

Amaranth

ANCIENT GRAIN, FOOD OF THE FUTURE



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INTRODUCTION

Since its establishment in 1999, Aarstiderne has been committed to finding creative and diverse ways to use vegetables. We have done this with the goal of enriching peoples' daily meals with the many flavors and textures that vegetables have to offer. We started with rediscovering old Danish vegetables like parsnip, celery, parsley, and other root vegetables that provide the basis for a solid and healthy plant-based diet. This is not because we dislike meat, fish, eggs, and all of the other animal products the earth has to offer, but because our eating habits have become too dependent on animal-based foods. We have forgotten the abundance of the plant world.

Throughout the years, we have delivered boxes to Danish and Swedish kitchen tables. This started with fruit and vegetable boxes, and has evolved into a full meal-box delivery system including the vegetables, grains, meat, fish, cheese, and spices needed to make a full meal. This new approach to food boxes has allowed us to form partnerships with innovative growers, craftspeople at slaughterhouses, cheese makers, spice connoisseurs, and juice pressers. And the journey continues!

In recent years there has been a growing movement towards vegetarianism and veganism, which has given us the opportunity to expand our efforts to support plant-based diets. We dipped our toes in the water by testing the cultivation and recipe potential for old Danish peas and beans from the NordGen genebank with the seed saving organization Frøsamlerne. In 2016, we became stakeholders with the University of Copenhagen project "Protein2Food", financed by the EU Horizon2020 programme, led by Sven-Erik Jacobsen. Dr. Jacobsen has long worked with both domestic and exotic protein crops for cultivation in Denmark, the rest of Europe, and developing countries, and is known internationally for his work with quinoa as a new global crop. We received seeds from the project and began cultivating quinoa, amaranth, millets, lupine, and lentils at our farm in 2016. Natalie Hoidal, an agronomy student helped us with the cultivation of these crops.

With support of the Protein2Food project, in addition to another EU funded project under FP7, Latincrop, Natalie worked with a team of agronomy students to develop a series of tasting events and recipes for amaranth. During a trip to Morocco, where farmers had begun cultivating the crop, they could sense that farmers struggled to find culinary uses for it. After returning to Denmark to work with the Protein2Food crops on our farm, she worked with Aarstiderne's chefs to taste-test the various crops. Together, with the University of Copenhagen, we developed the idea of working towards a cookbook that highlights the many ways that plant-based proteins can be incorporated into our diets.

Fate was on our side, as shortly after the taste tests, two interns from the Nutrition and Health Education program showed up to work with us. The scene for a cookbook was set, and ideas were translated into reality. This preliminary project is the first in the development of a full cookbook, and is based on the amaranth recipes developed by Natalie and her colleagues. With the help of our head chef, we polished up the recipes and adapted them to the Danish kitchen. Finally, the results were disseminated in collaboration with Latincrop and Protein2Food projects.

We'd like to thank the following contributors for their ideas, time, and energy in the development of these recipes:

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To Aarstiderne's Chef: Sanne Venlov for sharing her ideas and skills to improve the quality of the final product.

We warmly thank you all!

Good reading,
Svend Daverkosen, Agriculture and Environment Manager of Aarstiderne A/S

PREFACE

BY NATALIE HOIDAL

When we discuss plant-based diets, we often think of meat substitutes. But is it the whole story? People looking to eat less meat often seek advice online and find recipes for vegetarian and vegan burgers, spaghetti, “meatballs” and tofu scrambles. But is this the whole story? There is nothing wrong with these foods, but they do not begin to capture the vast diversity of what a plant-based diet can contain. A plant-based diet is a way to explore the diversity of flavours, textures, and the stories of plants from around the world. This book explores a wide array of plants with exciting histories, extensive health benefits, and most importantly, delicious flavours.

There are many good reasons to cut back on meat. The Food and Agricultural Organization of the United Nations estimates that currently one third of all arable land on earth is dedicated to animal feed production, and livestock rearing accounts for 15% of all greenhouse gas emissions caused by human activity². If we are to feed 9 billion people expected to live on this planet by 2050, food production must become significantly more efficient³. The land area and water required per kilocalorie of food produced are significantly lower for vegetable, grain, and legumes than for any type of meat, dairy, or egg production⁴. When comparing land area per unit protein, the trends are the same, though egg protein is comparable to roots and tubers in terms of water use⁴. If we are to reduce emissions from agriculture and produce enough food for a growing population, reducing meat consumption is imperative, especially in higher-income nations where meat consumption is highest.

In addition to reducing the environmental impacts of our diets, shifting to more plant-based sources of protein and nutrients can be a celebration of the myriad of diverse plants and flavours around us. Our current diets are remarkably monotonous. Today, we rely on only 20 species of plants to meet 95% of our daily energy requirements, with 50% of our carbohydrates, proteins, and calories coming from rice, maize, and wheat alone⁵. In contrast, throughout history more than 7000 plant species have been cultivated around the world for food⁶. In the process of industrializing of our food systems, we have forgotten the vast diversity of plant-based foods that our ancestors feasted on.

