

Quinoa

Plant-based Protein Advantages & Innovation



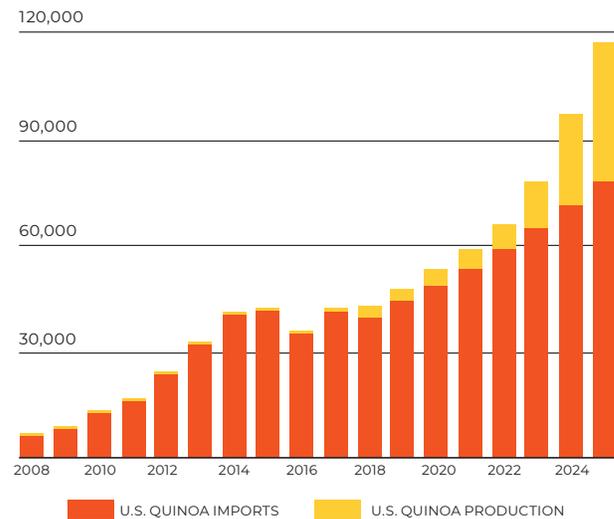
Quinoa has experienced remarkable growth over the two-plus decades it has been on the market, transforming from exotic specialty ingredient to familiar pantry staple.

It has become commonplace in home-cooked meals, restaurant menus, and an ever-expanding array of prepared foods applications.

Over the past decade, the North American quinoa market has grown at a pace of 19.2% per year, and this growth is projected to continue at a rate of 17% year-over-year to reach 117,000 metric tons by 2025.¹

For a crop that has been cultivated for over 5,000 years,³ quinoa's recent rise in domestic popularity is driven largely by consumer interest in quinoa's robust nutritional profile which contains fiber, minerals, vitamins, fatty acids, and antioxidants.⁴

U.S. Quinoa Market in Metric Tons Per Year²



¹ Mintel Report, June 2015 – May 2020

² Quinoa Seeds Market – Growth, Trends, COVID-19 Impact, and Forecasts (2021-2026), Mordor Intelligence

³ Mathew G. Nosworthy, James D. House, Overview of the Protein Quality Assessment of Quinoa (*Chenopodium quinoa*): p.3

⁴ Antonio Manoel Mardini Filho, et al., Quinoa: Nutritional Functional and Anti-nutritional Aspects. Food Science & Nutrition. June 2015: p.9



A Plant-Based Protein Powerhouse

Did you know 56% of consumers recognize quinoa for its protein and fiber?⁵ And with 6 grams of protein for every 140 grams prepared,⁶ quinoa is among the best plant-based protein sources on the market today.

The increase in consumer demand for quinoa, coupled with its protein and amino acid profile make it ideally positioned to catch the tailwind of the ongoing plant-based protein alternatives trend and further accelerate quinoa's short- and long-term growth potential.

Comparison of Macronutrients in Cooked Grains

	Quinoa ⁷	Brown Rice ⁸	White Rice ⁹
Energy (kcal)	170	170	180
Protein (g)	6	3.8	3.7
Fat (g)	2.7	1.3	0.4
Total Carbohydrate (g)	29.8	35.6	39.4
Fiber (g)	3.9	2.2	0.6
Starch (g) ¹⁰	24.7	33.1	38.7
Sugar (g)	1.2	0.3	0.1

2020 saw a 28% increase in consumer consumption of plant-based protein¹¹ with \$10 billion in global sales—a number projected to increase to \$14.5 billion by 2025 for a compound annual growth of 7.1%.¹²

APPLICATION VERSATILITY

Quinoa's potential as a plant-based protein source is even more promising when considering the wide variety of applications that have been identified in the food manufacturing space.

Initially thought of mostly as a side dish, quinoa has proven to be extremely versatile in prepared foods applications, both cooked as a whole grain or milled into flour. It can also be processed by extrusion, crisped, or flaked.

