STUDYING OF GENETICALLY MODIFIED COMPONENTS IN THE MEAT PRODUCTS

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Abstract

All over the world the food market is flooded by the goods, which are containing genetically modified organisms. In agriculture export of many leading countries there were found a vegetative foodstuff, vegetative raw materials, and parts of plants with the changed genetic code. These plants are growning for a long time in many areas. It's well-known, that the using of new transgene plants is considered to become one of the most perspective and profitable technologies into the agromanufacture sphere and biotechnology.

Keywords:

biotechnology, Earth, manufacture, agriculture, information.

Introduction

New transgenic plants, which gene or genes were modified by the replacing of some specifies of other plants [3] have been successfully using.

H'm-plant cropsing areas have been gradually increasing nearly on 60 %. It's obviously, nowadays this kind of area exceeds nearly 50 million hectares all over the worls, that takes about 3 -5 % of all agriculture territory on the Earth. In manufacture of foodstuff are used H'm-soya (70 %), H'm-corn (25 %), and also the potatoes, rice, tomatoes, and the sugar beet. The main manufactureres of production, which maintains GMO, are: USA (68 %), Argentina (12 %), Canada (6 %), Brazil (5 %), and China (4 %) [4,5]

At present time there is no the authentic scientific information about testifying of the genetically modified organisms on the theme of it danger. However, it doesn't prove the absolute safety of GMO production. Opponents of the H'M accelerated use program declare, the consequences of such products may have

long-term period and, that's why, it results may be clearly seen only after some humanity generations. As a proof, there were holded different experiments on animals, it results were just shocking. Considering a big quantity of people whio are consuming such H'M production as a soy, corn, rice, potatoes, etc. the whole effects can lead these people to the mass undesirable consequences [6,7]

The absolute part of genetically modified products is going for export. However, nowadays more and more countries create especial laws about the necessary obligatoring of such goods or even about it import prohibition [8].

Kazakhstan doesn't pay especial attentionq on the question of GMO production. The quantitiy of researches, whch had been dedicated to this theme, is not so big, it scientific exactness is considered to be controversual. Unfortunately, the problem of the GMO production in Kazakhstan wasn't studied well. It's established that nearly 60-75 % of all imported into the country food contains H'm-components [9]. For the further scientific research, there is a need of especial equipment, whci is epsont in Kazakhstan.

As we suppose, all these facts may let us confirm that nowadays the research of food containing GMO is very actual.

On this moment, the GMO presence monitoring is the method, which allowes to detect not only GMO presence in the food, but also to define it quantity.

The aim of our work is the testing of sausage by the method of polymerase chain reaction.

As criteria of products choices were: prices acceptable; its' food market wide-spreading; no marks of GMI maintaince.

Results of the present work may be used for by the sanitary stations, and also by people, who are informed about GMI presence in some kinds of food, particularry, in the sausages.

MATERIALS AND METHODS

Materials. *As investigated products, there had been chosen wide-spread sausages. Name of products and the list of marks (the companies and the manufacturers) are presented in* Table 1.

Tested samples

Table 1.

№	The product name	Mark. (The company or the manufacturer)
1	Shahtinskie sausages	**«KULAGER»** ALR «APRIL», The Republic of Kazakhstan
2	Halal sausages	
3	Dairy sausages	
4	Doctors' sausages	**ALR «TULPAR»** The Republic of Kazakhstan
5	Dairy sausages	
6	Dairy sausages	**IE «DEDOV»** The Republic of Kazakhstan
7	Dairy sausages H/S	**«RAKHAT» IE** «IVANOV», The Republic of Kazakhstan
8	Dairy sausages	**«RUBIKOM»** ALR "Rubikom enterprise", The RK
9	Beef sausages M	**«MIKOYAN»** CSC «Mikoyan meat combinat», RF
10	Beef sausages	**OSC «CARICYNO»** Russian Federation

Methods. As a method of the molecular-genetic analysis and GMI detection, we used polymerase chain reaction, which allowed us to reveal GMI insignificant small fragments of DNA by it repeated amplification.

The allocation of DNA from the described products was carried out by the help of the complete set "DNA-SORB-with", variant 50. In the present procedure we used an especial sorbent set for DNA molecules sedimentation.

The amplification of sequence of the promotor 35S, and also soy and corn genes spent by using set «Amplisence a variant 50-R the PLANT-SCREEN», sequences of set «Nos» were carried out with set application «Amplisence a variant 50-R Terminator Nos», sequences of DNA of the genetically-modified soya of a line 40-3-2, by means of a set of reactants «Amplisence a variant 50-R H'm-soya 40-3-2».

