

## FOOD ADDITIVE E412 - GUAR GUM

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Guar gum is a food additive that belongs to the group of thickeners, stabilizers and emulsifiers. According to the international classification of food additives, Guar gum appears as E412 [3]. Guar gum is a polysaccharide and is a soluble substance [4]. In its chemical composition, guar gum is similar to locust bean gum (food additive E410). A polymeric compound contains galactose residues. Guarana is quite hard and has high elasticity and solubility in water. Due to this, the additive E412 is considered a very advantageous emulsifier and stabilizer. In addition, this additive differs in good stability at a cycle of freezing and thawing of products [4].

Guar gum looks like a fine white powder, compatible with most other plant hydrocolloids, such as agar, pectin, carrageenan, methylcellulose, etc., which improve the consistency. Such combinations can have a mutually positive effect. Since this additive is a natural product, it is made from the pods of Indian acacia (guar beans) by extraction from seeds. The main suppliers of raw materials for the production of E412 - Pakistan and India. Guar gum is also produced in the United States, Africa, Canada and Australia [2].

Guar gum is extracted by mechanical separation of endosperm from guar seeds (35-42% by weight of seeds) and grinding [5]. According to another technology, guar gum is obtained by water extraction of the crushed raw material, filtration of the extract and purification by precipitation with alcohol, drying and grinding of the formed precipitate. This gum is called clarified, and it is similar to locust bean gum (E410).

In the human body, guarana is practically not absorbed by the intestines and reduces appetite, so it is believed that the additive E412 is harmless to health. In addition, guar gum in the body effectively lowers cholesterol and saturated fats. Added to diabetic drugs to slow the absorption of sugar in the intestine [5].

Although considered one of the safest supplements, guar gum in high doses can cause stomach upset, flatulence, nausea, and even allergic reactions.

In the late 1980s, the supplement was actively used in weight loss formulations in the United States. As a result, at least 10 people were hospitalized with deaths due to blockage of the esophagus because of the use of drugs in large quantities with insufficient fluid intake. Later, research conducted by scientists proved the ineffectiveness of guar gum in weight loss [2].

The main property of guar gum is the ability to slow down the crystallization of ice in various frozen foods, so it is especially often used in ice cream or in the manufacture of various chilled confectionery [4].

Also as a stabilizer, the additive E412 can be used in the meat industry, bakery production, increasing the shelf life of products and giving them greater elasticity and density. In addition, the additive is used as a stabilizer for cheeses and some other dairy products (kefir, yogurt, milk), as well as in jellies, jams and frozen desserts. Additive E412 improves the appearance of various salads, seasonings and ketchups. It is also found in syrups and juices, various food concentrates, dry soups, canned fish, in various oils, fats and even in pet food [2].

E412 is used not only for food production; the substance is used in the paper and textile industries, coal and oil industries, cosmetics and explosives [3].

I believe that the E412 additive is not very harmful, but you still need to consume this additive as well as any other. However, it should be consumed responsibly.

### References

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## THE LATEST TECHNOLOGIES IN CROP PRODUCTION

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Scientists have developed a number of hypotheses to explain the historical origins of crop production. They claim that it started when growing crops was necessary for people's needs. At the same time it was the period when they realized importance of implementation of basic technological operations.

In the twentieth century there were three stages that represent improvement of crop production technologies. Stage 1 (from the thirties to the fifties) focuses on growing grain crops by mechanization. Industrial technologies were developed for many crops. Stage 2 (from the fifties to the sixties) was marked by wide use of mineral fertilizers. Stage 3 was the period of pesticide development (the end of the twentieth century). This type of agrochemicals was used to destroy insects, weeds and other organisms that could spoil crop yields [1].

Nowadays special attention is paid to biological technologies which are based on biologization as compatibility between technologies and biological needs of crops. Rapid development of information technologies, geographic information systems and cartographic systems has created conditions for dissemination of advances in informatization into the sphere of crop production into the sphere of crop production. In search of more accurate techniques, farmers have been increasingly applying innovative and widely spread technologies.

The main components of special technical means are geographical information systems (GIS), differential global positioning systems (DGPS) and variable rate technologies (VRT). A geographical information system (GIS) can dramatically help in effective crop yield estimates. As a result, more accurate crop estimates lead to reduction of uncertainty. Moreover, GIS tools and online web resources are used by farmers to manage their agriculture production by satellites. The function of a differential global positioning system (DGPS) in agriculture is to map out crops, map crop yields, control chemical applications and seeding. Variable rate technologies (VRT) are one of many precision agricultural technologies adopted by farmers all over the world. Precision agriculture is a management strategy that uses electronic information and other technologies to gather, process, and analyze data to improve efficiency of agricultural operations. Some PA technologies are becoming standard practice for mechanized agriculture [2]. However, there is very little use of PA on non-mechanized farms in the developing world. The biggest gap in PA adoption is for small farms in the developing world that do not use motorized mechanization [3]. Another important and commonly used indicator in precision agriculture is NDVI (normalized difference vegetation index). It allows you to monitor fields and crops at any point of the globe using satellite images. They tell you a story of plant health and nutrient availability, helping growers pinpoint insect and disease pressures.

In conclusion, despite of crisis in agriculture of Ukraine, implementing of informational technologies is necessary. The application of methods of information technologies will be able to make a significant contribution to meet future global food needs.