



# ANCIENT REDISCOVERING FOOD: GRAIN AMARANTH

*Sheila Cortazar Moya, Michael Ottman, Amanda McDaniels,  
Andrea Cereceres Aragón and Nobuko Hongu*



Grain amaranth was a dietary staple for Central American Indians before Columbus arrived in the New World.<sup>1</sup> Today, in Mexico, amaranth is popped like popcorn and mixed with sugar or honey to make a popular sweet treat, called “*Alegría*” which is the Spanish word for joy (Figure 1). Amaranth is a nutritious grain, similar to chia seeds<sup>2</sup> and quinoa, providing high amount of plant protein, fiber, iron, and calcium. This article can help you learn more about amaranth, and show you how to incorporate them into your balanced diet.

## What is Amaranth?

Amaranth is the common name for many different species of *Amaranthus*, which are tall plants with broad green leaves that develop brightly colored grain heads producing tiny edible seeds.<sup>1,3</sup> Amaranth was a major food of the Aztecs and earlier American cultures thousands of years ago. Today, amaranth is grown around the world, in Africa, China, India, Russia, South America, Mexico and the U.S.<sup>3</sup> In the late 1970s, amaranth has gained increased attention and has been grown as a grain crop,



Figure 1. Alegria

and is listed as whole grain in the U.S. Amaranth is listed as one of whole grains by Whole Grains Council. See the website: <http://wholegrainscouncil.org/whole-grains-101/whole-grains-z>.

Although amaranth isn't a cereal crop like oats, wheat, or rice; its nutritional profile is similar to that of cereals, and has been eaten in much the same way as cereals. Grain amaranth can be used as seeds or flour to make products such as cookies, cake, and pasta. There are various ways that amaranth can be included in snacks and meals: *alegría* – popped amaranth mixed with sugar or honey in granola bars (Figure 1), amaranth pudding, and soup. (See the Recipes below) In the U.S., amaranth has been added to some food products, such as cereals, granola bars, tortilla chips, and baby foods. Check the ingredients listed on a food label.

## Nutritional Information and Health Benefits

Nutritional values and health benefits of grain amaranth have been reviewed and reported.<sup>4</sup> Compared to other grains, amaranth has higher amounts of protein and more dietary fiber. It also contains high levels of calcium, iron and magnesium (Table 1).

### Protein in Grain Amaranth

According to the established protein requirement by WHO (World Health Organization) and FAO (Food and Agriculture Organization), protein composition in amaranth grain is close to the optimum composition suggested by WHO/FAO. A score of 100 is the ideal balance of essential amino acids\* (basic units of protein) on a scale of protein quality. Grain amaranth provides the highest score of 75. Also, combined with other cereals such as rice or wheat, it reaches the optimum score because the amino acids that are deficient in one are abundant in the other.<sup>5</sup>

Gluten is the protein found in many grains and is responsible for the elasticity in dough and the chewiness of baked products. The gluten-free grain amaranth and its products are suitable

for incorporation into the diet of people with celiac disease and non-celiac gluten sensitivity.<sup>6</sup>

\*Amino acids are basic units of protein. They break down in the stomach and intestine and then join together to make different proteins that the body needs. Twenty two (22) amino acids are very important to human health. The human body can make 13 of these amino acids. However, the body cannot make the other nine amino acids. Thus, the nine other amino acids are known as essential amino acids. It is necessary or essential for humans to get them from the food they eat.

### Fats in Grain Amaranth

Fats in grain amaranth are mainly unsaturated, containing linoleic (or omega-6) fatty acid (25-62%) and alpha-linolenic (or omega-3) fatty acid (0.3-2.2%).<sup>5</sup> Omega-3 and omega-6 fatty acids are two essential fatty acids which need to be obtained from a diet.<sup>7</sup> Amaranth oil extracted from grain amaranth may reduce the amount of blood cholesterol and benefit patients with cardiovascular disease.<sup>8</sup> However, the mechanism of lowering cholesterol in the diet with amaranth needs further study.

