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FOOD HYGIENE

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Э 13 **Эбзеева, Л.Х.** Гигиена питания: учебное пособие для студентов II-III курса МИ лечебного факультета англоязычного отделение (на английском языке) / Л.Х. Эбзеева, М.Б. Узденов, В.П. Новикова. – Черкесск: БИЦ СКГА, 2024. – 100 с.

Food hygiene. Textbook for Students II-III yers of General Medicine in the English-speaking Medium. – Cherkessk: NCSA. – 2024. – 100 p.

Учебно-методическое пособие включает в себя материалы по одной из основных тем курса для студентов медицинского вуза, обучающихся на английском языке.

The textbook includes practical materials on the one of the basic themes of the Course for medical students of the English-speaking Medium.

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CONTENT

INTRODUCTION. PHYSIOLOGICAL AND HYGIENIC PRINCIPLES OF NUTRITION

Nutrition is the process of intake, digestion, absorption and the assimilation by the body of food substances (nutrients) necessary to cover the plastic and energy needs of the body, the formation of its own biologically active substances.

Nutrition is one of the most important factors determining health. Proper nutrition ensures normal growth and development of children, helps prevent diseases, prolong life, increase efficiency and creates conditions for adequate adaptation of the body to the environment. At the same time, food can be a source and carrier of a large number of organic and inorganic substances of artificial and natural origin that are potentially dangerous to human health. Proper nutrition is the basis of human health. It is the food we eat that ensures the development and constant renewal of cells and tissues of the body, is a source of energy that our body spends not only during physical activity, but also at rest. Food products are sources of substances from which enzymes, hormones and other regulators of metabolic processes are synthesized. Metabolism, which is the basis of human life, is directly dependent on the nature of nutrition.

As we see, nutrition directly provides all vital functions of the body. The composition of food, its properties and quantity determine growth and physical development, ability to work, morbidity, neuropsychic state, life expectancy.

TOPIC 1. PHYSIOLOGICAL NUTRITION STANDARDS FOR DIFFERENT POPULATION GROUPS

Physiological norms are based on the basic principles of rational nutrition (correct), in particular the doctrine of balanced nutrition. They are average values reflecting the optimal needs of individual population groups for nutrients and energy. The specified norms serve as the basis for organizing rational nutrition in groups and therapeutic nutrition in medical and preventive and sanatorium-resort institutions and dietary canteens.

Nutritional standards for adults are divided depending on: gender, age, type of work, climate; physiological state of the body (pregnant and lactating women).

In determining the need for essential nutrients and energy for the adult working population, differences in energy expenditure related to the nature of work are of particular importance. Therefore, in the nutrition standards, persons aged 18 to 60 years are divided into groups of work intensity. The groups differ in the degree of energy expenditure, depending on their professional activity.

1.1. Labor intensity groups and main occupations related to these groups

1st group – workers primarily engaged in mental labor**:** heads of enterprises and organizations, engineering and technical workers whose work does not require significant physical activity; medical workers, except for surgeons, nurses, and orderlies; teachers, educators, except for sports; workers in science, literature, and

the press; cultural and educational workers; planning and accounting workers; secretaries, clerks; workers of various categories whose work is associated with significant nervous tension (control panel workers, dispatchers, etc.).

2nd group – workers engaged in light physical labor: engineering and technical workers whose work involves some physical effort; workers engaged in automated processes; workers in the radio-electronic and watch industries; garment workers; agronomists, zootechnicians, veterinarians, nurses and orderlies; sales assistants in industrial goods stores; service workers: communications and telegraph workers; teachers, physical education and sports instructors, coaches.

Group 3 – workers with medium-heavy work: Machine operators (engaged in metalworking and woodworking); fitters, adjusters, tuners; surgeons; chemists; textile workers, shoemakers; drivers of various types of transport; food industry workers; workers in public utilities and catering; food sellers; tractor and field crew leaders; railroad and water workers; auto and electric transport workers; operators of lifting and transport mechanisms; printers.

Group 4 – workers engaged in heavy physical labor: construction workers; the bulk of agricultural workers and machine operators; miners in surface work; workers in the oil and gas industry; metallurgists and foundry workers, except for persons assigned to the 5th group; workers in the pulp and paper and woodworking industries; slingers, riggers; woodworkers, carpenters, etc.; workers in the building materials industry, except for persons assigned to the 5th group.

Group 5 – workers engaged in particularly heavy physical labor: miners directly engaged in underground work; steelworkers; lumberjacks and workers cutting wood; masons, concrete workers; diggers; loaders whose work is not mechanized; workers engaged in the production of building materials whose work is not mechanized.