By tapping into this diversity, we accomplish a few important things. For one, we reconnect to our own ancestral heritage and learn about the cultures and food traditions of others, all while becoming more adventurous chefs and eating more interesting meals. We also become healthier when we reduce our meat consumption and add greater plant diversity to our diets. Excessive meat consumption puts us at risk for cardiovascular disease, diabetes, high cholesterol, cancer, and hypertension¹. Adding vegetables, grains, and legumes reduces the risk of these metabolic conditions, and also improves our intake of vitamins, antioxidants and other beneficial nutrients¹. Importantly, adding diversity to our agricultural fields improves food security and ecosystem

services. More diverse crop rotations are the primary tool in managing pests, diseases, and build-up of resistance to chemical control. Adding more legumes to crop rotations also provides valuable nitrogen to the soil and reduces the need for synthetic fertilizers.

A plant-based diet is not simply a matter of avoiding harm, but rather can be a celebration of heritage, culture, and diversity. In this book we explore a wide diversity of protein rich plants that can form the basis of a plant-based diet. We dive into the history and traditions surrounding each grain, seed, or legume highlighted, and provide a series of recipes for each to inspire your next meal.

AMARANTH



WHAT IS AMARANTH?

Amaranth originates from South-western Mexico and was for over 6.000 years cultivated and eaten as a staple crop by the Aztecs, Miztecs, Zapotecs, and other groups in the region. Thanks to the plant's impressive ability to adapt to the surrounding climate, amaranth is cultivated today by farmers all over the world.

The amaranth family includes over 60 different species and a countless number of subspecies. Overall, amaranth can be divided into three types: *grain amaranth*, *vegetable amaranth* and *weed amaranth*, of which grain amaranth is the most interesting for cultivation purposes. Through the years, the plant has acquired many names like *kiwicha*, *huautli*, *grano inco* and *sangorache*.

Amaranth is best known for its tiny, nutritious seeds, which in most contexts are referred to as "grains". While botanically speaking, amaranth does not belong to the cereal family (wheat, rye, barley etc.), they are nutritionally similar to and traditionally are used in the same way as cereals.



WHY IS AMARANTH INTERESTING?

First of all, amaranth is nutritionally interesting because of a high protein content in both seeds (14 %) and leaves (25 %). Additionally, when looking at protein quality the plant excels further.

Unlike most other vegetable sources of protein, amaranth contains the essential amino acid *lysine*. This means that the protein in amaranth is more complete and of such high quality that it is comparable to egg protein. From a nutritional point of view this makes amaranth the perfect meat substitute and a good start-out ingredient for those wishing to reduce their meat intake.

In addition to the exemplary protein profile, amaranth is rich in minerals, vitamins and antioxidants, especially iron, magnesium, phosphorous and potassium. Moreover, amaranth is considered the only grain to contain vitamin C.

Last but not least, amaranth is gluten free by nature which makes it an obvious alternative to persons with celiac disease and others who wish to keep a diet low on or free from gluten.

AMARANTH, RAW

Nutrient content pr. 100 g

Energy	1552 kJ/371 kcal
Protein, in total	13,6 g
Fat, in total	7 g
- Saturated fat	1,5 g
Carbohydrates, in total	65,3 g
- Sugars	1,7 g
Dietary fibre	6,7 g
Vitamin C	4,2 mg
Iron, Fe	7,6 mg
Magnesium, Mg	248 mg
Phosphorous, P	557 mg
Potassium, K	508 mg

Source:

USDA (United States Department of Agriculture)



AMARANTH IN COOKING

Today amaranth is used around the world as an ingredient in bread, muffins, porridge, pancakes etc. In Mexico where the crop especially carries great historical and cultural significance, amaranth historically played an important part in religious ceremonies and is today still used in celebrations like *Día De Muertos* (Day of the Dead).

In Danish kitchens the use of amaranth is not yet common, likely because the seeds can seem strange or unfamiliar as an ingredient in traditional Danish meals containing meat, gravy and potatoes. The implementation of amaranth as a fixed part of the basic food stock therefore requires some creative thinking, technical guidance and cooking inspiration.

FLAVOUR AND CONSISTENCY

Seeds as well as leaves are edible and are suitable for breakfast, lunch and dinner, but also in desserts, pastries and snacks.

The flavour of the seeds differs in between varieties from mild and nutty to pungent and peppery. Unlike other seeds and grains, amaranth never completely loses its texture when cooked. The cooked seeds therefore appear to have a delicate chewiness and gives an interesting popping consistency similar to caviar.

As a leafy green vegetable, amaranth is not yet accessible on the Danish commodity market. The leaves are a delicious and very nutritious part of the plant with a protein content of up to 25 %! Regarding flavour as well as texture the leaves are similar to spinach.

