RESEARCH ON THE PROTEIN CONTENT OF SOME VEGETABLES, DRIED, MODIFIED AND NON-GENETICALLY MODIFIED IN THE CONTEXT OF A HEALTHY DIET

Valentin NECULA, Gheorghe PUCHIANU, D.V.ENACHE

Abstract. *The study highlights the variation in the protein content of different dried legumes, modified and non-genetically modified. The percentage of protein in dry grain legumes is an important factor in determining the need for protein consumed by people belonging to age groups and different physiological condition in the context of a healthy balanced diet. Working as a template we used different varieties of non- genetically modified beans and soybeans genetically modified and non- genetically modified. Variations were observed in the percentage of protein in both varieties of beans, dried genetically modified and unmodified. Variations in the protein have been reported between groups belonging to different soybean and bean varieties. Knowing that grain legumes contain second-class vegetable protein, protein percentage change is also a certainty for genetically modified varieties, thereby affecting the quality of vegetable protein and food quality using this type of protein.*

Key words: dry grain legumes, percentage of protein, genetically modified varieties

1. Introduction

The importance of grain legumes consists,first of all, in the high protein content of the seeds, giving them a high food value.

Plant growing plants included in this group are: peas (Pisum sativum), beans (Phaseolus vulgaris), soybean (Glycine max), lentil (Lens culinaris), chickpeas (Cicer arietinum), tick beans (Vicia faba), lupine (Lupinus sp), widening (Lathyrus sativus), peanuts (Arachis hypogea) and cowpeas (Vigna sinensis).'s all part of the Leguminosales order (Fabales), Leguminosae family (Fabaceae or Papilionaceae family).

The protein content of grain legumes exceeds 2-4 times that of cereals. Some of them (soy, lupine) protein content exceeds the carbohydrate.

[1] Transilvania University of Brasov - Faculty of Food and Tourism
E-mail: validoctoru@yahoo.com, gpuchianu@yahoo.com

The ratio between crude protein and non-proteinaceous components is: soya and lupine 1/1, 7, to, peas 1/2,8, the bean 1/2, 4, etc.. So the grains of the legumes

represent aliments and provenders concentrated in protein. It is also noteworthy the high protein value of grain, equivalent to some species with the animal protein, - containing essential amino acids. Grain legume protein has a high digestibility (90%) and it does not form uric acids (as some animal protein) whose accumulation in the body is harmful.
Grain legumes are the main source of vegetable protein necessary for the maintenance of life, growth and for the development of the body and one of the main sources for obtaining animal production.
For example, soya's specific protein is glicinina characterized by high solubility in water (61-92%) and high digestibility as well as the high content of essential amino acids, which results in a nutritional value similar to that of animal protein.
In this context, however, appears the quality problem of the consumed protein and especially thorny issue of genetically modified organisms wich, by recent studies determined the genetic modifications in human populations that consume them.

2. Materials and Methods

This study was deployed on a matrix represented by 8 groups belonging to different varieties of legumes as the following:
Lot 1 - consisting of 6 samples of the variety Borloti beans
Lot 2 - consisting of 6 samples of the variety Flageolet beans
Lot 3 - consists of 6 stages of chick peas.
Lot 4 - consisting of 6 samples of tiny lentils Castellucio variety of Norcia
Lot 5 - consisting of 6 samples of broken peas, beans the variety Bunetto
Lot 6 - includes 6 samples of large green lentils, beans, the variety Noah
Lot 7 - made up of 6 samples of soy non-genetically modified seeds. (Control group)
Lot 8 - made up of 6 samples of soybeans, genetically modified seeds.
Protein determination was performed by distillation by steam stripping, Kyeldahl and the tests to determine the sequences of nucleic acid and the changed or unchanged genetic structure of the analysed soybean varieties was performed by PCR.
The P.C.R. method principle is to identify the variety of Roundup Ready soybean (RRS) is made by detecting a segment of 172 bp, representing the junction region between the CaMV 35S promoter and the CTP4 sequence (Chloroplast Transit Peptides) derived from Petunia hybrida.
Kyeldahl method is based on the mineralization of the sample with sulfuric acid in the presence of catalyst, the total nitrogen in the sample is released in the form of ammonia. Ammonia with sulfuric acid form ammonium sulfate wich is decaying with a strong base (sodium hydroxide) and distilled. The distillate is captured in a solution of H_2SO_4 and titrated with NaOH. The nitrogen resulted is converted by factor, in protein, using the formula:

$$Proteină\ \% = \frac{0{,}0014(V_1 \times f_1 - V_2 \times f_2) \times F}{m} \times 100$$

in which:

