Biotechnology is a term used to define a special method of creating new plants in agriculture using genetic engineering. Genetically modified plants are grown throughout the world. Many researchers denote their economical and ecological benefits: they give higher yields without the need for additional means of chemical protection. Dissemination of these new, genetically modified plants is now called the Green Revolution. But at the same time, the warnings of the international community do not cease: what to expect from genetically modified organisms (GMOs) - salvation from hunger, disease, volatility or unexpected manifestations in human health and the environment?

Focusing on the main advantages

Almost every country of the world invests many in developing bio technologies. The usage of these technologies in agriculture is extensive and irreversible. But what is the reason of using bio technologies? The answer is evident. When growing genetically modified plants there is no need in agricultural machinery and fuel for growing plants. This fact has its positive effect on the reducing greenhouse gases, including CO2 into the atmosphere. Another advantage of growing genetically modified organisms is the decreasing of pesticides use, because a genetically modified plant is resistant to pesticides and diseases. This decrease has beneficial impact on the environment: it slows the process of global warming which is fraught with floods, droughts and other adverse effects.

No less important for farmers is the economic profit of bio technologies. Growing genetically modified plants can bring huge capital. That is one of the most important reasons of successful implementation of bio technologies in agriculture.

Due to the first splash of using biotechnologies the plants received herbicide tolerance, protection from pesticides and diseases. Nowadays we can observe a second splash which is focused on improving consumer quality. For example, “golden rice” which is enriched with vitamins has appeared. On the order a modification of soybean and rapeseed oils in which the ratio of fatty acids will be changed, of course, for the benefit of man (Sasson, 2005).

Now the largest areas (millions of hectares) are occupied by such genetically modified crops as soybeans, corn, beans, canola; also wheat, rice, potatoes, sugar beets, sunflowers, tomatoes, squash, cantaloupe, flax are cultivated. Scientists assure us that the foods with GMOs are even safer than those grown using fertilizers, herbicides and pesticides. But there is no any deep comprehensive research of human consumption of products with GMOs over a long period of time and, therefore, a fear of negative consequences, particularly for immune defense and reproductive function of the body, is quite logical.

Is it really safe?

No doubt, genetically modified plants have a lot of advantages, but scientists name several risks for people’s health which they can cause. We should take into account these negative aspects of GMOs and make an informed choice to use or not bio-tech foods.

Among the negative reactions of using genetically modified foods we can name inhibition of immunity, allergic reactions and metabolic disorders. All these reactions are direct result of the transgenic proteins. The impact of new proteins that produce the built-in GMO genes is unknown. The man had never used them before and, therefore, whether they are intolerant is not clear. A notable example is the attempt to cross Brazil nut gene with the genes of soybeans. Scientists have

tried to increase the nutritional value of the latter and increased the protein content in it. However, as it turned out, the combination proved to be a strong allergen, and it had to be removed from future production.

Many components of genetically modified plants are harmful for people. Substances intended to control insects, can block the digestive enzymes not only in insects but also in humans and affect the pancreas. A number of transgenic varieties of corn, tobacco and tomatoes that are resistant to insect pests, produce lignin - a substance that prevents infected plants. It can decompose into toxic and mutagenic phenols and methanol. Therefore an increase in lignin content in the fruits and leaves of plants is dangerous for man.

GMOs may be mutagenic and carcinogenic due to their ability to accumulate herbicides, pesticides and their decomposition products. For example, the herbicide glyphosate, used in the cultivation of transgenic sugar beet and cotton, is a potent carcinogen and can cause lymphoma. Some herbicides can have negative effects on survival and health of human embryos, as well as mutations. As a result of intracellular processes in the genetically modified varieties of tobacco and rice with high productivity, biologically active substances which can trigger the development of cancer accumulate.

There is one more concern of scientists. Most agricultural genetically modified crops in addition to genes, which give them the desired properties, contain antibiotic resistance genes as markers. Conventional antibiotics such as ampicillin (using for respiratory infections, sinusitis and urinary tract infections) and kanamycin (tuberculosis, infections of the upper and lower respiratory tract treated wounds) are used for food production. There is a danger that they may be transferred to pathogens that may cause their resistance to antibiotics. In this case, traditional methods of treatment of inflammation with antibiotics will be ineffective (Smith, 2007).

Unfortunately, there are no accurate data on the consequences of using GMO. All that we know are mostly guesses. Calculating the permissible limits of the use of such products, experts primarily base on the reaction of the organism in a relatively short time after consumption. Small amounts of foods with modified feedstock are not dangerous. However, the use of such products can influence on the body in 25-30 years. Physicians can not yet give an exact answer whether the gene changes may occur in the human body through such a long period or not.

