

# Rajagaro Flour

It is flour made from the seeds of a plant called amaranth. It is very nutritious flour.



**Amaranthus Caudatus**  
**(Love Lies Bleeding)**  
3-5 Feet Tall

## Botanical Name Amaranthus Paniculatus

Rajgira atta (Indian word for flour) is made from the seeds of a plant called amaranth. The name amaranth comes from the ancient Greek meaning 'deathless'. It was said that this plant promoted a very long life. The Sanskrit word for this is - amara - also meaning deathless.

Amaranthus, collectively known as amaranth, is a cosmopolitan genus of herbs. Approximately 60 species are recognized, with inflorescences and foliage ranging from purple and red to gold. Members of this genus share many characteristics and uses with members of the closely related genus Celosia.

Although several species are often considered weeds, people around the world value amaranths as leaf vegetables, cereals, and ornamentals. It is flour made from the seeds of a plant called amaranth. Amaranthus caudatus is a species of annual flowering plant. It goes by common names such as love-lies-bleeding, pendant, amaranth, tassel flour, velvet flour, foxtail, amaranth, and quilete. Many parts of the plants including leaves and seeds are edible and are used as a source of food in India and South America – where it is most important Andean species of Amaranthus as Kwacha. Rajgaro Flour is also known as Ramdana or Amaranth Flour. It is pleasant and nutty in taste. This Flour has high level of protein content and fiber as compare to regular cereals like wheat and rice. It is widely used in the preparation of cookies, crackers and backing mixes. It can also be eaten during fasting.

### Amaranth grain



Amaranth has been cultivated as a grain for 8,000 years. The yield of grain amaranth is comparable to rice or maize. It was a staple food of the Aztecs, and was used as an integral part of Aztec religious ceremonies. The cultivation of amaranth was banned by the conquistadores upon their conquest of the Aztec nation. Because the plant has continued to grow as a weed since that time, its genetic base has been largely maintained. Research on grain amaranth began in the US in the 1970s. By the end of the 1970s, a few thousand acres were being cultivated. Much of the grain currently grown is sold in health food shops.

Grain amaranth is also grown as a food crop in limited amounts in Mexico, where it is used to make a candy called alegría (Spanish for happiness) at festival times. Amaranth species that are still used as a grain are: *Amaranthus caudatus*, *Amaranthus cruentus*, and *Amaranthus hypochondriacus*. The grain is popped and mixed with honey. In Maharashtra state of India, it is called "Rajgira" (राजगीरा) in the Marathi language. The popped grain is mixed with melted jaggery in proper proportion to make iron and energy rich "laddus," a popular food provided at the Mid-day Meal Program in municipal schools.

Amaranth grain can also be used to extract amaranth oil - particularly valued pressed seed oil with many commercial uses.

## **Nutritional analysis**

As the following table shows, in a raw form, grain amaranth has many nutrients.

Raw amaranth grain, however, is not edible and cannot be digested. Amaranth grain must be prepared and cooked like other grains. Another table below suggests cooked amaranth is a competing and promising source of nutrition when compared to wheat bread, higher in some nutrients and lower in others.

The protein is of an unusually high quality, according to Educational Concerns for Hunger Organization (ECHO). The actual nutritional value of amaranth as human food is less than would be expected from raw amaranth grain data. According to ECHO, this is due to anti-nutritional factors in raw amaranth grain; examples of anti-nutritional factors present in amaranth include oxalates, nitrates, saponins and phenolic compounds. Cooking methods such as boiling amaranth in water and then discarding the water may reduce its toxic effects.

Amaranth grain is particularly high in lysine, an amino acid that is low in other grains. Amaranth grain is deficient in essential amino acids such as leucine and threonine - both of which are present in wheat germ. Amaranth grain is free of gluten, which is important for people with gluten allergies.