One of quinoa's most striking features is that its bio-availability, or protein digestibility, considerably increases when it is cooked.¹³ This nutritional retention makes quinoa ideal for fortifying a wide variety of commercially available products such as pasta, bread, cookies, muffins, cereal, snacks, drinks, flakes, baby food, and diet supplements, in which quinoa can constitute up to 20% of the finished product.¹⁴



In addition, the absence of gliadins (gluten-forming proteins present in wheat) and protein fractions corresponding to gliadin (found in oats, barley, rye and malt) makes quinoa appropriate for the preparation of gluten-free food products, enabling a greater variety of nutritious foods suitable for people with gluten intolerance and celiac disease.¹⁵

For an idea of just how many innovative quinoa applications are on the market today, please refer to the appendix at the end of this paper.



THE POWER OF PROTEIN-POWERED INNOVATION

As demand for plant-based protein alternatives increases, more and more food manufacturers are looking to quinoa as a functional ingredient. It delivers the plant protein consumers are looking for, and its versatility—in forms ranging from seeds to flour, flakes and crisps—makes it ideally suited to an impressive variety of applications, from traditional favorites to the trend-forward foods today's consumers are hungry for.

⁵ Quinoa On Trend with Consumers, Mintel 2020

⁶ USDA Database, retrieved 6.26.2020. Quinoa NDB 20137

⁷ USDA Database, retrieved 6.26.2020. Quinoa NDB 20137

⁸ USDA Database, retrieved 6.26.2020. Brown rice FDC-ID 785513

⁹ USDA Database, retrieved 6.26.2020 Long grain white rice NDB 20045

¹⁰ Calculated by difference

¹¹ 2020 Food & Health Survey – International Food Information Council. IFIC. June 2020: p.9

¹² Plant-based Protein Market by Source (Soy, Wheat, and Pea), Type (Isolates, Concentrates, and Textured), Form (Dry and Liquid), Application (Food and Feed), and Region (North America, Europe, APAC, South America, RoW) - Global Forecast to 2025. Market and Markets

¹³ Semra Navruz-Varli, Nevin Sanlier. Nutritional and Health Benefits of Quinoa (Chenopodium quinoa Willd.). Journal of Cereal Sciences: p.372

¹⁴ Diana Diaz Rizzolo, et al., Quinoa (Chenopodium quinoa Willd.), from Nutritional Value to Potential Health Benefits: An Integrated Review. Journal of Nutrition & Food Sciences: p.7

¹⁵ Antonio Manoel Mardini Filho, et al., Quinoa: Nutritional Functional and Anti-nutritional Aspects. Food Science & Nutrition. June 2015: p.5



Considering its versatility and incredible consumer appeal, it's no wonder quinoa is showing up in more and more food and beverage products. From flour to seeds to flakes, you can think big about using this tiny seed as an ingredient in an endless variety of on-trend applications.

A Few of Quinoa's Limitless Possibilities



BREAKFAST

Quinoa flour and flakes are highly functional in baked goods and a wide variety of breakfast food applications. For example, quinoa flakes are perfect for hot breakfast cereals or included in multi-grain blend toppings baked onto breads and bagels.

- ◆ **Hot Cereals**
- ◆ **Breakfast Breads**
- ◆ **Granola**
- ◆ **Cold Cereals**
- ◆ **Savory Breads**



PLANT BASED MEALS

Quinoa continues to experience growth on menu mentions and is commonly found in bowls, wraps, and especially plant-based burgers. You can use many different formats of quinoa for your meatless patties or even fermented quinoa-based beverages.

- ◆ **Prepared Meals**
- ◆ **Flatbreads**
- ◆ **Protein Bowls**
- ◆ **Meat Replacement**
- ◆ **Soups**
- ◆ **Beverages**
- ◆ **Salads**



SMALL BITES & MORE

Quinoa flour, flakes, crisps and seeds can be used in multiple different small bites. For example, Quinoa flour can be used to improve browning in low moisture baked goods such as cookies and crackers, and Quinoa crisps are used in energy and meal replacement bars to boost nutrition, increase visual appeal, and add texture.

- ◆ **Extruded Snacks**
- ◆ **Workout (Meals, Substitutes, Bars)**
- ◆ **Toppings**
- ◆ **Biscuits/Muffins**
- ◆ **Energy Bars**
- ◆ **Cookies**
- ◆ **Stuffing**

To learn more about our work in quinoa, contact us at (866) 452-0068 or visit us online at ardentmills.com/quinoahub

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