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Chickpea: Nature's Nutritional Architect for Human Health and Sustainable Living

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INTRODUCTION

Chickpea (*Cicer arietinum* L.) is one of the most extensively cultivated pulse crops in the world and occupies a central position in human nutrition across diverse geographical regions.In the evolving landscape of global nutrition, where the dual burdens of undernutrition and lifestyle-related diseases coexist, few crops bridge the gap between tradition and modern health science as effectively as chickpea. Chickpea represents more than a dietary staple it is abiologically efficient, nutritionally concentrated, and environmentally resilient food resource. As global food systems transition toward sustainable plant-based diets, chickpea has emerged as a strategic crop due to its high protein density, low glycaemic response, substantial micronutrient content, and functional phytochemicals.India continues to be the dominant global leader in chickpea (chana) production, consistently contributing roughly 70–75% of total world output, with production levels exceeding 11–13 million tonnes.The production for the 2025-26 marketing year is projected to be 11.337 million metric tonnes (MMT). This indicates a slight decline of 198,000 metric tonnes from the second advance estimates but maintains a high production level. MoA&FW (2025)

Unlike many carbohydrate-dominant staples, chickpea offers a balanced macronutrient profile alongside bioactive compounds with documented antioxidant, anti-inflammatory, and cardioprotective properties. Simultaneously, its capacity for biological nitrogen fixation enhances soil fertility and reduces dependence on synthetic fertilizers, reinforcing its ecological value. Thus, chickpea stands at the intersection of human nutrition, metabolic health, and sustainable agriculture, making it one of the most strategically important pulses for the 21st century.

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Macronutrient Composition:

Protein Quality and Amino Acid Profile

Chickpea seeds contain approximately 18–24% protein on a dry weight basis, making them an excellent plant-based protein source, particularly in regions where animal proteins are scarce or costly (Jukanti et al., 2012). The protein fraction is dominated by storage proteinsprimarily globulins (legumin and vicilin) and albuminscharacterized by high digestibility and functional properties relevant to human nutrition (Boye, Zare, & Pletch, 2010). The amino acid profile of chickpea is notable for its high lysine content, an essential amino acid typically limited in cereal grains. It also provides other essential amino acids such as leucine, valine, and isoleucine. Although chickpea is slightly limited in sulfur-containing amino acids (e.g., methionine), the traditional dietary practice of combining pulses with cereals enhances overall protein quality by complementing amino acid deficiencies (Tharanathan & Mahadevamma, 2003). This makes chickpea an essential component of balanced plant-based diets.

Carbohydrates and Glycaemic Response

Carbohydrates constitute the major portion of chickpea seeds, representing about 55–65% of total dry matter. These carbohydrates exist primarily as starch, soluble sugars, and structural polysaccharides. Importantly, chickpea starch is characterized by a relatively high proportion of slowly digestible and resistant starch, which contributes to a low glycaemic index (GI) and attenuated post-prandial glucose responses (Tosh & Yada, 2010). This low GI property has significant implications for metabolic health. Diets with low glycaemic responses are associated with improved blood glucose control, enhanced insulin sensitivity, and reduced risk of type 2 diabetes (Rebello, Greenway, & Finley, 2014). Resistant starch also acts as a prebiotic, promoting beneficial gut microbiota and enhancing colonic health.

Dietary Fiber and Gastrointestinal Health

Chickpea is naturally rich in dietary fiber, containing both soluble and insoluble fractions. Insoluble fiber, including cellulose and hemicellulose, facilitates gastrointestinal motility and regularity, reducing the risk of constipation and diverticular disease. Soluble fiber, such as pectins and β-glucans, forms viscous solutions in the gut that help regulate blood cholesterol and glucose levels by slowing nutrient absorption (Anderson et al., 2009).

Regular intake of dietary fiber from pulses, including chickpea, has been linked with enhanced satiety, improved weight management, and reduced incidence of cardiovascular diseases.

Lipids and Fatty Acid Composition

Although chickpea seeds contain a modest fat content (approximately 4–6%), their lipid profile is nutritionally favorable. The majority of fatty acids are unsaturated, particularly linoleic acid (omega-6) and oleic acid, which support cardiovascular health by improving lipid profiles and reducing inflammation (Duranti, 2006). The low saturated fat content further enhances the cardiovascular benefits of chickpea consumption.

Micronutrient Density

Minerals

Chickpea provides a wide spectrum of essential minerals that are critical for normal physiological functioning:

Mineral	Content Content (per 100g raw seed)	Function
Iron (Fe)	4.3 - 6.7 mg	Vital for hemoglobin formation and prevention of anemia.
Zinc (Zn)	2.4 - 7.4 mg	Essential for immune function, DNA synthesis, and wound healing.
Calcium (Ca)	93.4 – 197.4 mg	Important for bone health and neuromuscular function.
Magnesium (Mg)	125.1 – 158.7 mg	Required for enzymatic reactions and energy metabolism.
Phosphorus (P)	2627 – 3703 mg	Integral to cellular structure and energy transfer.
Potassium (K)	732.2 – 1125.5 mg	Supports fluid balance and cardiovascular regulation (ICMR–NIN, 2020).

While mineral bio-availability can be negatively impacted by phytates naturally occurring compounds in pulses, processing techniques such as soaking, germination, and fermentation improve mineral absorption and overall nutritional value (Sathe & Sharma, 2007).

