



Quinoa -A Treasure Full of Nutrients

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In recent decades, the world's population has surged in emerging nations, contributing to food scarcity and climate change. Finding food sources that are reasonably priced, high in protein, and able to withstand a range of environmental conditions is a challenge. Quinoa (*Chenopodium quinoa* Willd.), a herbaceous plant that is tetraploid and halophytic. Quinoa belongs to the genus *Chenopodium*, the family *Chenopodiaceae*, the class *Dicotyledoneae*, and the species *Quinoa* (Tanwar *et al.*, 2019). Due to its unique combination of oil, protein, and lipids, it is also known as a pseudo-cereal. Despite not belonging to the *Gramineae* family, it yields seeds that may be ground into flour and utilized as a cereal crop. One of the healthiest grains for human consumption is quinoa, which the FAO has identified as one of the crops that will provide food security for people in this century. Quinoa was first grown in India a few years ago under "Project Anantha" in the Himalayan region and the Ananthapuramu district of Andhra Pradesh. It is currently grown throughout India. Due to varying seed maturity even within a single plant, quinoa is often harvested by hand. Therefore, mechanical harvesting may result in seed losses. The natural saponins, a bitter chemical substance that coats the outside and functions as a natural insecticide, are removed from the seeds after they are harvested through processing. The natural saponins, a bitter chemical substance that coats the outside and functions as a natural insecticide, are removed from the seeds after they are harvested through processing.

Quinoa is nutrient-dense gold. Its protein content is very high (16–18%), with about 37% of the protein made up of important amino acids, such as casein, a milk protein (Drzewiecki *et al.*, 2003). Quinoa grains have higher-quality protein than most cereal grains, including wheat. It is a good source of iron, magnesium, zinc, folate, and other essential minerals. Quinoa has a lot of fiber and a number of vitamins and minerals that are lacking in the diets of many individuals. Consuming quinoa on a regular basis can assist you in meeting your requirements for iron, magnesium, potassium, fiber, and folate a vitamin that plays a crucial role in the growth and development of the fetus, making it especially vital during pregnancy. Eating quinoa can enhance your consumption of beneficial plant chemicals like polyphenols like ferulic acid, gallic acid, quercetin, and kaempferol, as well as nutrients like fiber and magnesium. Polyphenol compounds have anti-inflammatory and antioxidant properties that help to avoid oxidative cell damage. These substances help to counteract reactive oxygen species (ROS), which have been linked to several diseases. Furthermore, quinoa contains phytosterols with anti-inflammatory, cholesterol-lowering, and antioxidant qualities, such as beta-sitosterol.

Health Benefits

- **High in protein:** Quinoa is a complete protein, containing all nine essential amino acids that body needs to build and repair tissues. This makes it a great option for vegetarians.

- **Rich in fiber:** It is a good source of fiber, which is important for digestive health. Fiber can help to prevent constipation, promote regularity, and keep you feeling full for longer time.
- **Aid in weight management:** The fiber and protein content in quinoa may help feel more satisfied after eating, which may lead to reduced calorie intake and weight management.
- **Good source of vitamins and minerals:** Quinoa is a good source of many important vitamins and minerals, including magnesium, iron, folate, potassium, and phosphorus which are essential for overall health and well-being.
- **May lower blood sugar levels:** The fiber in quinoa may help to regulate blood sugar levels by slowing down the absorption of carbohydrates which can be beneficial for people with diabetes or pre-diabetes.
- **May improve heart health:** The antioxidants, fiber, and healthy fats in quinoa may contribute to better heart health. Quinoa is a good source of monounsaturated fats, which are the type of fat that can help to lower LDL (bad) cholesterol levels.
- **Gluten-free:** Quinoa is naturally gluten-free, making it a safe and healthy choice for people with celiac disease or gluten sensitivity.

Value addition of quinoa

Value addition in quinoa refers to processing the grain in ways that increase its convenience, appeal, and ultimately its market value.

Improved Functionality:

- **Reduced bitterness:** Raw quinoa has a natural coating containing saponins, which can taste bitter. Processing like soaking or rinsing removes saponins, making it more palatable.
- **Pre-cooked options:** Pre-cooked or puffed quinoa saves consumers cooking time and can be a good option for breakfast bowls or snack mixes.

Increased Variety and Convenience:

- **Quinoa flours and blends:** Grinding quinoa into flour allows it to be incorporated into breads, pastas, or baked goods, offering gluten-free alternatives. Blending quinoa flour with other flours can improve nutrition and texture.
- **Ready-to-eat snacks and breakfast cereals:** Quinoa can be roasted, puffed, or mixed with other ingredients to create healthy and convenient snack bars, breakfast cereals.

Enhanced Nutritional Profile:

Sprouted quinoa: Sprouting increases vitamin and mineral content, making even more nutritious.

Fortified quinoa: Quinoa can be fortified with additional minerals or vitamins to address specific dietary needs.

Product Diversification:

Quinoa based beverages: Quinoa milk is a lactose-free alternative to cow's milk and can be a base for smoothies or plant-based yogurts.

Quinoa pasta: Made from quinoa flour and often combined with other gluten-free flours it offers a nutritious option for those with gluten sensitivities.

Quinoa snacks/bar: Popped quinoa with nuts, seeds, and sweeteners can be used to make energy bars. Quinoa popcorn can be seasoned with various spices to create a crunchy and nutritious snack.

Quinoa flour: Ground quinoa seeds can be used to make gluten-free flour, suitable for baking bread, cakes, and cookies. It adds nutty flavour to baked goods.

Breakfast cereals: Rolled quinoa grains, can be used to make hot breakfast cereals similar to oatmeal. They can also be mixed with other grains and ingredients to create granola or muesli.

Salad dressings and sauces: Quinoa powder/flour can be used as a thickening agent in salad dressings, sauces, and gravies. Its mild flavor and nutritional benefits make it a versatile ingredient in various culinary applications.

Quinoa deserts: Quinoa can be used in desserts such as puddings, cakes, and muffins to add texture and nutritional value. Its slightly nutty flavor complements sweet ingredients like honey, chocolate, and fruits.

Quinoa based Ready-to-eat Meals: Salads, soups, and stir-fries can be prepared from quinoa providing a convenient and nutritious meal option for busy individuals.

References

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