The analysis by electrophoresis of PCR products in agarose gel was holded by the using of the complete set «EP a variant 300».

Also was done the analysis of electrophoresis results, which data was analized by the means of computer system Totallab.

RESULTS OF RESEARCH

For determing the presence of GMI in a food, there were made initial experiments, supported by test system "PLANT-SREEN" application. After isolation of DNA-genes from all tested samples, we putted amplification reactions in a corresponding mode. The number of cycles made 42. After the termination of PCR, amplification products had procedure of electrophoresis in agarose gel. Samples applied positive (PCS) and negative control (NCS).

In that test system there were applied 2 variants of the revealing of genetically modified soy (PCS 1) and corn (PCS 2). For the exactness of received results, the experiment was repeated three times with each sample. The photo of electrophoresis is presented in *Figure 1*.

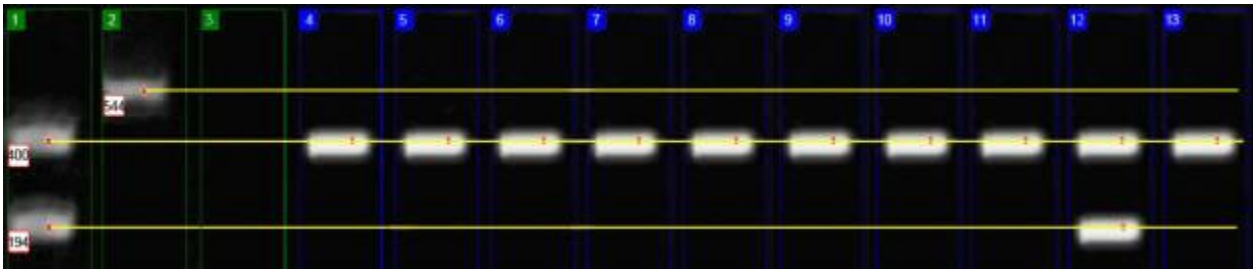

Figure 1. *Electrophoregramm of DNA, which was amplyfited by "PLANT-SREENS" test systems*

1. **PCS 1 am 400 и 194 пн.**
2. **PCS 2 maiz 544 original .**
3. **NCS.**
4. Shahtinskie sausages **«KULAGER»**
5. Halal sausages **«KULAGER»**
6. Dairy sausages **«KULAGER»**
7. Doctors' sausages **«TULPAR»**
8. Dairy sausages **«TULPAR»**
9. Dairy sausages **«DEDOV»**
10. Dairy sausages H/S **«RAKHAT»**
11. Dairy sausages **«RUBIKOM»**
12. Beef sausages M **«MIKOYAN»**
13. Beef sausages **«CARICYNO»**

The results analysis after the processing by Totallab computer system, let us to discover the DNA fragments of 400 bp, which were corresponding to the length of the amplified DNA fragments of the genome of soybean, in all the ten experiments. In the 12 sample (Sausage Beef M "Mikoyan") alsowas found the sequence of 35S promoter size 194 p.n.

According to the recommendations of the "Instructions AmpliSens-50-R», in case of receving of positive or negative result by the «Terminator NOS» and «GM – soybean». All investigated objects were tested in the described systems.

The separated DNA samples were putted in PCR with using "Terminator NOS» test-system. After the end of each experiment there was holded the detection of all products in the electrophoretic gel. The results are shown in Figure 2.

The electrophoresis doesn't have the 3rd line. This kind of numbering is used to keep in clear the coherence of objects of the 2nd Table.

In this electrophoresis the 3rd path is not used. We decided to use such numbering system due to preservation of sequence of the objects, which had been showned in *Table 1*. During the analysis of the received results, in one investigated product there were determined the required DNA fragments, which was corresponding to PCS. It was discovered by the test system (180 bp hadn't been revealed.).

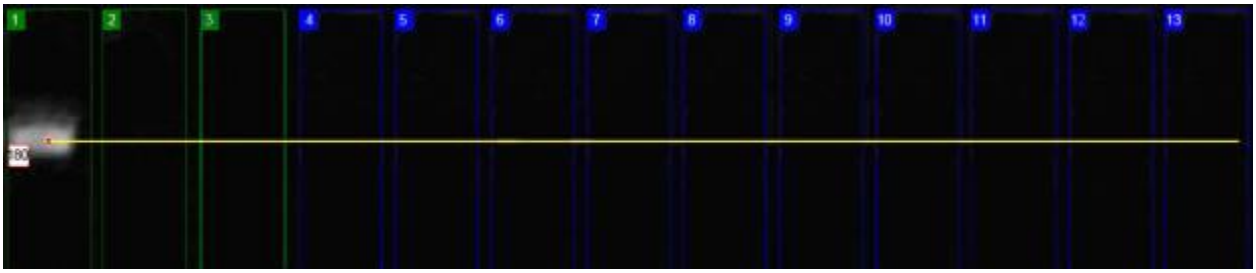

Figure 2. *Electrophoregramm of DNA, which was amplyfited by «Terminator NOS» test systems.*

