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AMARANTHUS AND ITS THERAPEUTIC USES

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Abstract

The article presented describes the therapeutic use of Amaranthus, mainly its oil. It is rich in bioactive compounds such as phenolic acids, lycopene, polyphenols, unsaturated fatty acids, glucosinolates, proteins, soluble peptides, flavonoids, squalene, betacarotene, etc. and may be used as additional powerful remedy for the treatment of various ailments such as Diabetes mellitus, cancer, malaria, hypercholesterolemia, atherosclerosis, helminthic and bacterial infections, inflammation, hepatic diseases and cardiovascular complications.

Keywords: *Amaranthus oil, therapeutic use, bioactive compounds.*

Introduction

The use of plants as therapy is not alien to humans. Among plants that could offer novel choice to the limited therapeutic alternatives is *Amaranthus* [11].

The *Amaranth* genus includes about 70 species and are mostly located in tropical or subtropical climate. They are found in South America, the southwestern United States, India, Pakistan, Latin America, etc. [1, 3]

The inflorescence consists of solitary flowers or cymose clusters, often aggregated into spikelike or headlike clusters**.** Flowers range in color from dark purple to red to yellow. The leaves of the plant are simple with alternate or opposite arrangement. Though Amaranth seeds are very tiny, each plant can produce up to 50,000 seeds. Amaranth is an annual [4, 6].

Amaranth species were grown by the Aztecs 5,000 to 6,000 years ago. Spanish conquistadors banned the grain from Aztec usage due to its important role in their religious ceremonies and little by little Amaranth was slowly forgotten.

Today, the grain is being brought back into the mainstream as a cheap and nutritious food source. Due to its high nutritional value, unique therapeutic and prophylactic properties and high yield, amaranth was recognized by experts of the UN Food Commission as the most promising grain crop of the 21st century.

To grow amaranth, special natural conditions are needed - rare rains, a lot of sun, temperatures up to 40°C, only in such conditions the grain matured and received rich organic matter. Odessa region of Ukraine suits these requirements perfectly and this crop is grew and processed here.

The aim: to summarize the pharmacological and therapeutic properties of amaranth products (amaranth oil).

The products of processing amaranth seeds are quite diverse - these are amaranth oil, amaranth flour, starch and cereals, as well as the substances lysine and squalene obtained from this plant, which are most widely used in the pharmaceutical and cosmetic industries.

Amaranth is a valuable dietary cereal that is most advantageous to one's cardiovascular health. Amaranth grain contains 6 - 9% oil (which is a higher percent than most other cereals). The oil contains 77% of unsaturated fatty acids including palmitic acid, oleic acid, and linoleic acid, an essential component of central nervous system cell membranes [2].

Furthermore, Amaranth contains squalene (up to 9%), a good cholesterol precursor and other important organic compounds and trace elements in it. Human studies have shown the cholesterol-lowering effects of Amaranth grain and oil as well as its positive effects on cardiovascular disease patients [9]. Martirosyan*et al.* [2] suggests that Amaranth has antioxidant properties as seen through reductions in lipid peroxide oxidation in subjects.

Amaranth oil properties

Amaranth oil occupies the highest positions in its family and has a pronounced therapeutic and prophylactic effect on the human body. Amaranth is used not only for the treatment of sick persons, but also it is used when a person is healthy. Preventive use of amaranth can significantly slow down the processes of vascular hardening, and therefore reduce the possibility of developing a heart attack and stroke. Long-term use of amaranth also prevents the development of cancerous processes in the human body. But this happens on condition that a concentrated form of cold-pressed oil is taken at a temperature not higher than 36-37 ℃. In this case, amaranth oil retains all its best natural properties, i.e. the oil stays "alive". The oil should have a light brown color with a greenish tinge, nutty taste with a slight bitterness. In the absence of such organoleptic qualities, one can think of falsification or poor-quality production of products [2, 3, 5, 8, 10, 11, 12].

As it has been mentioned above, Amaranth oil (*Royal amaranth*) is very rich in composition: the content of squalene is from 8 to 9 - 10%, tocotrienol (a particularly active form of vitamin E), polyunsaturated fatty acids: lipolic (Omega - 6), lipolenic (Omega - 3), oleic (Omega - 9), arachidonic, etc., nonessential and nonessential amino acids, phospholipids more than 9% (with a predominance of phosphatidylcholine), phytosterols, carotenoids (precursors of vitamin A), vitamin D, trace elements (potassium, iron, phosphorus, magnesium, copper, etc. .).