USAGE

Amaranth is a versatile ingredient. At present, amaranth is available in health food stores and organic webshops. It is not possible to buy Danish produced amaranth, which is why most products originates in Africa or India.

AMARANTH SEEDS

In order to get the most nutrition and flavour out of the tiny seeds they have to be cooked. This is done best by soaking and/or boiling, after which the seeds can be used in porridge, pastries, cakes and bread or as a substitute to couscous, rice or pasta.

Furthermore, you can cook raw amaranth directly in soups, curries, sauces and stews, where the seeds besides enhancing the sensory and nutritional profile of the dish will work as a thickener. You can also take advantage of this quality in other cooking situations where amaranth can be used as an alternative thickener that in some recipes could replace cream, eggs, corn starch or wheat flour.

AMARANTH FLOUR

Amaranth flour, derived from milled seeds, can be used in different types of pastries. Worth remembering is that amaranth contains no gluten which is why the best quality of raising and baking is achieved when combining amaranth flour with some kind of gluten-containing flour.

As a general rule approx. 10 % of the flour in a recipe can be replaced with amaranth flour.

POPPED AMARANTH

Popped amaranth is available in shops, but you can also make it yourself. The texture is similar to popcorn and the flavour is slightly nutty. Popped amaranth is a fun component in muesli, snack bars, and other sweet treats.

AMARANTH FLAKES

Amaranth flakes are lovely in homemade muesli or granola or as an ingredient in breads and pastries. In addition, you can cook them into porridge – either as a single component or in combination with other grains.

AMARANTH LEAVES

Amaranth leaves are used similarly to spinach; add them to stews, pies and salads or chop them and mix into omelettes or pancake batter.



COOKING INSTRUCTIONS

For the recipes in this book we have decided to focus on the amaranth seeds and their versatility. In order for you to be off to a good start and become hooked on amaranth we will guide you through the basic handling of amaranth and explain why to do as described. The purpose is to give you a solid understanding and touch on amaranth and inspire you to dive into various amaranth projects on your own with confidence.

Volume	Preparation	Weight
1 cup	Raw amaranth	200 g
1 cup	Cooked amaranth	245 g

SOAKING

When soaking amaranth, the seeds absorb some liquid. This results in a breakdown of compounds in the cell walls of the seed, thereby making the nutrients within more available. In addition, soaked seeds cook faster than raw.

HOW TO SOAK AMARANTH:

1. Pour amaranth into a bowl or a large jar.
 2. Cover with cold water in a 2:1 ratio, meaning 2 parts water to 1 part amaranth.
 3. Place the bowl/jar in the fridge and let soak overnight.
 4. Drain and rinse the amaranth thoroughly before further use.
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RINSING

Rinsing the seeds thoroughly will remove any excess dirt on the outside.

HOW TO RINSE AMARANTH:

1. Cover a strainer with a clean dishtowel or a cheese cloth.
 2. Pour in the amaranth seeds and rinse under cold running water for 3-4 minutes while stirring in the seeds with a spoon.
 3. Turn off the water, lift the towel/cloth with the rinsed seeds from the strainer, and squeeze out excess water by twisting the towel/cloth.
 4. Place the towel/cloth back in the strainer and scrape the seeds free with a spoon.
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BOILING

When boiling amaranth, the seeds double in size and become softer. Perfectly cooked amaranth is unlike other grains in that it should retain its chewiness. Overcooking the seeds makes them turn into one big, sticky mass, which is not much fun unless the purpose actually is to make a porridge. To boil amaranth into something delicate and optimal for further use therefore requires some carefulness. Most of all, you take care to maintain the proper ratio of liquid to grain. Depending on the purpose and your mood, you can boil the raw seeds in e.g. water, vegetable broth, apple juice or coconut milk. Another option is to add a pinch of salt, chunks of onion or carrot, raisins, cardamom pods or a cinnamon stick and perfume the amaranth before further use.

HOW TO BOIL AMARANTH:

1. Rinse the amaranth thoroughly.
 2. Add the amaranth to a pan and cover with liquid to scale 1:2, meaning 1 part amaranth to 2 parts liquid.
 3. Add flavouring of your choice (optional).
 4. Heat until boiling, reduce to simmer, cover, and let the seeds cook at low heat for 15 minutes.
 5. Turn off the heat and let the seeds steam for 5-10 minutes.
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NOTE: If you wish to cook the amaranth into porridge you may add additional liquid until it reaches your desired consistency.

POPPING

Popped amaranth is a fun and tasty preparation that follows the exact same method as making popcorn. Making it yourself requires some attention as the seeds easily burn – especially if you get too eager and add too many seeds to the pan at once.

HOW TO POP AMARANTH:

1. Heat a pan on high heat – it has to be super hot before continuing.
 2. Add the amaranth, 1-2 tbsp. at a time.
 3. Stir constantly while the seeds are popping and remove from the pan when most of the seeds have popped.
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