AMARANTH: CHEMICAL COMPOSITION AND USE PROSPECTS

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Abstract. *The priority direction in the field of creating new food products is the development of technologies for specialized products. The article presents the results of studying amaranth plants. Calculated nutritional value and biochemical composition.*

Keywords: *Amaranth, protein, organoleptic analysis, physical and chemical parameters.*

АМАРАНТ: ХИМИЧЕСКИЙ СОСТАВ И ПЕРСПЕКТИВЫ ПРИМЕНЕНИЯ

Аннотация*. Приоритетным направлением в области создания новых продуктов питания является разработка технологий специализированных продуктов. В статье представлены результаты изучения растений амаранта. Расчетная пищевая ценность и биохимический состав.*

Ключевые слова*: Амарант, белок, органолептический анализ, физико-химические показатели.*

INTRODUCTION

Amaranth for 8 thousand years was one of the main crops of South America and Mexico ("Aztec wheat", "Inca bread"), along with beans and corn. After the Spanish conquest of America, this culture was forgotten. In Asia, amaranth is popular among the hill tribes of India, Pakistan, Nepal and China as a grain and vegetable crop. Young amaranth leaves look like spinach. They are used both fresh and for cooking hot dishes. Dried leaves are also used for food. (Fig. 1)

MATERIALS AND METHODS

Amaranth is important as a fodder crop - many cultivated species are suitable for grain, grazing, green top dressing and silage. Amaranth grain is a valuable feed for poultry. Cattle and pigs eat greens and silage well. Silage made from amaranth has a pleasant apple smell.

Amaranth tricolor.

Four types of amaranth are cultivated as ornamental plants. Three of them are floral and decorative:

– Amaranthus cruentus L. [syn. Amaranthus paniculatus - Panicled amaranth]
– Amaranthus hypochondriacus L. – Sad amaranth
– Amaranthus caudatus L. – Tailed amaranth

One species - Amaranth tricolor (Amaranthus tricolor L.) - refers to deciduous-decorative. In folk medicine, amaranth may be of interest as a source of biologically active substances - amaranthine, rutin, carotenoids. Amaranth ripens 4-5 weeks after sowing, and in protected ground it can produce crops all year round. It can grow in drought and heat conditions and on saline soils.

The diversity of composition is the first reason to try amaranth. The benefits of adding this crop to the diet are clearly underestimated. This cereal is rich in calcium, magnesium, iron, carotenoids and fiber. In addition, the content of vitamins A, B, C and E is twice that of oat bran. Another reason to love amaranth seeds is high-quality, easily digestible protein, which is twice as much as in wheat or corn. 100 g of amaranth contains 14 g of pure protein, which is 20% of the daily protein requirement for an adult.(1)

The absence of gluten in the composition makes amaranth an ideal cereal for people with intolerance and hypersensitivity to gluten. Many recent scientific studies have shown how useful this product is for the human body: During the period of colds, the inclusion of amaranth in the diet will help strengthen immunity, help fight viruses and infections. The rich mineral composition of this plant minimizes the possibility of diseases bone tissues.

Due to its high fiber content, amaranth contributes to the normal functioning of the digestive system and intestinal detoxification. Helps to get rid of excess cholesterol and improves blood circulation. Vitamin K in the composition regulates blood clotting. Due to the content of rutin, amaranth helps in the fight against varicose veins, helps to strengthen the circulatory system, tissues, and capillaries.

Amaranth leaves are rich in peptides that slow down inflammatory reactions and prevent cell mutations. The plant improves digestion, normalizes cholesterol levels and provides the body with building material, helping to restore damaged and form new tissues.

1. Organoleptic analysis

A method for determining product quality indicators based on the analysis of the perceptions of the sense organs: sight, smell, hearing, touch, taste. The organoleptic evaluation of a product is a generalized result of its quality assessment, performed using the human senses.

2. Method for determination of protein GOST 26889-86.

The Kjeldahl method is that bound nitrogen (in the form of amino-, amido-, nitro-, nitroso-, azo-, azoxy-groups) when an organic substance is heated with concentrated sulfuric acid in the presence of a small amount of catalyst CuSO4 or others (salt mercury) is converted to ammonium sulfate. Process conditions depend on the type of organic molecule: amines and amides are easily decomposed, other compounds require prolonged heating in sealed refractory ampoules. After decomposition of the sample, alkali is added to it and ammonia is distilled off, absorbing it with a standard solution of hydrochloric acid HCl or boric acid H3BO3[2]. The nitrogen content is determined by the amount of absorbed ammonia. The Kjeldahl method is mainly used in the analysis of amino acids and proteins; especially widely used for the analysis of food and feed. (one)

3. Determination of humidity with a moisture meter (MB-35 OHAUS)

A moisture analyzer is one of the most convenient methods for determining moisture. We take 0.5g per sample and we can get a response in a certain time at 102℃-105℃

4. GOST 10847-2019 Grain. Methods for determining ash content.

Ash content - the amount of mineral substances, expressed as a percentage, remaining after the complete combustion of the organic matter of the sample. The essence of the methods is to burn a sample of ground grain, followed by a quantitative determination of the refractory residue (2)

RESULTS

Table 1

The chemical composition of amaranth

Nutrient	Quantity	Norm	% of norm in 100 g	% of the norm in 100 kcal	100% norm
Calories	371 kcal	1684 kcal	22%	5.9%	454 gr
Squirrels	13.56 gr	76 gr	17.8%	4.8%	560 gr

Fats	7.02 gr	56 gr	12.5%	3.4%	798 gr
Carbohydrates	58.55 gr	219 gr	26.7%	7.2%	374 gr
Alimentary fiber	6.7 г	20 г	33.5%	9%	299 г
Water	11.29 gr	2273 gr	0.5%	0.1%	20133 gr

DISCUSSION

Table 2

Name Indicators	Content, % on dry matter
Protein	16.5-17.5%
Fats	6.3-6.7%
Moisture	9.3-10.2%
Ash	3.1-4.7%

Table 3

Organoleptic Indicators	Results
View	oval leaf
Smell	specific
Color	green, brown
Taste	—

CONCLUSIONS

Many scientific studies conducted recently have shown how useful this product is for the human body. In our time, when various viruses of different types of reproduction are at a rapid pace, humanity is obliged to strengthen its immunity. During the breeding season of viruses and colds, the inclusion of amaranth in the diet will help strengthen the immune system, help in the fight against viruses and infections.

Also, a rich mineral composition was revealed in amaranth, which minimizes the possibility of bone tissue diseases. Due to the high fiber content of amaranth, it helps the normal functioning of the digestive system and detoxifies the intestines. It helps to get rid of excess cholesterol and improves the blood circulation process. Vitamin K in the composition regulates blood clotting.

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