Squalene is a substance that in combination with trace elements, vitamins C, D, group B and vitamin E (tocotrienols), polyunsaturated fatty acids and carotenoids, regulates lipid metabolism, has a pronounced antioxidant, antiviral, analgesic effect, stimulates granulation and epithelialization of tissues and involved in the processes of cell proliferation.

Squalene is also an essential component of cell membranes and is present in all cells of the body. It is one of the main protectors of cells. Serves as a source of oxygen necessary for the body, and helps to normalize the processes of tissue respiration, has antimicrobial, antiviral, anticarcinogenic and funingicidal properties [2]. It is the oxygen deficiency and cell destruction caused by an excess of oxidants that is the main reason for the emergence and spread of tumors. Therefore, squalene, as an antitumor factor, is able to increase the strength of the immune system several times, thereby ensuring the body's resistance to various diseases.

Squalene has unique healing properties, easily copes with most skin diseases, including eczema, psoriasis and trophic ulcers, burns. The local action of squalene is aimed at protecting, detoxifying, moisturizing, softening and nourishing the skin. In people with cancer, squalene is used in addition to the main methods of treatment - radiation and chemotherapy, surgical treatment, increasing their effectiveness and reducing the side reactions inherent in all these methods.

Clinical results (USA, Japan) confirm the effectiveness of amaranth oil in the complex therapy of patients with diabetes mellitus, gastric ulcer, duodenal ulcer, intestinal atony.

Applications of amaranth oil as a source of poly - unsaturated fatty acids

Oncology

Amaranth oil as a source of Omega-3 PUFA prevents the development, limits the growth and metastasis of breast cancer. In the mechanism of the protective action of Omega-3 acids in relation to breast carcinogenesis, a decrease in the production of prostaglandins E2 and F2, thromboxane A2, which are stimulators of tumor growth, is important. Along with the influence of Omega-3 PUFAs on the synthesis of prostaglandins, it is assumed that the immune-inhibiting effect will decrease due to the stimulation of peroxidation in the membranes of tumor cells. The inclusion of Omega-3 PUFAs in the diet of women with an increased risk of developing breast cancer for 4 months leads to a significant decrease in the content of the biomarker of the risk of developing a tumor in the blood.

The researches have come to the conclusion that Omega-3 PUFAs can stop the growth of cancerous tumors and are oncoprotectors, especially against cancer of the uterus, prostate, colon, and lungs, and also block the spread of cancer cells [http://www.cruk.manchester.ac.uk; 2].

Cardiovascular system

PUFAs prevent the development of atherosclerosis and reduce the level of triglycerols, low density lipoproteins in the blood, cholesterol and its deposition on the walls of arteries.

Linoleic acid synthesizes prostaglandins, which can lower blood pressure. Vitamin F affects the aggregation activity of platelets, and also reduces the content of fibrinogen in the blood, that is, it promotes blood thinning, having an antithrombotic effect on the cardiovascular system. PUFAs have cardioprotective and antiarrhythmic effects.

Insufficiency of PUFA leads to coronary thrombosis. PUFA has a normalizing effect on the walls of blood vessels, increases their elasticity, and reduces permeability. With a lack of PUFA, choline loses its lipotropic properties [3, 5].

Musculoskeletal system

Vitamin F affects the biosynthesis of prostaglandins, therefore it plays an essential role in the prevention of diseases affecting the musculoskeletal system, which are based on disorders of normal tissue nutrition, lipid metabolism and blood supply: rheumatoid diseases, radiculitis, osteochondrosis.

Amaranth oil as a source of Omega-3 and Omega-6. A positive effect was observed in almost all patients with eczema, seborrhea, trophic ulcers of various origins.

Good results have been obtained in the treatment of patients with lichen planus, atopic dermatitis, and shingles [8].

Pulmonology - tuberculosis and other lung diseases. The antileukotriene (in relation to series 4 LT) property of Omega-3 PUFA was the main efficacy in bronchial asthma. In particular, it was

found that as a result of the intake of Omega-3 PUFA in patients with exogenous (atopic) asthma, the late asthmatic reaction decreases [10, 11].