### Fiber in Grain Amaranth

Among grain amaranth's impressive nutritional values, amaranth is also a good source of fiber with 2.6 grams of dietary fiber per ½ cup of cooked amaranth (Table 1). The well-known, evidence-based benefits of dietary fiber in a balanced diet are to help 1) improve digestive health and 2) prevent heart disease, type 2 diabetes, and some cancers.

## Where to Buy Amaranth and its Cost

Amaranth grain can be found in local specialty or health food stores, such as Whole Food, or Sprouts Farmers Market, etc. The price may vary from \$2.70 to \$7.00 per pound. There are online resources for purchasing amaranth. Check shipping costs before

Table 1. Nutrient contents of cooked amaranth, brown rice and quinoa

Nutrient per ½ cup, cooked	Amaranth (%DV)	Brown Rice (%DV)	Quinoa (%DV)
Energy (kcal)	125 (7%)	109 (6.1%)	111(6.2%)
Protein (g)	4.7 (10%)	2.3 (5%)	4.0 (8.5%)
Fat (g)	1.9 (3%)	0.8 (1.2%)	1.8 (2.8%)
Carbohydrate (g)	23 (8%)	23 (8%)	20 (7%)
Fiber (g)	2.6 (11%)	1.8 (7.4%)	2.6 (11%)
Calcium (mg)	58 (6%)	10 (1%)	16 (2%)
Iron (mg)	2.6 (15%)	0.5 (3%)	1.4 (8%)
Magnesium (mg)	80 (20%)	43 (11%)	59 (15%)
Phosphorous (mg)	182 (18%)	75 (7%)	141 (14%)
Zinc (mg)	1.1 (7%)	0.6 (4%)	1.0 (6%)
Vitamin B-6 (mg)	0.14 (7%)	0.14 (7%)	0.11(6%)
Folate (µg)	27 (7%)	4 (1%)	39 (10%)

Percent Daily Values (%DV) are for adults or children aged 4 or older, and are based on a 2,000 calorie reference diet.

Reference: USDA National Nutrient Database for Standard Reference:

<https://www.ars.usda.gov/northeast-area/beltsville-md/beltsville-human-nutrition-research-center/nutrient-data-laboratory/docs/usda-national-nutrient-database-for-standard-reference/>

ordering online. In the U.S., amaranth is typically sold raw in bulk or packaged; but in Mexico, it is found already popped and ready to eat (Figure 2).

#### In the U.S., raw amaranth is sold



#### In Mexico, popped amaranth products are sold



*Flavor – coffee & honey*

Figure 2. Amaranth sold in the U.S., and in Mexico

### Homeowner's Guide

Palmer amaranth, a wild species of amaranth, is recognized as one of the most troublesome weed species. It is an aggressive, fast-growing species that has devastated crops in many states. It invades croplands in hot climates. Once amaranth is established, it can be hard to control.<sup>9, 10</sup> And, palmer amaranth plants can be poisonous to livestock.<sup>11</sup> If a plant is suspected to be Palmer amaranth, contact UA Extension Office in your county.

## Cooking Grain Amaranth and Recipes

Grain amaranth can be cooked by boiling it like rice or popping it like popcorn. These methods offer a variety of ways to prepare healthy breakfasts, lunches, dinners and snacks! Found below are the directions on how you may cook raw grain amaranth by boiling or popping.

### How to Cook Grain Amaranth:

#### Boiled:

1. Rinse the dry raw grain amaranth with cold, clean water.
2. Place the amaranth in a clean pot with water. In general, use a ratio of 1.5 cups water to  $\frac{1}{2}$  cup of amaranth. This could yield about 1.5 cups of cooked amaranth. (Amaranth triples in volume when cooking. Use cookware appropriate for the amount you are preparing.)

3. Set the pot on high heat and wait until the water begins to boil. As soon as it starts boiling, reduce the heat to low and cover the pot. (Do not open the pot lid.)
4. Cook the amaranth on low heat for about 20 minutes. Turn off the heat and leave the pot lid on for 5 minutes. Then, fluff the cooked amaranth with a fork and let any moisture evaporate.
5. Serve the cooked amaranth right away. If there are leftovers, store the cooked amaranth in a shallow container with a lid and keep it refrigerated for a few days. Remember do not leave perishable cooked foods at room temperature longer than 2 hours.<sup>12</sup>

#### Popped:

1. Toast a tablespoon or two of amaranth in a very hot, dry pan. Cover and shake the pan. Do not use oil.
2. Removed the popped amaranth and keep it in a container.
3. Serve the amaranth right away. If not all the cooked amaranth was used, then store it in an air tight jar and keep it in the refrigerator for later use.