Each of the work intensity groups is divided into three age categories: 18-29, 30-39, 40-59 years. This takes into account the gradual age-related decrease in energy expenditure, which affects the need for energy and nutrients. The division by gender is due to the lower body weight and less intense metabolism of women compared to men. Therefore, the need for energy and nutrients in women of all age and professional groups is, on average, 15% lower than in men. The exception is the need for iron, which is higher in women (from 18 to 60 years) than in men. The 5th work intensity group, which includes professions with particularly hard physical work, is not provided for women. The nutritional standards separately highlight the physiological needs of pregnant and lactating women.

When determining the need for nutrients and energy for the population aged 18 to 60 years, the average ideal body weight is taken to be 70 kg for men and60 kg for women. For overweight individuals (taking into account gender, age, height, and body type), the need for nutrients and energy is determined individually in accordance with the objectives of healthy regulation of body weight. Table 1 shows energy, protein, fat and carbohydrate requirements for the adult working-age population.

Table 1. Recommended intake of energy, proteins, fats and carbohydrates for the adult working population of different work intensity groups (per day)

Labor intensity groups	Age groups	Men						Women **					
		Energy *		Proteins (g)		Fats (g)	Carbohydrates (g)	Energy *		Proteins (g)		Fats (g)	Carbohydrates (g)
		mJ	kcal	total	of animal origin			mJ	Kcal	total	of animal origin		
1st	18-29	11.72	2800	91	50	103	378	10.04	2400	78	43	88	324
	30-39	11:30	2700	88	48	99	365	9.62	2300	75	41	84	310
	40-59	10.67	2550	83	46	93	344	9.20	2200	72	40	81	297
2nd	18-29	12.55	3000	90	49	110	412	10.67	2550	77	42	93	351
	30-39	12,13	2900	87	48	106	399	10.25	2450	74	41	90	337
	40-59	11.51	2750	82	45	101	378	9.83	2350	70	39	86	323
3rd	18-29	13.39	3200	96	53	117	440	11:30	2700	81	45	99	371
	30-39	12.97	3100	93	51	114	426	10.88	2600	78	43	95	358
	40-59	12.34	2950	88	43	108	406	10.46	2500	75	41	92	344
4th	18-29	15.48	3700	102	56	136	518	13.18	3150	87	48	116	441
	30-39	15.06	3600	99	54	132	504	12.76	3050	84	46	112	427
	40-59	14.43	3450	95	52	126	483	12,13	2900	80	44	106	406
5th	18-29	17.99	4300	118	65	158	602	—	—	—	—	—	—
	30-39	17.15	4100	113	62	150	574	—	—	—	—	—	—
	49-50	16.32	3900	107	59	143	546	—	—	—	—	—	—

* 1 kilocalorie (kcal) = 4.184 kilojoules (kJ); 1000 kcal = 4184 kJ, or 4.184 megaJ (mJ).

** The average requirement for pregnant women (period 5-9 months) is 2900 kcal (12.1 mJ), protein -100 gper day, including60 ganimal protein. The average requirement for nursing mothers is 3200 kcal (13.4 mJ), protein -112 g, including67 gprotein of animal origin.

The nutritional standards distinguish between groups of elderly (60-74 years) and old (75 years and older) people. A significant decrease in metabolic processes and limitation of physical activity, typical of these groups of the population, cause a decrease in their need for nutrients and energy. However, for elderly people who continue to work, the values specified in the above standards may be increased taking into account the nature of the work.

The given nutritional standards provide optimal values for the consumption of proteins, fats and carbohydrates at physiologically necessary ratios between them. To ensure the complete amino acid composition of food, animal proteins should make up 55% of the recommended protein requirements. For pregnant (for periods of 5-9 months) and lactating women, animal proteins make up 60% of the total amount of protein. The share of protein in the daily energy value of the diet, taken as 100%, should be: 13% for the 1st group of labor intensity, 12% for the 2nd and 3rd groups, 11% for the 4th and 5th groups. The average physical activity coefficients for women and men of the 1st-5th groups of labor intensity are presented in Table 2.