<b>Amaranth, uncooked</b>	
<b>Nutritional value per 100 g (3.5 oz.)</b>	
<b><u>Energy</u></b>	1,554 kJ (371 kcal)
<b><u>Carbohydrates</u></b>	65 g
- <b><u>Sugars</u></b>	1.7 g
- <b><u>Dietary fiber</u></b>	7 g
<b><u>Fat</u></b>	7 g
<b><u>Protein</u></b>	14 g
<b><u>Water</u></b>	11 g
<u>Thiamine (vit. B<sub>1</sub>)</u>	0.1 mg (9%)
<u>Riboflavin (vit. B<sub>2</sub>)</u>	0.2 mg (17%)
<u>Niacin (vit. B<sub>3</sub>)</u>	0.9 mg (6%)
<u>Pantothenic acid (B<sub>5</sub>)</u>	1.5 mg (30%)
<u>Vitamin B<sub>6</sub></u>	0.6 mg (46%)
<u>Folate (vit. B<sub>9</sub>)</u>	82 µg (21%)
<u>Calcium</u>	159 mg (16%)
<u>Iron</u>	7.6 mg (58%)
<u>Magnesium</u>	248 mg (70%)
<u>Manganese</u>	3.4 mg (162%)
<u>Phosphorus</u>	557 mg (80%)
<u>Potassium</u>	508 mg (11%)
<u>Zinc</u>	2.9 mg (31%)
Percentages are relative to <a href="#">US Recommendations</a> for adults. Source: <a href="#">USDA Nutrient Database</a>	

The table below presents nutritional values of cooked, edible form of amaranth grain to cooked, edible form of wheat grain as reported by United States Department of Agriculture's National Nutrient Database for Standard Reference, Release 23 (2010)

### Analysis – Cooked Amaranth Grain

<b>Synopsis ~ composition:</b>	<b>Amaranth grain, cooked</b>	<b><u>Bread</u>, wheat germ</b>
<b>Component (per 100g portion)</b>	<b>Amount</b>	<b>Amount</b>
water (g)	<b>75</b>	37
energy (kJ)	429	<b>1092</b>
protein (g)	4	<b>10</b>
fat (g)	2	<b>3</b>
carbohydrates (g)	19	<b>48</b>
fiber (g)	2	2
sugars (g)	n/a	4
iron (mg)	2.1	<b>3.5</b>
manganese (mg)	0.85	0.85
calcium (mg)	47	<b>89</b>
magnesium (mg)	<b>65</b>	28
phosphorus (mg)	<b>148</b>	121
potassium (mg)	135	<b>254</b>
zinc (mg)	0.9	<b>1.0</b>
pantothenic acid (mg)	<0.1	<b>0.5</b>
vitB6 (mg)	<b>0.11</b>	0.08
folate (µg)	22	<b>118</b>
thiamin (mg)	<0.1	<b>0.4</b>
riboflavin (mg)	0.02	<b>0.38</b>
niacin (mg)	0.24	<b>4.5</b>

## **Uses**

Amaranth flour is used in making pastas and baked goods. It must be mixed with other flours for baking yeast breads, as it contains no gluten. One part amaranth flour to 3-4 parts wheat or other grain flours may be used. In the preparation of flatbreads, pancakes and pastas, 100% amaranth flour can be used.

## **Cultivation**

The ultimate root of 'amaranth' is the Greek ἀμάραντος (amarantos), 'unfading,' with the Greek word for 'flower,' ἄνθος (anthos), factoring into the word's development as "amaranth." The more accurate 'amarant' is an archaic variant.

There are many members of the amaranth family. Some are grown primarily for their seeds, which are treated as a grain, others are decorative, and some are considered weeds. All are edible.

The two main types grown as a leafy food crop are loosely termed green amaranth and red amaranth.

The red amaranth is a wonderful vegetable/herb with dark green leaves marked and deeply veined in red. It has a semi-sour taste and is cooked like spinach in Indian vegetable dishes and dals (lentils pulses). Incidentally it has much more nutritional value than spinach.

Chinese people eat amaranth during summer, believing it to reduce internal heat and dampness.

The plant is used in Asian cookery extensively, and when it goes to seed, the tiny seeds - actually they look like seeds but botanically they are the fruits are dried and used as a pseudo-grain flour. When strictly non-cereal items are required in India, this one fits the bill nicely.