Though there wasn’t any complex investigation of impact of products with GMO into the people’s health, we know the results of the experiments with animals. It became known that rats fed with the modified corn got into difficulties with the kidneys and liver. The females of these animals had the increase of sugar in blood, increased pressure and increased amount of triglycerides (a form of accumulation of fatty acids). These results disturb, because we can only guess how such products influence on our health.

Does it solve the problem of hunger?

The answer is, unfortunately, no. In addition, it turned out that genetically modified corn, soybeans and potatoes are nearly thirty percent more expensive than those that are grown the old-fashioned. There is one more minus the production of genetically modified foods. The point is that the farmer could keep before a portion of the crop for seed. Now this is not possible, because the genetically modified plants do not give any viable seeds or fruit. That is primarily beneficial to suppliers of

planting material. And it turns out that contrary to the expectations of scientists, herbicide and pesticide use in the fields with GMO is on average one hundred and fifty grams per hectare more than in the usual fields (Rees, 2006).

Threat to the environment

Besides the risk to human health, scientists are actively discussing the potential threat of biotechnology for the environment. Resistance of genetically modified plant to herbicides can do a disservice if transgenic crops will spread uncontrollably. For example, alfalfa, rice, and sunflower characteristics are very similar to the weeds, and their arbitrary growth will be difficult to cope.

In Canada, one of the main countries producing GMO-products, such cases are already fixed. Canadian farm was occupied by genetically modified "super weeds" that have arisen as a result of random mating of three types of genetically modified oilseed rape, resistant to different types of herbicides. The result is a plant which, according to the newspaper, is stable to almost all agricultural chemicals.

A similar problem arises in the case of transfer of genes for herbicide resistance of crop plants to other wild species. For example, it is seen that the cultivation of transgenic soy leads to genetic mutations associated plants (weeds) that are becoming resistant to herbicide.

There is a fear that all these effects in the long term can cause a violation of entire food chains and, consequently, the balance within individual ecological systems, and even disappearance of some species.

Genetically modified food

The spectrum of genetically modified organisms in food is rather extensive. It can be meat and pastry products, which include the textured soy and soy lecithin, and vegetable products such as canned corn.

The main flow is composed from soybeans, corn, potatoes and canola. They come to us at the table rather in a pure form or as additives in meat, fish, bakery and confectionery products, as well as in baby food.

For example, if the product includes a vegetable protein, it is likely, soybeans, and it is likely that genetically modified. Aspartame contained in carbonated soft drinks, chewing gum, ketchup, etc., can be produced by genetically modified bacteria (Freedman, 2009).

Unfortunately, it is impossible to determine the presence of genetically modified ingredients with taste and smell. Only modern laboratory diagnostics can identify GMOs in food.

Bio technology: to be or not to be

The world is divided into two opposite groups: the supporters and the opponents of using bio technologies in food. It is evident that each group provides its evidence. In this situation it may be difficult to make a choice. What can us advice?

The person should decide to eat modified food or not. For this reason all genetically modified products should be labeled with a special inscription. If you are ready to use GMO you buy this product, if not then choose another. The usage of genetically modified products has a potential risk for the organism and the person should be warned about it.

My personal opinion is the following: people are a part of nature. Everything which is created by nature brings a benefit to a man. Genetically modified food is created artificially and that is why it is alien to people. Possibly, it will cause great disease and global catastrophes, possibly not. But if we are not sure, so better be more attentive and careful. Try to consume the food which was tasted during centuries. It is no need to rush for all new. If to look deeper into the dispute of genetically modified food, we may see that it has material background. The manufactures of GMOs provides the results of their own investigations, the manufactures of classical food argue with the first and conduct their experiments. And the consumer in this situation looks like a blind kitten: we don't know for sure, but we must believe. It sound not so pleasant, but it is true. Take care about your health no one will do it instead of you.

Also there are several advises for the officials of the country. First of all, the decision on the issue of genetically modified crops into the environment and the use for human consumption must be taken openly. That will guarantee the fairness and give confidence for the population. Then, the information about the risks which genetically modified plants incur should be available before taking those decisions and research on security should be held by independent laboratories (non-business) and publicly. Very important to give to countries and regions the right to regulate the use of genetically modified crops. And, at least, patenting of GMOs should be abolished. If under these conditions, genetically modified crops will be in demand by society it would be the best argument in favor of their widespread use.

After all, everything in nature is rational and balanced in harmony. Every living organism performs a specific to it function in a holistic system of multibillion links and dependencies. Rough outside intervention can break this chain and give rise to dangers of global proportions. In all, including experiments in biotechnology should be reasonable measures for the safety restraints.

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