If your grain amaranth is not popping, you may need to increase the heat. It takes only a few seconds to pop amaranth grains. When amaranth grains are heated in a pan too long, moisture content in grains is lost to pop. Proper moisture content is an essential factor for good popping.<sup>13</sup>

Popped amaranth can be spread on oatmeal, salad, yogurt, or mixed with smoothies, soup or ramen noodles. If you can buy popped amaranth, it is ready to use.



Figure 3. Popped amaranth

## Amaranth, Cheese & Fruit



### Ingredients (1 serving)

- 1 tablespoon grain amaranth (raw)
- 1 cup cantaloupe (or your choice of fruit)
- 2 tablespoons cottage cheese (low fat)

### Directions

1. Wash your hands with warm water and soap for 20 seconds before and after handling food.
2. Pop the grain amaranth (follow the direction above) and set it aside.
3. Cut the cantaloupe into medium pieces and place the pieces on a plate.
4. Add 2 tablespoons of cottage cheese (low fat) on the cantaloupe.
5. Finally, sprinkle 2 tablespoons of popped amaranth over the cottage cheese and fruit.

### Nutrition Information per Serving

109 calories, 22g carbohydrates, 6g protein, 1g fat, 2g fiber, 46mg calcium, 144mg sodium, 534mg potassium, 1g cholesterol

Estimated total cost: \$1.50

## Tuna Amaranth Patties



### Ingredients (1 serving)

- 1 tablespoon grain amaranth (raw)
- 1, 6-ounce can of tuna
- 1 egg
- 1 tablespoon chopped onion
- ¼ teaspoon salt and black pepper to taste
- A couple dashes of hot sauce or tabasco
- 1 teaspoon of vegetable oil (or any kind)
- ¼ teaspoon butter

4 The University of Arizona Cooperative Extension

### Directions

1. Wash your hands with warm water and soap for 20 seconds before and after handling food.
2. Pop grain amaranth (follow the direction above) and set it aside.
3. Drain the liquid from the tuna can, leaving a tablespoon of the tuna water in the can.
4. In a small mixing bowl, mix drained tuna, egg, onion, and popped amaranth. Sprinkle on salt, black pepper, and hot sauce or tabasco.
5. Divide the tuna mixture into half. Shape both mixtures into a ball and then flatten them between your hands. Place the patties on a tray and refrigerate for an hour so they don't fall apart when cooked.
6. Heat vegetable oil and butter in a skillet over medium heat. Gently place the patties in the pan and cook patties until golden brown, or 3-4 minutes on each side.
7. Serve tuna amaranth patties immediately. Serve with tartar sauce or serve the patties on slider buns to make a tuna burger (optional).

### Nutrition Information per Serving (without buns)

269 calories, 19g carbohydrates, 30g protein, 8g fat, 2g fiber, 76mg calcium, 101mg sodium, 603mg potassium, 49mg cholesterol

Estimated total cost: \$1.85

## Amaranth Pudding



### Ingredients (2 serving)

- ½ cup grain amaranth (raw)
- 2 cups water
- 1 cup milk (low fat)
- 2 teaspoons sugar
- Vanilla extract
- ½ cup fruit (cantaloupe, strawberry or mango)

### Directions

1. Wash your hands with warm water and soap for 20 seconds before and after handling food.
2. Rinse the dry raw grain amaranth with cold, clean water. Use tea strainer to wash the amaranth with running water.
3. In a large saucepan, add 1.5 cups of water with ½ cup of amaranth and bring the water to a boil. Reduce the heat and simmer for about 10 minutes.

