

## **Review of the Report on medical and biological testing of transgenic Colorado beetle resistant potato, carried out at the Nutrition Institute of the Russian Federation Academy of Medical Sciences in 1998.**

The report on the medical and biological research includes results of a toxic and hygienic testing of the transgenic potato in comparison with conventional potatoes, carried out on animals.

The documents available contain statistically reliable differences in chemical composition between the conventional and transgenic potatoes. Significantly different were concentrations of vitamins C, E, beta-carotene, carbons (fructose, glucose), fatty acids. Which is why the authors' conclusion about identical chemical composition of the transgenic and conventional potatoes is untrue.

The toxic and hygienic testing included studies of general toxic effects of the transgenic potato and its specific types of toxicity: potential allergenic, immune toxic and mutagenic characteristics.

The studies of the general toxicity of the transgenic potato were done in the framework of a chronic (continuous, 6-month long) experiment when the potato were fed to the Vistar male rats with the background of the general vivaric rations. The control groups were made of rats with usual vivaric rations and rats that had conventional potato in their vivaric rations. To evaluate the nutrition safety of the transgenic potato for the rats, the researchers used integral, hematological, biochemical and histological research methods. The conducted experiments showed that in a month of eating genetically modified potatoes the rats suffered from statistically confirmed weight loss, anemia and dystrophy-like changes in hepatocytes of the rats fed with the transgenic potato compared to the rodents that were getting conventional potatoes in their general vivaric rations.

Unfortunately, the authors don't analyze the causes of the above mentioned changes that may characterize the toxic effects of the transgenic potato on animals. Besides, it is quite surprising that in the materials and methods the weight of the animals selected for the experiments was 80 to 100 grams while the Methodological Instructions MUK 2.3.2. 970-00 require the use of animals of 60 to 80 grams.

However, the world experience says that such experiments should involve mature, 3-4-month old rats with the weight of at least 160 grams, as well as on young and developing animals.

Despite the uncovered and statistically confirmed deviations in whole (crude) protein in the blood serum of the experimental group in comparison with the control groups, the results interpretation contains significant mistakes and completely ignores the uncovered phenomenon (see p.p. 22, 24 – tables 25 and 29). In the toxicology experiment part, the researchers failed to explain what caused the statistically confirmed weight loss of the body, the liver, anemia in the rats that ate both the transgenic and conventional potatoes compared to the rats with usual vivaric rations.

Section 7.4.1. of the Methodological Instructions MUK 2.3.2. 970-00 envisages research of effects of genetically modified foodstuffs on the reproduction functions aiming to uncover the possible embryo-toxic, gonado-toxic and teratogenic effects. This research was never conducted. There are no data on studies of potential mutagenic effects of genetically modified foodstuffs in the form of testing of gene mutations on microorganisms or drosophilae. The impact of the transgenic potato on the lipid metabolism of the animals involved in the experiments.

We also believe that the Methodological Instructions MUK 2.3.2. 970-00, "Evaluation of safety of foodstuffs acquired from genetically modified sources" need to be revised and improved. It is necessary to set up single age, weight of the experiment animals, to take into account laboratory animals death percentage and extend the time of their examination (monthly).

In conclusion, the authors suggest that it might be necessary to conduct additional research to study effects of transgenic potatoes on 5 generation of laboratory animals and impact of genetically modified foodstuffs on the life expectancy of the animals.

So, the Nutrition Institute of the Russian Academy of Medical Sciences conducted research of the Colorado beetle resistant potato with obvious violation of the Methodological Instructions MUK 2.3.2. 970-00. The authors made significant mistakes in interpreting the results. The uncovered physiological, histological deviations in the rats fed with genetically modified potato not only don't create any grounds to think of this potato as safe, but also confirm either the harm they might make (at least for the rats involved in the experiments) or the necessity of further research.

It is absolutely obvious that further research is needed indeed to include, among other things, toxicology testing on more rats, mutagenic effects testing on microorganisms or drosophilae, allergenic potential research that would include long-lasting clinic testing on healthy volunteers.

Until the above mentioned research is done, neither the use of the type of potato in question in food production nor release of the transgenic potato into the environment, in our opinion, are acceptable.

L. Krepkova  
Deputy Head  
Laboratory of Drug Toxicology  
VILAR  
Ph.D. in Biology

V. Bortnikova  
Laboratory of Drug Toxicology  
VILAR  
Ph.D. in Biology  
Leading research scientist