# **Amaranth: a Healthy Grain for Vegetarian Recipes**

## **Potato Puri**



Rajgira atta with boiled mashed potatoes, chilli and salt filed in Roti, Paratha, and Breads during fast, you can have as a main food. The easiest way to roll puri is keep the dough inside zip lock cover and roll with the rolling pin otherwise it will not roll.

## **Ingredients**

1. Rajagaro Atta (heaped) 1 cup
2. Boiled potatoes 2 medium sized
3. Green chillies finely chopped 2
4. Finely chopped Coriander leaves 1 tbsp
5. Salt to taste

## **Methodology**

1. First, mash the boiled potatoes.
2. In a large bowl, mix rajgira flour, mashed boiled potatoes, green chili, coriander leaves and salt and knead with sufficient water and add little oil at the end so that it does not stick.

3. Make stiff dough. Divide the dough into 10 equal portions.
4. In a zip lock cover, take the dough and keep it inside and close it.
5. Then in the rolling pin, make it round shaped of 3 inch.
6. Heat the oil and Deep fry till golden brown on both sides.
7. Drain them in a paper towel.
8. Serve hot with dum aloo or Paneer or any other fasting vegetable

Amaranth (*Amaranthus*) has a colorful history. It is highly nutritious, and the plant itself is extremely attractive and useful. Amaranth was a staple in the diets of pre-Columbian Aztecs, who believed it had supernatural powers and incorporated it into their religious ceremonies. Before the Spanish conquest in 1519, amaranth was associated with human sacrifice and the Aztec women made a mixture of ground amaranth seed, honey or human blood then shaped this mixture into idols that were eaten ceremoniously. This practice appalled the conquistadors who reasoned that eliminating the amaranth would also eliminate the sacrifices. The grain was forbidden by the Spanish, and consequently fell into obscurity for hundreds of years. If not for the fact that the cultivation of amaranth continued in a few remote areas of the Andes and Mexico, it may have become extinct and completely lost to us.

Amaranth is used in various cultures in some very interesting ways. In Mexico it is popped and mixed with a sugar solution to make a confection called 'alegria' (happiness), and milled and roasted amaranth seed is used to create a traditional Mexican drink called 'atole.'

Peruvians use fermented amaranth seed to make 'chicha' or beer. In the Cusco area the flowers are used to treat toothache and fevers and as a food colorant for maize and quinoa. During the carnival festival women dancers often use the red amaranth flower as rouge, painting their cheeks, then dancing while carrying bundles of amaranth on their backs as they would a baby.

In both Mexico and Peru the amaranth leaves are gathered then used as a vegetable either boiled or fried. In India amaranth is known as 'rajagaro' (the King's grain) and is popped then used in confections called 'laddoos,' which are similar to Mexican 'alegria.'



In Nepal, amaranth seeds are eaten as gruel called 'sattoo' or milled into flour to make chappatis. In Ecuador, the flowers are boiled then the colored boiling water is added to 'aquaredeinte' rum to create a drink that 'purifies the blood,' and is also reputed to help regulate the menstrual cycle.

Since 1975 amaranth has been gaining support in the U.S. and is now grown in Colorado, Illinois, Nebraska, and other states, but is still not a mainstream food. It is found in many natural food stores and the flour is often used in baked goods.

The name amaranth hails from the Greek for 'never-fading flower.' The plant is an annual herb, not a 'true' grain and is a relative of pigweed, a common wild plant also known as lamb's-quarters, as well as the garden plant we know as Cockscomb. There are approximately 60 species of amaranth and there is no definite distinction between amaranth grown for the leaf (vegetable), and the seed (grain).

Amaranth is a bushy plant that grows 5 to 7 feet, with broad leaves and a showy flower head of small, red or magenta, clover like flowers which are profuse, and constitute the plants exquisite, feathery plumes. The seed heads resemble corn tassels, but are somewhat bushier. They are quite striking as well. The seeds are tiny (1/32") lens shaped, and are a golden to creamy tan color, sprinkled with some occasional dark colored seeds.

Each plant is capable of producing 40,000 to 60,000 seeds. The leaves of ornamental varieties, such as Joseph's Coat resemble the coleus plant and are quite striking. Their coloring can range from deep red, purple-red, orange, pink, green, to white. The sight of a full-grown amaranth field with its vividly colored leaves stems and flower or seed heads is an amazingly beautiful sight that evokes much emotion.

