

## Research of Vegetative Raw Materials for Preparation of Fermented Vegetables

Nurseitova Z.T., Kassymova M.K., Mamayeva L.A.

M. Auezov South Kazakhstan State University  
Shymkent, Republic of Kazakhstan

### Abstract

In this investigation for preparation fermented vegetables are considered chemical, mineral and vitamin composition of vegetable raw materials. Use of vegetables (carrot of Nantskaya-4 and pumpkin of Mindal-35) by production of milk products increase they biological and food values, are developed they assortment.

### Keywords

Enrichment, polymalting extracts, combined dairy products, fermented vegetables

### Introduction

In recent years, innovative projects of domestic food industry dominated by the term "enrichment". In developed countries, spending on consumption of enrichment foods advance of the consumption of dietary supplements is almost 1.5 times. The most obvious decree to create innovative enriched products is using of raw materials, the traditional for single industry, in the production of products other industry. This trend is not limited by enrichment of cheese with fruit or vegetable ingredients. It manifests itself in the actual creation of new and popular products, including milk and fruit components, grain ingredients, and plant extracts [1].

In dairy products added polymalting extracts of barley, corn and wheat. Using of grain supplements to create combined dairy products, preparation of plant components is based on the properties of specific plant materials and technology features.

### Literary review

In nutrition of modern person frequently not enough ballast substance, and number of vitamins and microelement. Fairly simple way is filling of ration by these substances with grains and bolting. Often grains are used in sprout form in the production of child and dietetic foods, bakery and dairy products. In the form of grass sprouted to become not only supplier of carbohydrates, but also source of easily digestible of simple sugars, fatty acids, amino acids, enzymes, dietary fiber, vitamins and mineral compounds [2].

In the dry matter of wheat, oats, corn and soy contains 60-80% of carbohydrates, 7-18% protein, 2-5% fat, enzymes, vitamins, etc.

Proteins are the most important substances included in compound of living cells. The protein content and their quality determine technological advantage of the grain. Proteins consist of carbon, hydrogen, oxygen and nitrogen. The protein content of wheat varies widely from 9.2 to 25.8% (in the mean 13.5%). The grain of hard wheat typically contains:

Monosaccharides (glucose is grape sugar; fructose is fruit sugar), sweet, very soluble in water, are easily digested by human body, it is easy fermented with yeast, lactic acid bacteria (these properties are used in the production of spirits, wines, breads, sour fruits and vegetables, dairy products).

Oligosaccharides (sucrose is beet bin or cane sugar; maltose is malty sugar, lactose is dairy sugar) in the process of metabolism is transformed to monosaccharide. They, as monosaccharides, sweet, readily soluble

in water, easily is digested by the human body, under action of enzymes of digestive tract easily is hydrolyzed, and in the industry this property is used for obtaining synthetic honey for heat is caramelize (it is formed dark-colored substances) are crystallized, ie, is candied (for storage of jams, chocolates, sweetmeats, caramels, honey).

Polysaccharides (starch, glycogen, inulin, cellulose, etc.) do not have sweet taste, so is called unlike sugar carbohydrates. Starch accumulates in the form of grains of characteristic shape and size in tubers, roots, stems, seeds of plants. Under division of enzymes, acids, starch splits into glucose and is well absorbed by human organisms.

Fiber (cellulose) is part of tissue covering plants, forming the basis of cell walls. Organism of human almost is not absorbed for want of enzymes for its cleavage to glucose, but it increases

intestinal motility, secretion of gastric juice and promotes movement of food. The high fiber content in the product reduces its nutritional value and digestibility [3].

Today, in the organization of rational nutrition and in the by curing of many diseases great importance is attached by dietary fibers, which are structural connections that form the shell of the plant cells. Due to the content of fiber in vegetables, hemicelluloses, pectin substances and others, they are important for the body and rich source of dietary fiber.

### Discussion of results

On the basis of above composition was studied composition of plant material: oats, corn and wheat. The content of the chemical composition of crops are given in table 1.

**Table 1**  
**Center chemical composition of grain (g per 100 g of product)**

Culture	Water	Proteins	Fats	Sugar	Starch	Cellulose	Mineral substance	Energy value, kkal
Wheat	14,0	11,2	2,1	1,2	54,0	2,4	1,7	290
Corn	14,0	9,9	2,2	1,5	54,0	2,6	1,7	287
Oats	14,0	10,3	2,4	1,3	48,14	4,3	2,4	264

In the glassy grains of common wheat of protein substance are not always greater than the floury. For individual tissues of wheat grain proteins are divided by fits and starts. Aleuronic layer most rich by protein substances. Most of proteins are also in germ. The protein content in the endosperm is less than the whole grain. Proteins in different parts of the endosperm are differed in the content ratio of individual amino acids.