0.0014 - amount of nitrogen in g corresponding to 1 ml of 0,1 N H2SO4;
V1 - volume of 0.1 N H2SO4 solution used in the capture of the distillate in ml;
V2 - volume of 0.1N NaOH solution used for sample titration in ml;
f1 - factor solution 0.1 N H2SO4 solution, (is a constant value equal to 1)
f 2 - factor of 0.1 N NaOH solution, (is a constant value equal to 1)
m - mass of the sample taken in the work, g;
F - total nitrogen conversion factor protein substances;
P -% crude protein

$$P\% = \frac{V_1 - V_2 \times 0{,}00875 \times 100}{m} = \frac{V_1 - V_2 \times 0{,}875}{m}$$

3. Results and Discussions

For each analyzed batch were done 6 determinations made by two analysts, taking into account the average of the results of the measurements of the two analysts and not more than 0.5% between two measurements. We present in Table 1, the results of the determined protein in the matrix that included dried, organically grown grain legumes.

Table 1. Determined protein in the matrix that included dierd, organically grown grain legumes

GRAIN LEGUMES SPECIES	AVERAGE PERCENTAGE OF PROTEIN
Beans, variety, Borlotti	24,7
White beans, variety, flageolet	21,2
Chickpeas	17,41
Lentils petty variety, Castellucio of Norcia	25,51
Crushed peas, variety, Bunetto	21,43
Green Lentils great variety, Noah	24,18

Percentage variation between different species of legume protein is highlighted in terms of Fig. 1.

For the determination of soy protein we used a blank represented by a non-genetically modified soybeans (lot7) attested by laboratory tests and PCR samples analyzed genetically modified (lot 8).Mean of two determinations 6 analysts for protein in the control group of non- genetically modified soybeans was 32.4%.

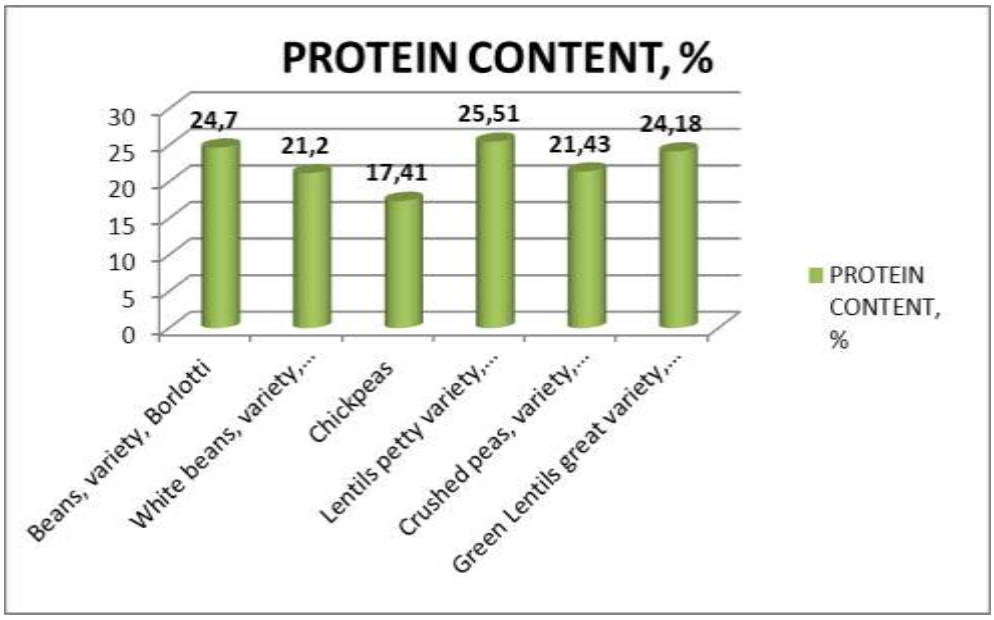

Fig.1. Protein content by legume (%)

The results obtained for the determination of protein made from two analysts for the six samples of soybeans genetically modified to the same conditions are given in table 2.

Table 2. Percentage of determined protein by sample (%)

SOYBEAN SAMPLES ANALYZED	PERCENTAGE OF PROTEIN DETERMINED
Non-genetically modified blank (batch 7)	**32,4**
sample 1 genetically modified	36,45
sample 2 genetically modified	35,18
sample 3 genetically modified	35,20
sample 4 genetically modified	36,18
sample 5 genetically modified	43,43
sample 6 genetically modified	34,80

The change in the percentage of protein in samples of lot 8 genetically modified highlights form Fig. 2.