Aside from amaranth being such an attractive plant it is extremely adaptable to adverse growing conditions. It resists heat and drought, has no major disease problems, and is among the easiest of plants to grow. Simply scratching the soil, throwing down some seeds, and watering will reward you with some of these lovely plants.

**Amaranth can be cooked as a cereal, ground into flour, popped like popcorn, sprouted, or toasted. The seeds can be cooked with other whole grains, added to stir-fry or to soups and stews as a nutrient dense thickening agent.**

**Amaranth flour is used in making pastas and baked goods. It must be mixed with other flours for baking yeast breads, as it contains no gluten. One part amaranth flour to 3-4 parts wheat or other grain flours may be used. In the preparation of flatbreads, pancakes and pastas, 100% amaranth flour can be used. Sprouting the seeds will increase the level of some of the nutrients and the sprouts can be used on sandwiches and in salads, or just to munch on.**

To cook amaranth boil 1 cup seeds in 2-1/2 cups liquid such as water or half water and half stock or apple juice until seeds are tender, about 18 to 20 minutes. Adding some fresh herbs or gingerroot to the cooking liquid can add interesting flavors or mix with beans for a main dish. For a breakfast cereal increase the cooking liquid to 3 cups and sweeten with Stevia, honey or brown rice syrup and add raisins, dried fruit, allspice and some nuts.

Amaranth has a 'sticky' texture that contrasts with the fluffier texture of most grains and care should be taken not to overcook it as it can become 'gummy.' Amaranth flavor is mild, sweet, nutty, and malt like, with a variance in flavor according to the variety being used.

Amaranth keeps best if stored in a tightly sealed container, such as a glass jar, in the refrigerator. This will protect the fatty acids it contains from becoming rancid. The seeds should be used within 3 to 6 months.

The leaves of the amaranth plant taste much like spinach and are used in the same manner that spinach is used. They are best if consumed when the plant is young and tender.

Amaranth seed is high in protein (15-18%) and contains respectable amounts of lysine and methionine, two essential amino acids that are not frequently found in grains. It is high in fiber and contains calcium, iron, potassium, phosphorus, and vitamins A and C.

The fiber content of amaranth is three times that of wheat and its iron content, five times more than wheat. It contains two times more calcium than milk. Using amaranth serves as a combination with wheat corn or brown rice results in a complete protein as high in food value as fish, red meat or poultry.

**Amaranth also contains tocotrienols - a form of vitamin E which has cholesterol-lowering activity in humans.** Cooked amaranth is 90% digestible and because of this ease of digestion, it has traditionally been given to those recovering from an illness or ending a fasting period. Amaranth consists of 6-10% oil, which is found mostly within the germ. The

oil is predominantly unsaturated and is high in linoleic acid, which is important in human nutrition.

The amaranth seeds have a unique quality in that the nutrients are concentrated in a natural 'nutrient ring' that surrounds the center, which is the starch section. For this reason the nutrients are protected during processing. The amaranth leaf is nutritious as well containing higher calcium, iron, and phosphorus levels than spinach.

For something new, different, and highly nutritious in your diet, try amaranth and have some fun experimenting and discovering your favorite ways to use it. If you would like to learn more about whole grains and their uses, you may wish to try one of these books. They are available at Amazon and can be purchased through Health and Beyond Online by simply clicking on the title.

### **Complete Whole Grain Cookbook, Aveline Kushi**

### **All American Waves of Grain: How to Buy, Store, and Cook Every Imaginable Grain, Barbara Grunes**

### **Amazing Grains: Creating Main Dishes with Whole Grains, Joanne Saltzman**

#### Amaranth with Spinach Tomato Mushroom Sauce

1. 1 cup amaranth seed
2. 2-12 cups water
3. 1 Tablespoon olive oil
4. 1 bunch spinach (or young amaranth leaves if available)
5. 2 ripe tomatoes, skinned and coarsely chopped
6. ½ pound mushrooms, sliced
7. 1-½ teaspoons basil
8. 1- ½ teaspoons oregano
9. 1 clove of garlic minced
10. 1 Tablespoon onion, minced
11. Himalayan Rock salt (Fire Salt)

Add amaranth to boiling water, bring back to boil, reduce heat, cover and simmer for 18-20 minutes.

