

## Nutritional Benefits of Quinoa-A Review

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### ABSTRACT

*Cereals are considered as an important source of nutrition in human diet. They provide about half of the energy of world population. Cereals include maize, rice, wheat, sorghum, barley, oats and rye. Other grains like amaranth, quinoa, chia, buckwheat and flaxseed have also been studied due to their extreme nutritional values and high protein profiles. These grains plants are excellent source of the energy, lipids, fibers, vitamins, minerals, proteins, ashes and amino acids. Quinoa is one of them and is excellent source of lysine and niacin. It is rich in essential amino acid content. It also has antioxidant agents that perform good function in the human body when consumed. Quinoa is also a well natural source that is helpful to combat against Celiac disease. In this review, we shall discuss the different nutritional benefits of quinoa.*

**Keywords:** Quinoa, Nutritional Benefits, Amino acids, Vitamins, Minerals, Energy.

### INTRODUCTION

Quinoa is a very nutritious plant which belongs to family Amaranthaceae. Its scientific name is *Chenopodium quinoa* Wild. It was domesticated in the Andean regions and is highly adapted to the different kinds of soils and climatic zones (Maradini-Filho et al., 2017). The scientific community took so much interest in it because of its high nutrients profile. As it is highly rich in proteins, fats, fiber, minerals and vitamins along with excellent balance of essential amino acids. The advance character of quinoa is that it is gluten

free and is highly suitable for the patients of celiac disease (Alvarez-jubete et al., 2010). Although quinoa has a lot of benefits for the consumers but due to less knowledge of its importance and high input costs, the farmers grow it very low. There is a great need of the time for the human community to put pressure on the growth of quinoa as it is called pseudo cereal and is highly important for the humans as it has rich profile nutrient content. This highly enriched profile content makes the functional benefits for human beings (Alvarez-jubete et al., 2010).

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### Nutritional Characters of Quinoa

Quinoa is the plant that belongs to the family Amaranthaceae and subfamily is Chenopodiaceae with genus *Chenopodium*. It was native to the Andean zones of Peru, Chile and Bolivia. It has been cultivated from

hundreds of years (Jancovora et al., 2009). The main reason behind the crop production of this plant is its high nutritional profile which makes it highly suitable for the production and consumption. The different types of quinoa are given below in Fig. 1.



**Fig. 1: Different Types of Quinoa Seeds**

(Source: <http://nutraceuticals.imedpub.com/archive.php>)

The grain of quinoa has beautiful attraction for consumer as it is new resource for eating and then it has high nutritional quality due to presence of protein content (Spehar, 2007). It is also rich in lysine content which enables the quinoa more nutritious as comparable to the vegetables. The quinoa grain contains high amylose content with fully enriched carbohydrate along with starch and sugar. It is also rich in vitamins like Vitamin B complex, vitamin E, vitamin C, Vitamin k and minerals like potassium, calcium, magnesium, zinc, copper and iron (Jacobsen, 2003). The amount of lysine and methionine is present in more quantity inside the quinoa because it makes the quinoa more reliable diet source for human consumption. The lipid composition of cereals like wheat, rice and maize is same like the soybean. The cereals like wheat, rice, barley and maize have a rich nutrient profile but comparably quinoa it makes highly more

nutritious because of its better nutrient profile of amino acids and proteins. The nutritional values of a food product is always determined by its nutritional profile like its amino acids and protein profile and degree of saturation, adsorption, assimilation and biological utilization. There are nine amino acids which are highly essential for humans that include isoleucine, lysine, leucine, methionine, tryptophan, histidine, valine, phenylalanine and threonine and all these essential amino acids are present in the quinoa (Vega et al., 2010). The protein contents of the quinoa grains varies from 13.9% to 17%. The quinoa grain has high amount of amino acid tryptophan which usually lacks in the common cereals. The protein bioavailability of amino acids varies greatly according with the variety, treatments and conditions provided for growth. The overall nature of quinoa also changes during the cooking process. The *in vitro*

bioavailability of quinoa protein ranges from 77% to 81%. According to the researchers, the bioavailability of the quinoa proteins is like equal to the bioavailability of the other protein rich foods. Due to absence of the gliadins and gliadins relevant proteins in the quinoa makes it highly best for consumption for the people facing celiac disease (James, 2009). The starch is considered as one of the main carbohydrate component of the quinoa and varies from 53% to 75% (dm). The starch of quinoa is highly rich in amylopectin. This has best freeze-thaw stability that boosts up its functionality as thickener in the frozen foods. The fiber content of quinoa is closer to the amount found in cereals which ranges from 8% to 10% dm. The oil content in quinoa varies from 3% to 10% and this oil is highly rich in essential fatty acids like  $\alpha$ -linolenic acid and linoleic acid and also has high amount of naturally found antioxidants like tocopherols (Ogungbenle, 2003). Quinoa is also considered as an oilseed crop as it has high lipid fraction and quality oil content. Quinoa is much enriched with micronutrients like minerals and vitamins. It is good source of riboflavin, folate and thiamine and also fully enriched with vitamin B 6 and vitamin E (Almeida and Sam, 2009).

### CONCLUSION

From the above discussion, we conclude that quinoa has many health benefits as quinoa plant is enriched with essential fatty acids, amino acids, minerals, ashes, proteins, vitamins and carbohydrates. It is also enriched with dietary fibers. So, this standardized quality of nutritional profile makes the quinoa very nutritious for daily food consumption. It is healthier than vegetables and other cereals as it has good lysine content and is gluten free. So, it is very good food source for the patients suffering from celiac disease. But the farming community is not taking so much interest in the cultivation of quinoa because of lack of knowledge of its importance and high input costs. But in developed countries, its cultivation has been started well. The agents present in quinoa which are highly antioxidants in nature are very important for

the researchers who are working in the medical field. Quinoa plant has also well role in curing the patients with cardiovascular disease. Hence, it is obvious that quinoa plant must be utilized on daily basis.

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