

NUTRITIONAL AND BIOCHEMICAL IMPORTANCE OF CHICKPEA IN RESPECT TO HUMAN HEALTH A REVIEW

Alka Katiyar* and S.P. Mishra

Deptt. of Crop Sciences, M.G.C.G.V Chitrakoot

Email: alkaphdbiochem@gmail.com

Received-05.03.2015, Revised-24.03.2015

Abstract: Pulses are an important source of dietary protein, energy, minerals and vitamins for the mankind. Chickpea is a good source of carbohydrates and protein, together constituting about 80% of the total dry seed mass in comparison to other pulses. They are a good source of many nutritionally important substances, especially the high-quality proteins with typically high content of lysine and a lower content of sulphur containing amino acids. Hence, it is appropriate legumes with cereals to balance the resulting amino acid composition of the food. The content of total dietary fiber in dry matter reaches about 30% and the resistant starch in legumes also behaves like a fiber. Chickpea is being consumed by humans since ancient times owing to its good nutritional properties. Furthermore, chickpea is fulfilling the need as functional food with potential beneficial effects on human health.

Keywords: Chickpea, Human health, Legumes Nutritional significance

REFERENCES

- Abbo S, Molina C, Jungmann R.** (2005). Quantitative trait loci governing carotenoid concentration and weight in seeds of chickpea (*Cicer arietinum* L.). *Theor Appl Genet* **111**, 185-195.
- Agriculture and Agri-Food Canada** (2006). Chickpea: Situation and outlook. *Biweekly Bulletin* **19**.
- Ali, A.; Mahmood, K. and Afzal, M.** (2003). Cultivation of grain in thal. *Zarantnama* **42**: 16-21.
- American Association of Cereal Chemists [AACC]** (2001). The definition of dietary fibre. (Report of the Dietary Fibre Definition Committee to the Board of Directors of the AACC.) *Cereal Foods World* **46**, 112-126.
- Aurand LW, Woods AE & Wells MR** (1987). Food composition and analysis. New York: Van Nostrand Reinhold Company.
- Burley VJ, Paul AW & Blundell JE** (1993). Influence of a high-fibre food (mycoprotein) on appetite: effects on satiation (within meals) and satiety (following meals). *Eur J Clin Nutr* **47**, 409-418.
- Chavan JK, Kadam SS & Salunkhe DK** (1986). Biochemistry and technology of chickpea (*Cicer arietinum* L.) seeds. *Crit Rev Food Sci Nutr* **25**, 107-157.
- Chibbar RN, Ambigaipalan P & Hoover R** (2010). Molecular diversity in pulse seed starch and complex carbohydrates and its role in human nutrition and health. *Cereal Chem* **87**, 342-352.
- Cummings JH, Stephen AM & Branch WJ** (1981). Implications of dietary fibre breakdown in the human colon. In Banbury Report 7 Gastrointestinal Cancer, pp. 71-81 [WR Bruce, P Correa, M Lipkin, S Tannenbaum and TD Wilkins, editors]. New York: Cold Spring Harbor Laboratory Press.
- Dalgetty DD & Baik BK** (2003). Isolation and characterization of cotyledon fibres from peas, lentils, and chickpea. *Cereal Chem* **80**, 310-315.
- Dixon RA** (2004). Phytoestrogens. *Annu Rev Plant Biol* **55**, 225-61
- FAO** (2002). Human vitamin and mineral requirement. *Report of a joint FAO/WHO expert consultation*, Bangkok, Thailand.
- Gecit HH** (1991) Chickpea utilization in Turkey. In *Proceedings of a Consultants Meeting*, pp. 69-74. AP, India: ICRISAT.
- Geervani P** (1991). Utilization of chickpea in India and scope for novel and alternative uses. In *Proceedings of a Consultants Meeting*, pp. 47-54. AP, India: ICRISAT.21
- Giovannucci E, Ascherio A, Rimm EB.**(1995). Intakes of carotenoids and retinal in relation to risk of prostate cancer. *J Natl Cancer Inst* **87**, 1767-1776.
- Haider M & Haider S** (1984). Assessment of protein-calorie malnutrition. *Clin Chem* **30**, 1286-1299
- Hulse JH** (1991). Nature, composition and utilization of pulses. In Uses of Tropical Grain Legumes, *Proceedings of a Consultants Meeting*, pp. 11-27. AP, India: ICRISAT.
- Ibáñez MV, Rinch F, Amaro M, et al.** (1998). Intrinsic variability of mineral composition of chickpea (*Cicer arietinum* L.). *Food Chem* **63**, 55-60.
- Ibrikci H, Knewton SJB & Grusak MA** (2003). Chickpea leaves as a vegetable green for humans: evaluation of mineral composition. *J Sci Food Agric* **83**, 945- 950.
- Iqbal A, Khalil IA, Ateeq N.** (2006). Nutritional quality of important food legumes. *Food Chem* **97**, 331-335.
- Jana, S. and Singh, K.B** (1993). Evidence of geographical divergence in kabuli chickpea from germplasm evaluation data. *Crop Science* **33**: 626-632.