While amaranth is cooking, stem and wash spinach, then simmer until tender. Dip tomatoes into boiling water to loosen skin, then peel and chop. Heat oil in a skillet over medium heat and add garlic and onion. Sauté approximately 2 minutes then add tomato, mushrooms, basil, oregano, salt, pepper and 1 Tablespoon of water. Drain and chop spinach and add to tomato mixture. Cook an addition 10 – 15 minutes, stirring occasionally. Lightly mash tomato as it is cooking.

Stir the sauce into the amaranth or spoon it on top.

## **Amaranth 'Grits'**

1. 1 cup amaranth
2. 1 clove garlic, finely chopped or pressed
3. 1 medium onion, finely chopped
4. 3 cups water or vegetable stock
5. Sea salt or soy sauce to taste
6. Hot sauce to taste

Garnish: 2 plum tomatoes

Combine the amaranth, garlic, onion, and stock in a 2-quart saucepan. Boil; reduce heat and simmer covered until most of the liquid has been absorbed, about 20 minutes.

Stir well. If the mixture is too thin or the amaranth not quite tender (it should be crunchy, but not gritty hard), boil gently while stirring constantly until thickened, about 30 seconds. Add salt or soy sauce to taste.

Stir in a few drops of hot sauce, if desired, and garnish with chopped tomatoes.

## **Growing Amaranth as a Food Plant**

### **How To Grow Amaranth, Why, What To Do With It**

**Growing amaranth** is possible all year round in the tropics. That's one of the reasons it is an essential and ubiquitous plant in my permaculture garden.

Here are some more good reasons to grow amaranth plants:



1. It is a very nutritious leaf and grain.
2. It makes yummy spinach.
3. Amaranth leaves make nice salad greens. They are not as slimy as the other tropical leafy greens that are supposed to serve as lettuce substitutes in hot climates.
4. Amaranth self-seeds.
5. Amaranth flowers can look spectacular (depends on the variety).

### **What Is Amaranth?**

Most people I talk to have never heard of amaranth, yet **amaranth is a leaf vegetable and grain** that has been eaten for centuries all over the world.



Amaranth seeds have been used since ancient times in Central and Latin America and in the countries of the Himalayas. Amaranth leaves are used across Asia.

The green-leaved varieties are popular in India and other places, the Chinese prefer their amaranth red-leaved and amaranth grain once was a staple in the diets of pre-Columbian Aztecs.

## **Amaranth and Nutrition**

Technically amaranth is a seed not a grain. The amaranth family (*Amaranthaceae*) includes the previously separate family of the beets and spinaches, the *Chenopodiaceae*. Amaranth is not related to the *Graminae*, the real grains.

Compared to other grains amaranth seeds have a much higher content of the minerals calcium, magnesium, iron and of the amino acid Lysine. (Grains are usually low in that, corn has none. Most people get their Lysine from meat.)



Amaranth seeds are also high in potassium, zinc, Vitamin B and E and can contain over 20% protein (depending on the variety).

You can find amaranth grain in health food stores in the form of **amaranth flour** and the popped seeds as **amaranth cereal**.

I never tried the flour (I don't cook or bake much, if at all). But I can tell you that amaranth cereal is delicious.

**Amaranth leaves** are nutritionally similar to beets, Swiss chard and spinach, but are much superior. For example amaranth leaves contain three times

more calcium and three times more niacin (vitamin B3) than spinach leaves. (Or twenty times more calcium and seven times more iron than lettuce, which simply isn't all that nutritious...).

Amaranth is much closer genetically to its wild ancestors than our over developed and nutritionally depleted typical vegetables. Amaranth leaves are an excellent source of carotene, iron, calcium, protein, vitamin C and trace elements.

Local farmer's markets may offer bunches of **amaranth greens**, but those don't keep at all so you'd have to use them quickly. It's much easier to grow amaranth and cut it as needed.