1. **PCS 180 mon .**
2. **NCS**
3. **----------**
4. Shahtinskie sausages **«KULAGER»**
5. Halal sausages **«KULAGER»**
6. Dairy sausages **«KULAGER»**

7. Doctors' sausages **«TULPAR»**
8. Dairy sausages **«TULPAR»**
9. Dairy sausages **«DEDOV»**
10. Dairy sausages H/S **«RAKHAT»**
11. Dairy sausages **«RUBIKOM»**
12. Beef sausages M **«MIKOYAN»**
13. Beef sausages **«CARICYNO»**

During the analysis none of studided products were identified the original DNA fragments, which are corresponding to the SI of the test system (180 bp), that proves the absence of genetically modified maize in these products.

Subsequent experiments were holded by using the the «GM soya 40-3-2» test-system. The amplified DNA fragments electrophoresis (Figure 3) shows the detection of the amplification products of DNA, where are separated from all studied samples of sausages.

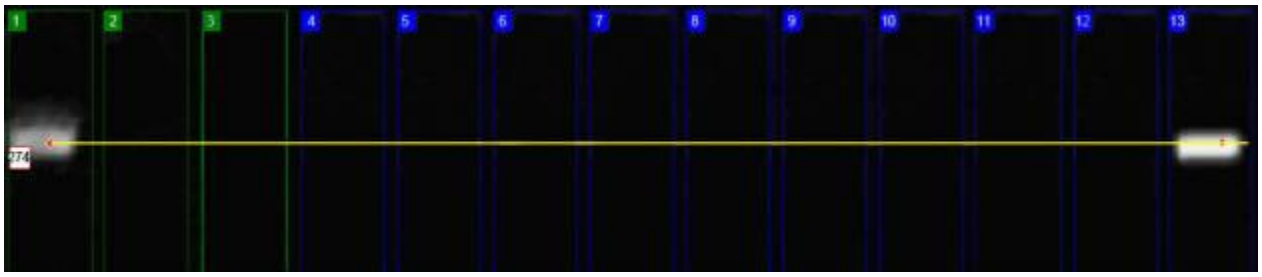

Figure 3. *Electrophoregramm of DNA, which was amplyfited by «GM soya 40-3-2» test-system*

1. **the PCS 274 Mon .**
2. **NCS**
3. **----------**
4. Shahtinskie sausages **«KULAGER»**
5. Halal sausages **«KULAGER»**
6. Dairy sausages **«KULAGER»**
7. Doctors' sausages **«TULPAR»**
8. Dairy sausages **«TULPAR»**
9. Dairy sausages **«DEDOV»**
10. Dairy sausages H/S **«RAKHAT»**

11. Dairy sausages **«RUBIKOM»**
12. Beef sausages M **«MIKOYAN»**
13. Beef sausages **«CARICYNO»**

In this experiment the positive result, whci is corresponding to the size of amplified DNA fragments of 274 bp, is showed only by the number 13 sample (Sausage Beef "TSARITSINO").

Thus, our studies have determined the presence of GMO in all tested samples of sausages without exception, that let us to suggest the fact of using of genetically modified ingredients in the manufacture of these products.

A summary data of the research results is presented in Table 2.

Results of the researches

Table 2.

№	The product's name	Brand	P-S	US	GM
1	**PCS I am**		+	-	+
2	**PCS Corn**		+	+	-
3	**NCS**		-	-	-
4	Shahtinskie sausages	**«KULAGER»**	+	-	-
5	Halal sausages		+	-	-
6	Dairy sausages		+	-	-
7	Doctors' sausages	**«TULPAR»**	+	-	-
8	Dairy sausages		+	-	-
9	Dairy sausages	**"DEDOV"**	+	-	-
10	Dairy sausages H/S	**"RAKHAT"**	+	-	-

11	Dairy sausages	**«RUBIKOM»**	+	-	-
12	Beef sausages M	**«MIKOYAN»**	+	-	-
13	Beef sausages	**«CARICYNO»**	+	-	+

The further investigations will expand the number of researched products, and will increase the number of test systems for identifing the various GMI and, also, will have the definition of the identified fragments of DNA nucleotide sequence.

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