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# A Review: Nutritional, Medicinal and Economic Importance of Quinoa

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**ABSTRACT**

*On the basis of reviewed literatures, Crop Quinoa is abiotic stress tolerant, low input requiring and economic produce is grain of superior nutritional profile as compared to common cereals. Its production technology has yet to be explored according to local conditions. For obtaining high crop yields nutrient in balanced amount is a basic requirement. Quinoa has great importance in supplying essential amino acids, protein, starch, ash. It is also useful in economic processing. The medicinal values are much higher than other cereal crops. The cultivation of this crop is much easier than other crop and can grow in drought, salinity and stress condition.*

***Keywords:*** *Quinoa, Stress, Economic, Nutritional, etc.*

## INTRODUCTION

The Chenopodium (family Amaranthaceae) contains regarding 250 species (Giusti, 1970), that embody herbaceous, woody and arboresque perennials, though most species are colonizing annu- als (Wilson, 1990). Chenopodium spp. are culti- vated for hundreds of years as a greens (Chenopodium album) likewise as a vital subsidiary grain crop (Chenopodium quinoa and C. album) for human and animal foodstuff because of high-protein and a balanced amino-acid spectrum with high essential amino acid (5.1–6.4%) and essential amino acid (0.4–1.0%) contents (Prakash & Pal, 1998; & Bhargava et al., 2003a). C. quinoa Willd could be a native of the range of mountains region and is a member of the section Cellulata of the section caryophylloid dicot genus of the genus Chenopodium. It belongs to the cluster of crops referred to as pseudo cereals (Cusack, 1984; & Koziol, 1993) that has different domesticated chenopods, amaranths and buckwheat. The grain has high-protein content with abundance of essential amino acids, and a large vary of vitamins and minerals (Repo-Carrasco et al., 2003). Recently, there has been growing interest in a very variety of states (especially in Europe), initiating introduction and analysis work on quinoa (Galwey, 1992; & Jacobsen, 2003).

### Nutritional importance

The dietary excellence of quinoa has been recognised considering that historic instances with inside the Inca Empire.

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The significance that quinoa ought to play in nutrients has been emphasised now no longer best in growing international locations however additionally with inside the evolved world. Quinoa seeds have a better nutritive price than maximum cereal grains and incorporate notable protein and massive quantities of carbohydrates, fat, nutrients and minerals. Perisperm, embryo and endosperm are the 3 regions wherein reserve meals is saved in quinoa seed (Prego et al., 1998). The suggest protein content material mentioned for quinoa grain is 12–23% (González et al., 1989; Koziol, 1992; Ruales & Nair, 1994a, 1994b; Ando et al., 2002; Karyotis et al., 2003; & Abugoch, 2009), that's better than that of barley, rice or maize, and is similar to that of wheat (USDA, 2005; & Abugoch, 2009).

**Amino Acid**

Moreover, the essential amino acid balance is excellent because of a wide range of amino acids, with higher lysine (5.1–6.4%) and methionine (0.4–1%) contents (Prakash & Pal, 1998; Bhargava et al., 2003, 2006a; Abugoch, 2009, & Evan & Kevin 2020). isoleucine, 338% of the lysine, 212% of the methionine + cysteine, 320% of the phenylalanine + tyrosine, 331% of the threonine, 228% of the tryptophan and 323% of the valine recommended by FAO/WHO/UNU in protein sources for adult nutrition (Vega-Gálvez et al., 2010).

**Starch**

Starch is the most important carbohydrate in quinoa grains, making up approximately 58.1–64.2% of the dry matter (Repo-Carrasco et al., 2003). Quinoa starch consists of two polysaccharides: amylose and amylopectin. The amylase content of quinoa starch varies between 3% and 20%, while the amylose fraction of quinoa starch is quite low (Abugoch, 2009).

**Ash**

The ash content of quinoa (3.4%) is higher than that of rice (0.5%), wheat (1.8%) and other traditional cereals (Cardozo & Tapia, 1979). Quinoa grains contain large amounts of minerals like Ca, Fe, Zn, Cu and Mn (Repo-Carrasco et al., 2003). Calcium (874 mg/kg) and iron (81 mg/kg) in the seeds are significantly higher than most commonly used cereals (Ruales & Nair, 1992).

The leaves of quinoa contain ample amount of ash (3.3%), fibre (1.9%), vitamin E (2.9 mg α-TE/100 g) and Na (289 mg/100 g) (Koziol, 1992). Prakash et al. (1993) reported that leaves have about 82–190 mg/kg of carotenoids, 1.2–2.3 g/kg of vitamin C and 27–30 g/kg of proteins. A recent study on the leaf quality parameters in quinoa has shown that the leaves contain ample amount of carotenoids (230.23–669.57 mg/kg), which was higher than that reported for spinach, amaranth and C. album (Gupta & Wagle, 1988; Prakash & Pal, 1991; Shukla et al., 2003; & Bhargava et al., 2006b, 2007).