Oats are one of the most common of cultivated cereals. The protein content in grain of oats ranges from 9.0 to 19.5%. The largest variations were found in the content of basic amino acids (lysine,

arginines), the smallest are acidic (aspartic and glutamic acids).

Proteins of germ are rich by essential amino acids, which are fairly well balanced, which cannot be said about the amino acid composition of endosperm proteins and grains as whole. For the fractional composition of proteins of oats by far differs from proteins wheat, rye and barley. The dominant fraction of his is glutamic, then globulins and prolamins.

The total protein content in grain of corn ranges from 4,9-23,6%. Proteins of the germ in the processing of corn are usually removed. Due to the high biological value of they should be used after degreasing as valuable addition to variety of foods. The

total protein content on sort varies slightly and number of individual amino acids going into within them composition, within wide limits. In the largest number of proteins of corn are contained minimal part of polyamines, albumins also. The ratio of fractions in the germ is bitter differed from the ratio of fractions in the endosperm.

Food value of vegetables is mainly determined by their content of carbohydrates, organic acids, nitrogen, and tannins. Paramount importance in the

diet is vegetables as sources of vitamins such as C, P, and vitamin A. Together with vegetables the human of body gets the bulk of the salts of alkali metals, which play an important role in maintaining acid-alkaline balance in blood and tissues person.

Amino acids are the basic structural units of which are built of molecules of proteins. Amino acid composition was studied plants (oats, corn, wheat) (Table 2).

Table 2 - Average amino acid composition of proteins of oats, corn, wheat, % of dry matter

Amino acids	Oats	Corn	Wheat
Asparagines acid	5,0	-	5,8
Serine	4,4	-	3,74
Proline	3,6	-	12,0
Alanine	5,9	-	3,9
Valine	6,2	6,2	4,2
Isoleucine	-	4,9	3,6
Tryptophan	0,9	0,9	1,0
Histidine	7,6	-	2,3
Lysine	4,2	5,0	3,5
Threonine	2,2	3,5	2,8
glutamic acid	8,3	-	29,9
Glycine	7,7	-	3,6
Cysteine	3,0	-	-
Methionine	1,1	3,4	-
Leucine	9,1	11,6	6,8
Phenylalanine	5,4	5,2	4,8
Arginine	18,1	-	5,22

Chemical composition of vegetables is variety and differs according to their type, grade, maturity, and timing of harvest, methods of storage and other factors.

Carbohydrates are found mostly in foods of vegetable origin. They play a role in plastic processes and functional activity of individual organs, metabolism and protective reaction of body. On the average to grown man requires per day 400-500 g of carbohydrates. With a lack of in food ration of carbohydrates on the production the energy in the body consumes more protein, and excess of carbohydrates result in the formation and deposition of fat in the human body. By the oxidation of 1 gram of digestible

carbohydrates in the body is extracted 3.75 kcal (15.7 kJ) [4].

We have studied the chemical composition of carrot (variety Nantskaya-4) and pumpkin (variety Minda 35) for the preparation of fermented vegetables.

Carrots (variety Nantskaya 4) are one of the most important vegetable crops. It is important to carrots due to the presence of pectins (1.6%), which have a favorable effect on the metabolism of the human body and promotes the excretion of radioactive elements. Carrots are valued as a source of carotene. Minerals are composed of potassium, calcium, phosphorus, iron and trace elements.

Pumpkin (variety Mindal 35) is large fleshy fruits of annual plant. In the pumpkin contains from 3 to 5% sugar, 0.6% minerals, 1% protein, and the same amount of pectin. Among the mineral salt is the main place of phosphoric acid. Pumpkins are rich in carotene (1.5 mg /

%). Pumpkin is easily digested, contributes to the activation of the digestive system. It is rich in enzymes, promotes the absorption of vitamin B, and prevents obesity and the accumulation of cholesterol in the body. Table 3 shows the chemical composition of vegetables.

Table 3 - Comparative chemical composition of vegetables

№	chemical composition	Products	
		carrots	pumpkin
1	Water, %	88,5	90,3
2	Fat, %	0,1	-
3	Protein, %	1,3	1,0
4	Carbohydrates, %	7,0	6,5
5	Mineral substances, mg		
	Na	21	14
	K	200	170
	Ca	51	40
	Mg	38	14
	P	55	25
6	Vitamins, mg		
	β-carotene	9.4	15
	B <sub>1</sub>	0.06	0.05
	B <sub>2</sub>	0.07	0.03
	PP	1.0	0.5
	C	5.0	8

## Conclusion

Thus, the investigated vegetables are particularly rich in carbohydrates. Carbohydrates are part of the nucleic acids, cell membranes, connective tissue, are involved in the regulation of internal environment. Of particular note is the value of plant components as a source of vitamins

In this regard, the use of vegetables (carrots Nantskaya 4 and pumpkin Mindal 35) in the production of dairy products increases their biological and nutritional value, expanding their range.

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