Vitamins

Chickpea is a valuable source of B-group vitamins, particularly folate (vitamin B9), which plays a critical role in cell division, DNA synthesis, and red blood cell production. Folate is especially important for maternal and fetal health, reducing the risk of neural tube defects and supporting rapid cellular growth during pregnancy (ICMR–NIN, 2020). Chickpea also contributes thiamin, riboflavin, niacin, and pyridoxine, which support energy metabolism and nervous system function.

Bioactive Compounds and Functional Properties

Chickpea contains diverse phytochemicals including phenolic acids, flavonoids, tannins, saponins, phytosterols, and isoflavones, which exhibit antioxidant, anti-inflammatory, and anti-carcinogenic properties (Mudryj et al., 2014). These bioactive compounds help neutralize free radicals, reduce oxidative stress, and protect cellular integrity, enhancing the functional value of chickpea beyond basic nutrition.

Phytosterols, for instance, compete with cholesterol for absorption in the gut, thereby lowering serum cholesterol levels and contributing to cardiovascular health. Saponins and flavonoids have also been associated with improved immune responses and reduced inflammation.

Health Benefits and Dietary Significance

Regular inclusion of chickpea in the diet confers multiple health benefits:

- Improvement of overall nutritional status
- It regulates the blood glucose levels through low glycaemic response.
- Promotion of cardiovascular health via favorable lipid profile and phytosterols.
- It enhances the digestive efficiency due to high dietary fiber.
- It prevents the micronutrient deficiencies.
- It supports in weight management through enhanced satiety.
- Strengthening of immune competence
- Reduction in risk of chronic metabolic diseases (Rebello et al., 2014; Wallace, Murray, & Zelman, 2016)

Clinical and epidemiological studies indicate that pulses, including chickpea, are integral to healthy dietary patterns that reduce the risk of obesity, type 2 diabetes, and cardiovascular diseases.

Role in Sustainable Nutrition Systems

Beyond human health, chickpea plays a strategic role in sustainable agriculture. As a leguminous crop, it participates in biological nitrogen fixation, enriching soil nitrogen and reducing the need for synthetic fertilizers. This contributes to lower greenhouse gas emissions, improved soil fertility, and enhanced environmental sustainability (FAO, 2016). Chickpea's adaptability to semi-arid conditions and low-input systems makes it suitable for climate-resilient agriculture, thereby supporting food security in resource-limited regions.

CONCLUSION

Chickpea (*Cicer arietinum* L.) is a nutritionally dense, functionally valuable, and environmentally sustainable pulse crop of global significance. Its balanced composition of high-quality proteins, complex carbohydrates, dietary fiber, essential minerals, vitamins, and bioactive phytochemicals establishes it as both a staple food and a functional dietary component. Regular consumption of chickpea supports metabolic health, reduces the risk of chronic diseases, enhances digestive efficiency, and contributes to micronutrient sufficiency. Its cultivation also advances sustainable agricultural systems through nitrogen fixation and resilience in low-input environments. Strengthening chickpea production, utilization, and consumption is pivotal to advancing nutritional security, public health resilience, and sustainable food systems worldwide.

REFERENCES

Anderson, J. W., Baird, P., Davis, R. H., Ferreri, S., Knudtson, M., Koraym, A., Waters, V., & Williams, C. L. (2009). Health benefits of dietary fiber. *Nutrition Reviews*, *67*(4), 188–205.

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Boye, J., Zare, F., & Pletch, A. (2010). Pulse proteins: Processing, characterization, functional properties and applications in food and feed. *Food Research International*, *43*(2), 414–431.

Duranti, M. (2006). Grain legume proteins and nutraceutical properties. *Trends in Food Science & Technology, 17*(2), 67–78.

FAO. (2016). *Pulses: Nutritious seeds for a sustainable future*. Food and Agriculture Organization of the United Nations.

ICMR–NIN. (2020). *Indian Food Composition Tables (IFCT 2017, updated edition)*. Indian Council of Medical Research–National Institute of Nutrition.

Jukanti, A. K., Gaur, P. M., Gowda, C. L. L., & Chibbar, R. N. (2012). Nutritional quality and health benefits of chickpea (*Cicer arietinum* L.): A review. *British Journal of Nutrition, 108*(S1), S11–S26.

Ministry of Agriculture & Farmers' Welfare, 28 May 2025 (Third Advance Estimates).

Mudryj, A. N., Yu, N., & Aukema, H. M. (2014). Nutritional and health benefits of pulses. *Applied Physiology, Nutrition, and Metabolism, 39*(11), 1197–1204.

Rebello, C. J., Greenway, F. L., & Finley, J. W. (2014). A review of the nutritional value of legumes and their effects on obesity and related co-morbidities. *Obesity Reviews, 15*(5), 392–407.

Sathe, S. K., & Sharma, G. M. (2007). Effects of processing on the nutritional and functional properties of chickpea. *Critical Reviews in Food Science and Nutrition, 47*(6), 567–581.

Tharanathan, R. N., & Mahadevamma, S. (2003). Grain legumes—A boon to human nutrition. *Trends in Food Science & Technology, 14*(12), 507–518.

Tosh, S. M., & Yada, S. (2010). Dietary fibres in pulse seeds and fractions: Characterization, functional attributes, and applications. *British Journal of Nutrition, 108*(S1), S26–S33.

Wallace, T. C., Murray, R., & Zelman, K. M. (2016). The nutritional value and health benefits of chickpeas and hummus. *Nutrition Journal, 15*, Article 71.