- Let the amaranth cool and then drain the water.
- Add 1 cup of milk to cooked amaranth. Then add vanilla extract and sugar to taste. Bring it to a boil for 5 more minutes.
- Remove the pot from heat. Add the pudding into individual dessert bowls. Chill in the refrigerator.
- Add ½ cup fruit on the top of the pudding and serve.

#### Nutrition Information per Serving

271 calories, 49g carbohydrates, 10g protein, 4.7g fat, 4.3g fiber, 177mg calcium, 45mg sodium, 541mg potassium, 2mg cholesterol

**Estimated total cost: \$0.88**

## Amaranth Soup



#### Ingredients (2 serving)

- 4 fresh medium size tomatoes, chopped
- 1 clove garlic, minced
- ½ medium size onion, chopped
- 2 cups chicken broth
- 1 tablespoon vegetable oil (or any type of oil you like)
- ½ cup of grain amaranth (raw)
- ½ cup of quinoa (raw)
- 1 tablespoon popped amaranth for garnish
- salt and pepper for taste

#### Directions

- Wash your hands with warm water and soap for 20 seconds before and after handling food.
- Chop tomatoes and onion and mince garlic; set these ingredients aside.
- With water, rinse the quinoa in a fine-mesh strainer. This technique removes quinoa's natural coating which can make it taste soapy or bitter. After this step, set aside the quinoa.
- With water, rinse amaranth in a fine-mesh strainer and set aside.
- In a large saucepan, add tomatoes, onion and garlic into 2 cups of chicken broth and bring it to a boil. Reduce the heat and simmer for about 20 minutes. Set aside.
- Add 1 tablespoon of vegetable oil to a medium saucepan and heat it over low heat. Then add minced garlic, chopped onion, and the tomatoes. Mix them together with a wooden spoon. On low heat, cook the vegetables until they're soft. This should take about 10

minutes. Stir them two or three times so they cook evenly and don't stick to the bottom of the saucepan.

- With a blender, blend the ingredients from #3 (quinoa) on medium speed until it is a smooth consistency.
- Place 2 ½ cups of chicken broth in a large pot. Add the mix from the blender into the pot and bring it to a boil. Then, reduce heat.
- Add ½ cup of grain amaranth and ½ cup of washed quinoa to the soup. Stir the soup, mixing well. Cook for about 20 minutes. Stir once more and add water if necessary.
- Season with salt and pepper. Garnish with popped amaranth. Serve hot.

#### Nutrition Information per Serving (1 cup)

249 calories, 15.6g carbohydrates, 28.8g protein, 7.4g fat, 2g fiber, 74mg calcium, 99.5mg sodium, 762mg potassium, 47mg cholesterol

**Estimated total cost: \$1.22**

## References

- Baltensperger, D. D., Lyon, D.J., Nelson, L.A., & Corr, A.J. (1991). NF91-35 Amaranth Grain Production in Nebraska. Historical Materials from University of Nebraska-Lincoln Extension. Paper 408. Available online. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1405&context=extensionhist>
- Franklin, A.M., Hongu, N. (2016). Chia Seeds. University of Arizona Extension. Available online. <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1692-2016.pdf>
- Delate, K. Amaranth. Iowa State University. Extension and Outreach Alternative Agriculture. Available online. <https://www.extension.iastate.edu/alternativeag/cropproduction/amaranth.html>
- Venskutonis, P.R., Kraujalis, P. (2013). Nutritional Components of Amaranth Seeds and Vegetables: A Review on Composition, Properties, and Uses. *Comprehensive Reviews in Food Science and Food Safety*.12 (4): 381–412.
- Mrakar, S.G., Turinek, M., Jakop, M., & Bavec, F. (2010). Grain Amaranth as an alternative and perspective crop in temperate climate. *Journal for Geography*, 5(1): 135-145.
- Farr, K.J., Gallaway, P.J., & Hongu, N. (2016). Gluten-Free Diet: Is this Diet for you? University of Arizona Extension. Available online.
- Hongu, N., Wise, J.M., & Gallaway, P.J. (2014). Healthy fats: Tips for improving the quality of fat intake. University of Arizona Extension. Available online. <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1452-2014.pdf>