*Corresponding Author

- Kaur M, Singh N & Sodhi NS** (2005). Physicochemical, cooking, textural and roasting characteristics of chickpea (*Cicer arietinum* L.) cultivars. *J. Food Eng* **69**, 511-517.
- Kaur, M. and Singh, N.** (2005). Studies on functional, thermal and pasting properties of flours from different chickpea (*Cicer arietinum* L.) cultivars. *Food Chemistry* **91**: 403-411.
- Kendall CW, Emam A, Augustin LS et al.** (2004). Resistant starches and health. *J AOAC Int* **87**, 769-74.
- Ling WH & Jones PJ** (1995) Dietary phytosterols: a review of metabolism, benefits and side effects. *Life Sci* **57**, 195-206.
- Mathers JC** (2002). Pulses and carcinogenesis: potential for the prevention of colon, breast and other cancers. *Br J Nutr* **88, Suppl. 3** S273-S279.
- Muehlbauer FJ & Tullu A** (1997). *Cicer arietinum* L. In New CROP Fact SHEET, pp. 6. Seattle, WA: Washington State University, USDA-ARS.
- Muir JG & O'Dea K** (1992). Measurement of resistant starch: factors affecting the amount of starch escaping digestion in vitro. *Am J Clin Nutr* **56**, 123-127.
- Murty CM, Pittaway JK & Ball MJ** (2010). Chickpea supplementation in an Australian diet affects food choice, satiety and bowel function. *Appetite* **54**, 282- 288.
- Osorio-Díaz P, Agama-Acevedo E, Mendoza-Vinalay M, et al.** (2008). Pasta added with chickpea flour: chemical composition, in vitro starch digestibility and predicted glycemic index. *Cienc Tecnol Aliment* **6**, 6-12.
- Pandey G & Enumeratio G** (1993). In *Planta Medica Gyanendra Ausadhiya Padapavali*, pp. 116. Delhi, India: *Spring*.
- Pittaway JK, Ahuja KDK, Robertson IK.** (2007). Effects of a controlled diet supplemented with chickpea on serum lipids, glucose tolerance, satiety and bowel function. *J Am Coll Nut* **26**, 334-340
- Pugalenthi M, Vadivel V, Gurumoorthi P, et al.** (2004). Comparative nutritional evaluation of little known legumes, *Tamarindus indica*, *Erythrina indica* and *Sesbania bispinosa*. *Tropical and Subtropical Agroecosystems* **4**, 107-123.
- Quinteros A, Farre R & Lagarda MJ** (2001). Optimization of iron speciation (soluble, ferrous and ferric) in beans, chickpea and lentils. *Food Chem* **75**, 365-370.
- Regina A, Bird A, Topping D, et al.** (2006). High-amylose wheat generated by RNA interference improves indices of large-bowel health in rats. *Proc Natl Acad Sci USA* **103**, 3546-3551.31
- Rehman, Z. U. and Shah, W. H.** (2001). Tannin contents and protein digestibility of black grams (*Vigna mungo*) after soaking and cooking. *Plant Foods for Human Nutrition* **56**: 265- 273
- Rincón F, Martínez B & Ibáñez MV** (1998). Proximate composition and antinutritive substances in chickpea (*Cicer arietinum* L.) as affected by the biotype factor. *J Sci Food Agric* **78**, 382-388.
- Rincon, F., Beatriz, M. and Ibanez, M.V.** (1998). Proximate composition and antinutritive substances in chickpea (*Cicer arietinum* L.) as affected by the biotype factor. *Journal of Science of Food and Agriculture* **78**: 382-388.