**Stress tolerance**

Quinoa well-knownshows excessive tiers of resistance to numerous of the most important damaging elements together with soil salinity, drought (Jensen et al., 2000; González et al., 2009, 2011; Jacobsen et al., 2009; & Fuentes & Bhargava, 2011), frost (Jacobsen et al., 2005, 2007), sicknesses and pests (Jacobsen et al., 2003a; & Bhargava et al., 2003). Due to its sturdiness below damaging weather conditions, quinoa can be one of the alternatives for meals manufacturing below numerous damaging abiotic constraints (FAO, 1998). The frost resistance of quinoa has been identified for lots years (Rea et al., 1979). The species well-knownshows 100% germination even at 2°C and no extreme impact at the plant at temperatures near to −3°C (Bois et al., 2006).

**Economic Processing**

Quinoa has numerous uses. It is taken into consideration as one of the excellent leaf protein listen reassets and so has the capacity as a protein replacement for meals and fodder and withinside the pharmaceutical industry. The complete plant also can be used as inexperienced fodder for cattle, sheep, pigs, horses and hen. Results have indicated that as

much as one hundred fifty g/kg unprocessed or dehulled quinoa seed might be covered in broiler feed (Jacobsen et al., 1997). This incorporation of quinoa in hen feeds can substantially gain the hen industry. The seeds may be eaten as a rice replacement, as a warm breakfast cereal or may be boiled in water to make little one cereal meals (Bhargava et al., 2006a). Quinoa flour in mixture with wheat flour or corn meal is utilized in making biscuits, bread and processed meals (Bhargava et al., 2006a). There are severa recipes for approximately one hundred preparations, which include tamales, huancaína sauce, leaf salad, pickled quinoa ears, soups and casseroles, stews, torrejas, pastries, chocolates and desserts, and tender and fermented warm and bloodless beverages, in addition to breads, biscuits and pancakes, which incorporate 15–20% quinoa flour. The flour has properly gelation property, water absorption ability, emulsion ability and stability (Oshodi et al., 1999). The excessive water absorptivity can be used withinside the formula of a few meals which includes sausages, dough, processed cheese, soups and baked products (Oshodi et al., 1999).

It may be fermented to make beer, or used to feed livestock (Galwey, 1989). Solid-nation fermentation of quinoa with Rhizopus oligosporus Saito affords a properly-first-rate tempeh (Valencia-Chamorro, 2003). Quinoa milk, a excessive first-rate and nutritive product, may also have the capacity for intake as milk or as an factor of milky products (Jacobsen et al., 2003b). This tasty and healthful product is of precise significance for those who are not able to digest casein or animal lactose.

**Medicinal Values**

The use of quinoa for medicinal functions has additionally been mentioned. The plant is reportedly utilized in inflammation, as an analgesic and as a disinfectant of the urinary tract. It is likewise utilized in fractures and inner haemorrhaging and as an insect repellent (Mujica, 1994). The presence of glycine betaine, trigonelline and their derivatives has been mentioned withinside the plant (Jancurova et al., 2009). In humans, glycine betaine may be with no trouble absorbed thru nutritional consumption or endogenously synthesized withinside the liver thru choline catabolism. The awareness of glycine betaine in human blood plasma is exceedingly regulated. Its concentrations are decrease in sufferers with renal disease, and its urinary excretion is improved in sufferers with diabetes mellitus (Dini et al., 2006).

## REFERENCES

Abugoch, L. E. (2009). Quinoa (Chenopodium quinoa Willd.): composition, chemistry, nutritional, and functional properties. *Advances in Food Nutrition Research 58*, 1–31.

Casini, P. (2002). Possibilita di introdurre la quinoa negli ambient mediterranei. *Informatore Agrario 27*, 29–32.

Cordeiro, L. M. C., Reinhardt, V., & Baggio, C. (2012). Arabinan and arabinan-rich pectic polysaccharides from quinoa (Chenopodium quinoa) seeds: structure and gastroprotective activity. *Food Chemistry 130*, 937–944.

Cusack, D. (1984). Quinoa: grain of the Incas. *Ecologist 14*, 21–31.

De Bruin, A. (1964). Investigation of the food value of quinoa and canihua seed. *Journal of Food Science 29*, 872–876.

Delatorre-Herrera, J., & Pinto, M. (2009). Importance of ionic and osmotic components of salt stress on the germination of four quinua (Chenopodium quinoa Willd.) selections. *Chilean Journal of Agricultural Research 69*, 477–485.

Dini, I., Tenore, G. C., & Dini, A. (2004). Phenolic constituents of Kancolla seeds. *Food Chemistry 84*, 163–168.

Dini, I., Tenore, G. C., Trimarco, E., & Dini, A. (2006). Two novel betaine derivatives from Kancolla seeds

(Amaranthaceae). *Food Chemistry 98*, 209–213.

Dostalek, J. (1987). Influence of the mode of pollination on offspring of some species of the genus Chenopodium. *Preslia 59*, 263–269.

Evan, B. C., & Kevin, M. M. (2020). Seed Composition and Amino Acid Profiles for Quinoa Grown in Washington State. *Forntiers in nutrition*, *126*(7), 3–5.

Hariadi, Y., Marandon, K., Tian, Y., Jacobsen, S. E., & Shabala, S. (2011). Ionic and osmotic relations in quinoa (Chenopodium quinoa Willd.) plants grown at various salinity levels. *Journal of Experimental Botany 62*, 185–193.

Heiser, C. B., & Nelson, D. C. (1974). On the origin of cultivated Chenopods (Chenopodium).