8. Martirosyan, D.M., Miroshnichenko, L.A., Kulakova, S.N., Pogojeva, A.V., & Zoloedov V.I. (2007). Amaranth oil application for coronary heart disease and hypertension. *Lipids in Health and Disease*. 6:1
9. College of Agriculture and Life Sciences, Coconino County, The Arizona Native Plant Society. A Northern Arizona Homeowner's Guide: To identifying and managing palmer's amaranth. Available online. [https://extension.arizona.edu/sites/extension.arizona.edu/files/resources/palmers-amaranth\\_0.pdf](https://extension.arizona.edu/sites/extension.arizona.edu/files/resources/palmers-amaranth_0.pdf)
10. Mohseni-Moghadam, M., Ken, C., & Ashigh, J. (2013). Palmer Amaranth Biology and Management. New Mexico State University, Cooperative Extension Service. Available online. [http://aces.nmsu.edu/pubs/\\_a/A617.pdf](http://aces.nmsu.edu/pubs/_a/A617.pdf)
11. Schmutz, E.M., Freeman, B.N., Reed, R.E. (1974). Live-stock-poisoning plants of Arizona. Tucson: The University of Arizona Press.
12. Food Safety Information. Leftovers and Food Safety. (2013). USDA, Food Safety and Inspection Service. Available. [http://www.fsis.usda.gov/wps/wcm/connect/8e9f95a6-fd35-42d3-b6cb-b07a4b853992/Leftovers\\_and\\_Food\\_Safety.pdf?MOD=AJPERES](http://www.fsis.usda.gov/wps/wcm/connect/8e9f95a6-fd35-42d3-b6cb-b07a4b853992/Leftovers_and_Food_Safety.pdf?MOD=AJPERES)
13. Tandjung, A.S. (2003). Improvement in popcorn popping performance through edible coatings and understanding inherent factors affecting moisture loss. Purdue e-Pubs. Available. <http://docs.lib.purdue.edu/dissertations/AAI3124231/>

## Abstract

Grain amaranth is a protein-rich, gluten-free, high-fiber grain. It also contains high levels of calcium, iron and magnesium. Grain amaranth can be popped or boiled, and added to your daily dishes. Popped amaranth is widely available in Mexico. However, currently, in Arizona, it can be found only as raw grain amaranth. This article introduces several recipes that may help you include amaranth in a healthy diet.



COLLEGE OF AGRICULTURE & LIFE SCIENCES

Cooperative  
Extension

THE UNIVERSITY OF ARIZONA  
COLLEGE OF AGRICULTURE AND LIFE SCIENCES  
TUCSON, ARIZONA 85721

**SHEILA CORTAZAR MOYA, M.S.**

*2016 Latin American Research Intern, Department of Nutritional Sciences*

**MICHAEL OTTMAN, PH.D.**

*Agronomy Specialist, The School of Plant Sciences*

**AMANDA MCDANIELS**

*Research Assistant, Department of Nutritional Sciences*

**ANDREA CERECERES ARAGÓN, B.S.**

*2016 Latin American Summer Program Intern, Department of Nutritional Sciences*

**NOBUKO HONGU, PH.D., M.ED., R.D.**

*Associate Professor, Nutrition & Physical Activity Extension Specialist, Department of Nutritional Sciences*

**CONTACT:**

**NOBUKO HONGU**

[hongu@email.arizona.edu](mailto:hongu@email.arizona.edu)

This information has been reviewed by University faculty.  
[extension.arizona.edu/pubs/az1735-2017.pdf](http://extension.arizona.edu/pubs/az1735-2017.pdf)

Other titles from Arizona Cooperative Extension can be found at:  
[extension.arizona.edu/pubsion](http://extension.arizona.edu/pubsion) can be found at:  
[cals.arizona.edu/pubs](http://cals.arizona.edu/pubs)

*Any products, services, or organizations that are mentioned, shown, or indirectly implied in this publication do not imply endorsement by The University of Arizona.*

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Extension & Economic Development, College of Agriculture Life Sciences, The University of Arizona.

The University of Arizona is an equal opportunity, affirmative action institution. The University does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation in its programs and activities.