Jagdish Singh, J Food Process Technol 2015, 6:10
http://dx.doi.org/10.4172/2157-7110.C1.028

OMICS International
conferenceseries.com

7th Indo-Global Summit and Expo on
Food & Beverages
October 08-10, 2015 New Delhi, India

Jagdish Singh
ICAR-Indian Institute of Pulses Research, India

Nutritive and non-nutritive bioactive components in pulse grains: Implications for human nutrition and health

Protein calorie-malnutrition (PCM) is believed to be primary nutritional problem in most developing countries of the world. Grains of cereals and legumes remain the major sources of calories and proteins for a large proportion of the world population. The food values of seeds of pulses are high providing 1040 to 1430 kJ of energy per 100 g. Their protein content (18-28%) is generally about double that of most cereals but is usually deficient in sulfur containing amino acids, methionine and cystine. On the other hand, cereal-grain contains lower amounts of proteins which are deficient in lysine but have adequate amounts of sulfur amino acids. It is often, therefore, emphasized that legume-grain proteins are the natural supplement to cereal-grain protein in producing an overall essential amino acid balance. Carbohydrate profiles of pulses include prebiotics: Raffinose-family oligosaccharides, fructo oligosaccharides, sugar alcohols and resistant starch that contribute to the low glycemic index (GI<55) and high dietary fibre. Among the sugars, raffinose, stachyose, verbascose, ajugose and pentosans predominate in most of the pulses. Pulses are good source of B vitamin folate which significantly reduces the risk of neural tube defects (NTDs). In addition to the traditional macronutrients, pulses contain a wide variety of anti-nutritional compounds which vary considerably in their biochemistry. They can be proteins (protease inhibitors, α-amylases and lectins), glycosides (α-galactosides, vicine and convicine) and tannins, saponins as well as alkaloids. They do not appear equally distributed in all legumes and their physiological effects are diverse. The enzyme inhibitors reduce protein digestibility and lectins can reduce nutrient absorption. Phytic acid reduces mineral bioavailability. Some phenolic compounds can reduce protein digestibility and mineral bioavailability and galacto-oligosaccharides may cause flatulence. On the other hand, the same compounds which qualify as phytochemicals may have health protective effects (for example, as anticarcinogenic, hypocholesterolemic or hypoglycemic agents). Phytic acid exhibits antioxidant activity and protects DNA damage; Lignans and isoflavones have anticarcinogenic, weak oestrogenic and antioxidant properties. Phenolic compounds including tannins found mainly in the seed coat have antioxidant activity. Phytoestrogens in pulses may play a role in the prevention of hormone-related cancers such as breast and prostate cancer; saponins have hypocholesterolaemic effect and anti-cancer activity. Legumes are used in various food forms after suitable processing depending on the regions of their production and consumption. Processing generally improves the nutrient profile of legume seed by increasing *in vitro* digestibility of proteins and carbohydrates and at the same time there are reductions in some anti-nutritional compounds. Most anti nutritional factors are heat-labile such as protease inhibitors and lectins, so thermal treatment would remove any potential negative effects from consumption. On the other hand, tannins, saponins and phytic acid are heat stable but can be reduced by dehulling, soaking, germination and or fermentation. Aspects such as production, consumption, processing and food uses, chemical composition and effect of processing on the nutritive value are the important topics of this paper. To enhance their utilization, new potential as diversified food uses have been highlighted. Future research needs and priority research areas are listed.

Biography

Jagdish Singh is the Head of the Division of Basic Sciences at ICAR-Indian Institute of Pulses Research, India. His area of research and specialization is Bio-fortification.

jagdish1959@gmail.com