From the analisys of Fig.2 and Table 2 we can observe increased variation rates of the protein content for the genetically modified samples of soybean. Limits of variability of protein differences from batch 8 are quite large, covering a power range between 0.02% and 8.53%.

In comparison with non-genetically modified blank, represented by the average of the 6 samples belonging to group 7, which is of 32.4% differences for the 6

samples genetically modified Kjeldahl method has the following values of the protein that we present in Table 3.

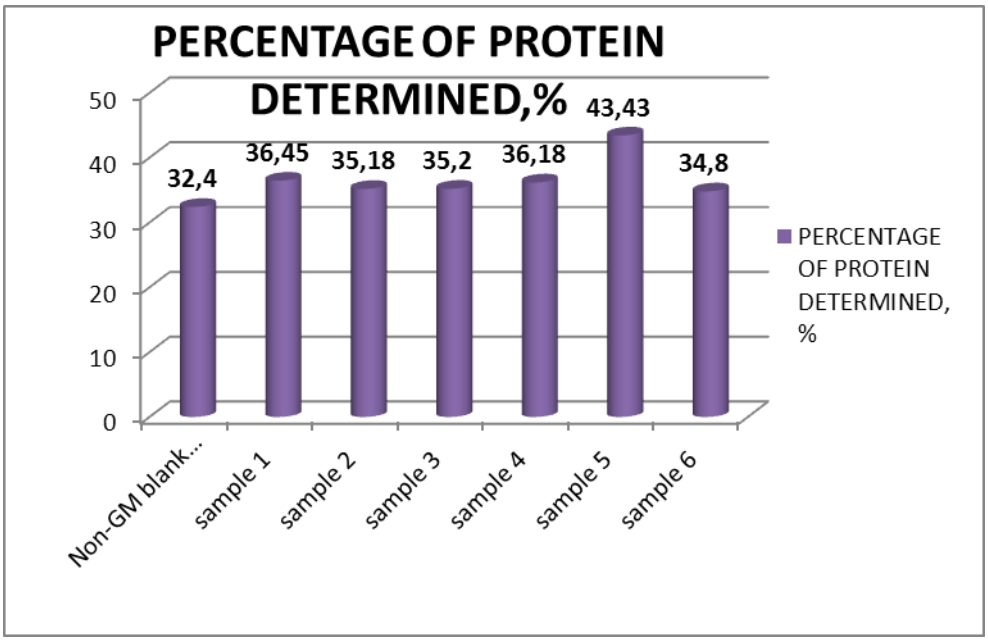

Fig.2. Percentage of determined protein (%)