Recommendations for the use of amaranth oil.

- prevention of heart attack and stroke - take 30 minutes; before meals, 1 dessert spoon 2 times a day, 500-600 ml per year;

- prevention and treatment of cardiovascular diseases: coronary heart disease, myocarditis - take 30 minutes before meals, 1 teaspoon 2 times a day during complex treatment or 400-500 ml per year for preventive purposes.

- prevention and treatment of atherosclerosis, hypertension, hyperlipoproteinemia - take 30 minutes before meals, 1 teaspoon 2 times a day during complex treatment or 400-500 ml per year for prophylactic purposes;

- prevention of oncological diseases - 30 minutes before meals, 1 teaspoon 2 times a day, 500-600 ml per year;

- gastroenterological diseases: gastritis, peptic ulcer, gastroesophageal esophageal reflux disease (GERD), hepatitis, fatty hepatosis, constipation, colitis, proctosigmoiditis, etc. - take 30 minutes before meals, 1 teaspoon 3 times a day, 500-600 ml per year;

- diabetes mellitus - take 1 dessert spoon 30 minutes before meals 2 times a day during the first year, from the second year 500-600 ml per year;

- dermatological diseases: psoriasis, eczema, trophic ulcer, herpetic rash, atopic dermatitis, dry seborrhea, acne, furunculosis, postoperative wounds that do not heal for a long time - apply outside with a thin layer 2 times a day, and also take 30 minutes before meals 1 dessert spoon 2 times a day for 6 months;

- burns of 2 and 3 degrees - apply outside with a thin layer 2-3 times a day, and also take 1 teaspoon 30 minutes before meals 2 times a day until the damaged areas heal or within 2 weeks;

- during chemotherapy - take 1 dessert spoon 30 minutes before meals 2 times a day;

- during radiation therapy for cancer patients - take 1 dessert spoon 2 times a day 30 minutes before meals, and also apply outside with a thin layer before irradiation on skin areas in the irradiated area, and in the form of vaginal or rectal tampons for patients with organ pathology small pelvis;

- gynecological diseases: vaginitis, cervical erosion, thrush - take 1 dessert spoon 30 minutes before meals 2 times a day and in the form of vaginal suppositories or tampons for 3-4 weeks.

- urological diseases: urethritis, urolithiasis - take 30 minutes before meals, 1 teaspoon 2 times a day, prostatitis, prostate adenoma - take 1 dessert spoon 30 minutes before meals 2 times a day and in the form of rectal suppositories or tampons within 4-5 weeks.

- restoration of potency and fertility in men and women - take 30 minutes before meals, 1 teaspoon 2 times a day, 500-600 ml per year.

- diseases of the musculoskeletal system: rheumatic diseases, osteochondrosis - take 30 minutes before meals, 1 teaspoon 3 times a day, as well as in the form of applications on the area of the joints.

- tuberculosis, bronchial asthma - take 1 dessert spoon 30 minutes before meals 3 times a day, 5-6 months.

- recommended for persons suffering from alcohol and drug addiction, undergo a rehabilitation course in order to support and restore the function of the organs of internal secretion and immunity.

- recommended for cosmetic procedures, as a product with a very powerful anti-aging effect, as well as for massage.

- amaranth oil is ideal for baby's skin care - relieves inflammation, maceration, diaper rash.

Contraindications.

Acute pancreatitis, acute calculous cholecystitis are contradictions for amaranth oil use.

We offer amaranth in capsules for the treatment and prevention of diseases of the gastrointestinal tract (colitis, intestinal atony, constipation, intestinal dysbiosis), liver diseases (various forms of hepatitis, cirrhosis) and bowel cancer prevention.

Amaranth in capsules removes toxins, radioinucleides, restores immunity. For adults, 2 capsules a day, for children from 7 to 12 years old, 1 capsule 2 times a day. Take capsules for 3-4 months. The dosage can be increased or decreased after consulting a doctor. Drink 50-100 ml with water.

Conclusions

Amaranthus plant family contains varied types of pharmacologically active compounds and has a rich amount of valuable ingredients that are beneficial

for health offering alternative remedies to various diseases affecting a human being.

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