## What Does Amaranth Look Like?



Amaranth is an upright, moderately tall, broad leafed, annual plant. There is a number of different species of amaranth and a huge number of varieties within those species.

Amaranth comes in all sizes, shapes and colours. The leaves can be round or lance shaped, five to fifteen cm long or more, light green, dark green, reddish or variegated. Seeds maybe white, yellow, pink or black. Flowers can be huge tassles or tiny globes, red, pink, yellow or cream...

Amaranth is related to a common weed you probably know, **pigweed**. Or rather, the pigweeds (there are different kinds) are amaranth species. The

weedy amaranth types are also edible and taste much like the cultivated varieties. They just don't grow as large and leafy, or produce as many grains, or look half as good in the garden.

Some cultivated amaranth varieties grow to two metres or six feet tall and individual plants that landed in a great spot with no competition may grow even taller.

The flowers can be striking and they produce a huge number of tiny seeds. (Over 100,000!)

Do you know the flower Love Lies Bleeding? That's an amaranth species, *Amaranthus caudatus*, and yes, the leaves and seeds are edible and nutritious like any other amaranth.

You probably won't find leaf and grain amaranth seed in your local garden centre (you should find amaranth flowers), but online seed retailers who specialise in heirloom seeds, organic seeds, vegetable seeds or anything similarly sensible usually carry them.

Don't expect the cultivated leaf amaranth species to look as stunning as Love Lies Bleeding or some grain amaranths. The leaf amaranth flowers are usually much smaller, and creamy or greenish in colour. You grow those for food only, not for looks.





## **How To Grow Amaranth**

Well, there really isn't much to it. Amaranth seed is very fine. If you grow leaf amaranth you want a large number of plants because you will likely harvest the whole plant while it is still young. There is no point starting it in punnets.

(Unless you only have a few seeds. Then you can start your first plants in pots or something. But do collect enough seeds for the next planting to save that step. See below.)

Thinly sprinkle the seed on the ground and rake it in. Like all fast growing leafy greens amaranth loves rich soil with steady moisture and a good supply of nutrients, especially nitrogen. But it isn't as fussed as spinach or silverbeet would be. Amaranth is much hardier. It can cope with heat and dry conditions a lot better than any other leafy green. (One more good reason for this lazy gardener to grow it!)

If you are frustrated with trying to grow tasty, leafy greens in the tropic, amaranth is a plant you should start growing today.

## **Harvesting, Using And Cooking Amaranth**



Harvest leaf amaranth whenever you like. Ok, harvest it as early as you like and definitely before it flowers (you can eat the buds though).

The youngest leaves have a milder flavor and are good to use in salads, the mature leaves are better cooked like spinach. Anything you would use spinach for, just use amaranth leaves exactly the same way.

You can use the young stems as well. (Older stems would need peeling and I sure won't bother with that...)

I usually cut my amaranth when it is between one and two feet tall. I just cut the whole stem, maybe six to ten inches above the ground. The stem will reshoot and I may harvest that again (unless by then the bugs demolished it).

I always leave the two or three biggest, healthiest amaranth plants in a bed alone and let them go to seed.

Once the flower head has mostly dried up I cut that and shake the seeds out into a paper bag. That gives me thousands of amaranth seeds for the next few plantings. Seeds also drop on the ground as the seed heads ripen and during harvesting.

After shaking out the seeds into the bag I crunch up the left over, dry seed head (which still contains seeds) and spread the remains over some other areas.

And if I'm about to move the mobile chicken pen I throw it in there for the chickens to spread.

As a result there is always amaranth growing here somewhere, even when I don't get around to planting it properly.

I grow three amaranth varieties. One ornamental variety, two meters tall with massive red flower heads, one leaf amaranth, and weed amaranth :-). And I eat all of them. I eat whatever is closest to the kitchen and ready.

Despite amaranth being one of the precious few grains that is actually feasible for home growing, I do not grow grain amaranth. I don't eat grains anyway, plus harvesting and cleaning enough grain to make it worthwhile sounds like a lot of work. I also cannot see myself getting into making my own amaranth flour or popping the seeds for cereal etc.