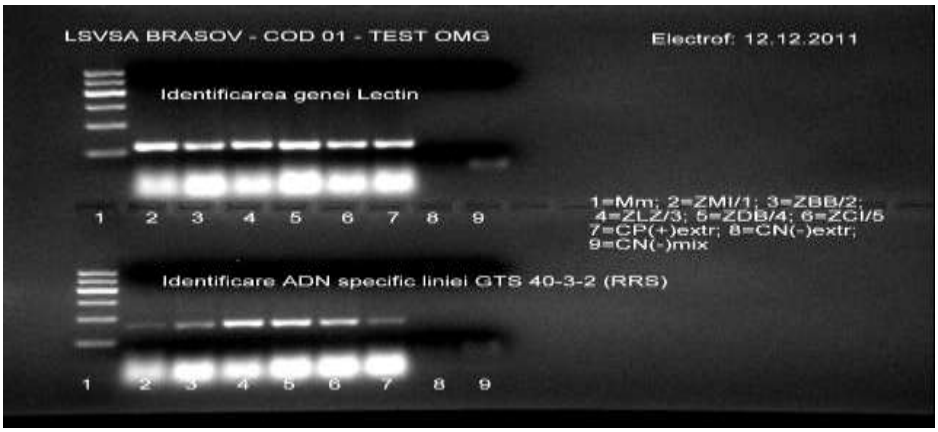

Fig. 3. Molecular blank for the P.C.R. test

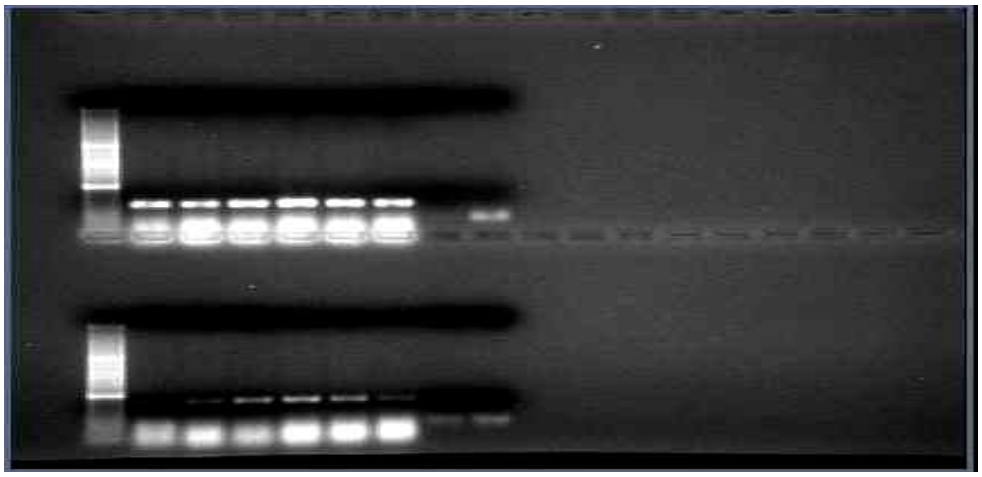

Fig. 4. PCR positive aspect., For sample 1 of genetically modified soy

Table 3. Comparison between Protein values

% PROTEIN IN BLANK SAMPLE (THE AVERAGE VALUE)	% PROTEIN IN GENETICALLY MODIFIED SAMPLES	% PROTEIN DIFFERENCE, RESULT
32,4	36,45	4,05
	35,18	2,78
	35,20	2,80
	36,18	3,78
	43,43	11.03
	34,80	2,40

Table 4. Percentage differences between the referential standard protein and protein values determined by analysis of genetically modified soybeans.

% PROTEIN IN ACCORDANCE WITH THE ORDER 249/2003	% PROTEIN IN GENETICALLY MODIFIED SAMPLES	% PROTEIN DIFFERENCE, RESULT
33	36,45	3,45
	35,18	2,18
	35,20	2,20
	36,18	3,18
	43,43	10,43
	34,80	1,80

Considering represented referential order 249/2003, which specifies the protein content of soybeans, 33% in this case a change occurs, related to an increase in the percentage of protein in genetically modified soybean. Analysing the blank sample in wich the parameter value determined the percentage of protein, 32.4% is observed from the data analysis it matches the value entered in order (33%).In Table 4 we present these value differences.
It is observed in this case a rather high variability limit values covering a range between a minimum of 1.80% protein accounted for sample 6 and a maximum of 10.34 that is assigned sample number 5 of Lot 8. Analyzing all cases of inter-comparisons of the values represented by the percentage of protein derived from genetically modified sample analysis, between them, the differences resulting from the comparative analysis of the control of genetically modified samples or differences resulting from comparing the date of referencing standard samples analyzed, we observe significant differences cover a value between 1.80 and 11.03% protein, in favor of genetically modified soybean varieties.

Conclusions

(1) A healthy diet is based on risk-free and eating genetically modified food.
(2)Genetically modified organisms can fix ,for a specified time period, some problems that the food in our days face.
(3)The effects on the consumer's body are possible and they manifest trough a series of organic disorders from tumors to some defects that appeared at newborn babies.
(4)The PCR method so as the determination of protein by the Kjeldahl method represent high precision laboratory methods covered by RENAR accreditation.
(5)Among the species of dried legumes beans, there are significant differences in the percentage of protein.
(6)The same differences in the percentage of protein is observed in genetically modified soy samples by the examination of several samples.
(7)There are several criteria for inter-comparing between the working matrix elements,between genetically modified soybean samples regarding the maximum and minimum values determined, between the blank and genetically modified soybean samples and between referential approved genetically modified law and evidence.
(8)In all these cases there is a value range which has the maximum and minimum limits.
(9)In the case of the differences in the protein values , their lower values, however, are more compact with less scope for expansion, for example, from 2.20 to 2.18 - 3.18.

(10) There are situations where these limits have huge variations for example 10.43 to 1.80 and 11.03 to 2.40
(11)The increase of the protein percentage in soybeans is a clear indication that the plant is genetically modified but this is a track that can cause the specialist to seek the PCR test detecting any changes, achieving in this way a feedback.
(12)Although the percentage of genetically modified soybean protein is higher, ensuring easier the protein requirement for a consumer during the day, at least for now the following question remains valid: how healthy and without risk to food safety is a such protein?

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