- Sánchez-Vioque R, Clemente A, Vioque J.** (1999). Protein isolates from chickpea (*Cicer arietinum* L.): chemical composition, functional properties and protein characterization. *Food Chem* **64**, 237-243.
- Sastry CST & Kavathekar KY** (1990). In *Plants for reclamation of wastelands*. pp. 684, New Delhi, India: *Council of Scientific and Industrial Research*.34
- Shad ,A. Md.; Perrez. H.; Zaffar I.Z; haq, Ul, Z. Md; and Nawaz.H.**(2009). Evaluation of biochemical composition and physico-chemical parameters of oil from seeds of desi chickpea varieties cultivated in arid zone of Pakistan. *Pak. J. Bot.***41** (2):655
- Siddhraj, P., Becker, K. and Makkar, H.P.S.** (2000). Studies on the nutritional composition and antinutritional factors of three different germplasm seed materials of an underutilized tropical legume *Mucuna puriens* var. utilis. *Journal of Agricultural and Food Chemistry* **48**(12): 6048-6060
- Singh U** (1984). Dietary fibre and its constituents in desi and kabuli chickpea (*Cicer arietinum* L.) cultivars. *Nutr Rep Int* **29**, 419-426.
- Singh, N.; Jeena, A. S.; Arora, P.P. and Upreti, M. C.** (2003). Path coefficient analysis in relation to selection for yield and its components in chickpea. *Agric. and Biol. Res.*, **19** (2): 104 -106.
- Tharanathan RN & Mahadevamma S.** (2003). Grain Legumes - a boon to human nutrition. *Trends Food Sci Technol* **14**, 507-518.
- Udupa, S.M., Sharma, A., Sharma, R.P. and Rai, P.A** (1993). Narrow genetic variability *Cicer arietinum* L as revealed by RFLP analysis. *Journal of Plant Biochemistry and Biotechnology* **2**: 83-86
- United States Department of Agriculture** (2010). USDA National Nutrient Database for Standard Reference, Release **22** (2009). <http://www.nal.usda.gov/fnic/foodcomp/search/> (accessed 01/07/2010; 12/07/2010; 02/08/2010).
- Vasishta, and Srivastava, R.P.** (2009). Variability in health promoting biochemical parameters of different type of chickpea. *Journal of food legumes.* **22** (3): 185-189.
- Warner PKW, Nambiar VPK & Remankutty C** (1995). In *Indian medicinal plants*, pp. 773-774. *Chennai, India: Orient Longman.*
- William, P.C. and Singh, U.** (1987). Nutritional quality and the evaluation of quality in breeding programmes pp. 329-356. In the *Chickpea* (Ede Mc Saxena and K.B. Singh), CAB International/ICARDA, Wallingford, U.K
- Wood JA & Grusak MA** (2007). Nutritional value of chickpea. In *Chickpea breeding and management*.

pp. 101-142 [SS Yadav, R Redden, W Chen and B Sharma, editors]. Wallingford, UK: CAB International.

Wood JA & Grusak MA (2007). Nutritional value of chickpea. In Chickpea breeding and management. pp. 101-142 [SS Yadav, R Redden, W Chen and B

Sharma, editors]. Wallingford, UK: CAB International.

Yust MM, Pedroche J & Giron-Calle J (2003). Production of ace inhibitory peptides by digestion of chickpea legumin with alcalase. *J. Food Chem* **81**, 363- 369.24