vitamins and minerals, while proteins supply the building materials of the body for its growth and for proper and balanced functioning of the various important organs. Protein deficiency in babies and young children causes not only physical impairment, but also permanent and irreversible brain damage[1]. As a result, protein-calorie malnutrition has become one of the most outstanding dietary problems in India and other developing countries[2]. From a survey of the conventional and new proteins used in various food preparations, it will be evident that to supplement protein intake, maximum use will have to be made of oilseed proteins. Oilseeds are an excellent source of protein and energy for improving cereals[3].

Proteins present in various foods differ in their nutritive value on account of the difference in the amino acid composition. An analysis for amino acid by modern methods has given an excellent nutritive evaluation of the absorbed fraction of the food protein and thus, for this reason, one must be concerned with qualitative and quantitative adequacy of amino acids[4].

## EXPERIMENTAL

The oil seeds (*Arachis hypogaea* JGN-3, *Brassica campestres* VARUNA, *Carthamus tinctorius* JSF-1, *Glycine max* JS-90-41 and *Helianthus annus* KBSH-1) were procured from Department of Plant Breeding and Genetics, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur.

The samples were hydrolyzed in 6 N hydrochloric acid for 18 h at 110°C. The hydrolysate was analysed by JASCO high performance liquid chromatograph UV-975 amino acid analysis system.

## RESULTS AND DISCUSSION

From the perusal of the data (Table-1), it appears that in the seed proteins of *Arachis hypogaea* JGN-3, *Brassica campestris* VARUNA, *Glycine max* JS-90-41 and *Helianthus annus* KBSH-1 the percentage of aspartic acid was maximum (84.27, 82.91, 14.83 and 89.27 g/100 g proteins respectively), in the seed proteins of *Carthamus tinctorius* JSF-1 the percentage of glutamic acid was maximum (14.83 g/100 g proteins), in the seed proteins of *Brassica campestris* VARUNA valine (0.02 g/100 g proteins), in the seed proteins of *Carthamus tinctorius* JSF-1 phenyl alanine (0.15 g/100 g proteins), in the seed proteins of Glycine max JS-90-41 threonine (0.95 g/100 g proteins) and in the seed proteins of *Helianthus annus* KBSH-1 tyrosine (0.04 g/100 g proteins) were present in lowest percentage.

TABLE-1
AMINO ACID COMPOSITION OF SOME NEW VARIETIES OF OIL SEEDS

| Amino acid | Amino acid analysis (g/100 g proteins) | | | | |
|---|---|---|---|---|---|
| | *Arachis hypogaea* JGN-3 | *Brassica campestris* VARUNA | *Carthamus tinctorius* JSF-1 | *Glycine max* JS-90-41 | *Helianthus annus* KBSH-1 |
| Aspartic acid | 84.27 | 82.91 | 3.22 | 14.83 | 89.27 |
| Glutamic acid | 3.40 | 12.86 | 25.35 | 11.99 | 0.33 |
| Serine | 6.56 | 0.60 | 7.67 | 10.06 | 4.55 |
| Glycine | 0.20 | 0.11 | 14.41 | 2.68 | 0.59 |
| Histidine | 0.10 | 0.66 | 11.26 | 2.83 | 3.11 |
| Alanine | 1.03 | 0.32 | 17.14 | 3.33 | 0.23 |
| Arginine | 3.01 | 0.22 | 10.19 | 2.12 | 0.22 |
| Threonine | 0.09 | 0.11 | 1.01 | 0.95 | 0.09 |
| Proline | 0.10 | — | 0.28 | 1.00 | 0.25 |
| Lycine | 0.02 | 0.03 | 3.43 | 5.76 | 0.15 |
| Tyrosine | 0.06 | 0.08 | 0.49 | 8.98 | 0.04 |
| Valine | 0.21 | 0.02 | 2.43 | 10.41 | 0.05 |
| Methionine | 0.06 | 0.06 | 0.29 | 4.56 | 0.08 |
| Cystine | 0.09 | — | — | 9.29 | 0.17 |
| Isoleucine | — | 0.04 | — | — | — |
| Ieucine | 0.26 | 0.19 | — | — | — |
| Phenylalanine | 0.30 | 0.80 | 0.15 | 11.11 | 0.16 |

Isoleucine has not been reported in the seed proteins of Arachis hypogaea JGN-3. The seed proteins of *Arachis hypogaea* JGN-3 were found to contain highest amount of aspartic acid. The values obtained in the present studies are

considerably higher than those reported earlier by various investigators[5–7]. However, other amino acids in the decreasing order were serine, glutamic acid, arginine, alanine, phenyl alanine, leucine, valine, glycine, histidine, proline, threonine, cystine, tyrosine, methionine and lycine.

*Brassica campestris* VARUNA is lacking in proline and cystine. The seed protein of *Brassica campestris* VARUNA was found to contain highest amount of aspartic acid (82.91 g/100 g proteins) followed by glutamic acid (12.86 g/100 g proteins). Other amino acids in the decreasing order were phenylalanine, histidine, serine, alanine, arginine, leucine, threonine, glycine, tyrosine, methionine, isoleucine, lycine and valine. A study of amino acid composition of the seed proteins of *Brassica camperstris* VARUNA as reported in the present study and by various workers[8–10] reveals that considerable varietal variations exist.

*Carthamus tinctorius* JSF-1 is lacking in isoleucine and leucine. Phenylalanine (0.15 g/100 g proteins) is somewhat sacrificed in the seed proteins of *Carthamus tinctorius* JSF-1. However, other amino acids in the increasing order were tyrosine, threonine valine, aspartic acid, lycine, serine, arginine, histidine, glycine, alanine and glutamic acid. The amino acid composition of seed protein of *Carthamus tincotrius* JSF-1 was found to be in good accordance with reported values[11–13].

*Glycine max* JS-90-41 is lacking in isoleucine and leucine. Threonine (0.95 g/100 g proteins) is somewhat sacrificed in the seed proteins of *Glycine max* JS-90-41. However othe, aminer acids in the increasing order were proline, arginine, glycine, histidine, alanine, methionine, lycine, tyrosine, cystine, serine, valine, glutamic acid and aspartic acid. However, not much variation exists with the reported values[4, 14–17].

*Helianthus annus* KBSH-1 is lacking in isoleucine and leucine. Tyrosine, valine, methionine, threonine, lysine, phenylalanine and cystine are somewhat sacrificed in the seed proteins of *Helianthus annus* KBSH-1. However, other amino acids in the increasing order were arginine, alanine, proline, glutamic acid, histidine, serine and aspartic acid. Considerable variation has been observed in the amino acids composition of seed proteins of *Helianthus annus* KBSH-1[18–20].

There is much variation in the amino acid composition of seed proteins in the oilseeds of *Arachis hypogaea* JGN-3, *Brassica campestris* VARUNA and *Helianthus annus* KBSH-1 under investigation. Variations in the various constituents of oilseeds have been attributed to the variety[21, 22], conditions, fertilizer treatments and climatic conditions[23–25].

The present results seem to confirm the good quality of the protein in *Carthamus tinctorius* JSF-1 and *Glycine max* JS-90-41 as compared to other oilseeds.

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