Table 2. Average physical activity coefficients for women and men of work intensity groups 1-5

Labor	Physical activity activities	Age (women)	Intensive	Physical activity activities	Age (men)
1	1.4	18-29	1	1.4	18-29
		30-39			30-39
		40-59			40-59
2	1.6	18-29	2	1.6	18-29
		30-39			30-39
		40-59			40-59
3	1.9	18-29	3	1.9	18-29
		30-39			30-39
		40-59			40-59
4	2.2	18-29	4	2.2	18-29
		30-39			30-39
		40-59			40-59
5	-			2.5	

** The average requirement for pregnant women (period 5-9 months) is 2900 kcal (12.1 mJ), protein -100 g per day, including 60g animal protein. The average requirement for nursing mothers is 3200 kcal (13.4 mJ), protein -112 g, including 67 protein of animal origin.

Norms The physiological requirements for vitamins for the adult population are reflected in Table 3.

Table 3. Norms of physiological need for vitamins for the adult population

Labor intensity group	Vitamins							
labor	WITH	A	E	D	B1	B2	B6	B12
1 men	70	1000	10	2.5	1,2	1.5	2	3
women	70	800	8	2.5	1,1	1.3	1.8	3
2 men	70	1000	10	2.5	1.4	1.7	2	3
women	70	800	8	2.5	1,1	1.3	1.8	3
3 men	80	1000	10	2.5	1.6	2	2	3
women	80	1000	8	2.5	1.3	1.5	1.8	3
4 men	80	1000	10	2.5	1.9	2,2	2	3
women	80	1000	8	2.5	1.5	1.8	1.8	3
5 men	100	1000	10	2.5	2.1	2.4	2	3
Persons 60-74	80	1000	15	2.5	1.4	1.6	2	3
Older persons	80	1000	15	2.5	1,2	1.4	2	3
Additionally								
Pregnant women	20	200	2	10	0.4	0.3	2	-
Nursing	40	400	4	10	0.6	0.5	5	1

The share of fats in the daily energy value of the diet of all population groups is on average 33% with a division by climatic zones: for the southern – 27-28%, for the northern – 38-40%. Vegetable fats should make up 30% of the total amount of fats. To ensure the completeness of the fatty acid composition of food, the standard requirement for linoleic acid is set – 4-6% of the daily energy value of the diet for all population groups.

The consumption standards for essential minerals are given taking into account the necessary ratios between calcium, phosphorus, magnesium and the characteristics of iron absorption in Table 4.

Table 4. Recommended intake values of minerals (mg/day)

Population groups	Calcium	Phosphorus	Magnesium	Iron *
Adult men	800	1200	400	10
" women	800	1200	400	18
Pregnant »	1000	1500	450	20
Nursing »	1000	1500	450	25
* Taking into account the absorption of 10% of the iron introduced with food.				

The nutritional standards provide for division into three climatic zones: central, southern and northern. The energy requirements of the population of the northern zone exceed those of the central zone by 10-15%, the requirements for proteins and carbohydrates in relative terms (as a percentage of the energy value of the diet) are approximately the same. Thus, the need for fats for the population of the northern zone is increased in absolute (in grams) and relative terms. For the southern zone, compared to the central zone, the energy requirements are reduced by 5% due to a decrease in the proportion of fats replaced by carbohydrates.

1.2. Proper (complete, rational) nutrition is the basis of human health.

The composition of food, its properties and quantity determine growth and physical development, ability to work, morbidity, neuropsychic state, life expectancy.

With food, our body must receive a sufficient amount of essential substances: proteins, fats, carbohydrates, vitamins, trace elements, minerals and water. Scientists' research confirms the exceptionally important role of trace elements in healthy human nutrition. Minerals, water, inorganic elements and their salts, which are part of plant and animal tissues. They play a significant role in the formation and construction of body tissues, especially skeletal bones, maintain acid-base balance in the body, osmotic pressure of cellular and extracellular fluids, determine the state of water-salt metabolism, the blood coagulation system, participate in muscle contraction, create the necessary conditions for the normal course of metabolic processes and energy. Minerals are of great importance for the formation and development of protein, for enzymatic processes. Violation of mineral metabolism leads to the development of severe pathological conditions - osteoporosis, osteomalacia, diabetes, rickets, increased neuromuscular excitability, etc. An increase or decrease in the content of certain minerals in the body is characteristic of many diseases. For example, an increase in the magnesium content in the blood is noted in hypothyroidism, hypertension, arthritis, rickets; a decrease in the concentration of magnesium in the blood is observed in case of obstruction of the bile ducts, thyrotoxicosis, chronic alcoholism, as well as in case of impaired absorption of magnesium in the intestine, in pancreatitis. Polluted environment, sedentary lifestyle, high physical and mental stress, frequent stressful situations, unbalanced nutrition lead to loss of health. Minerals in the body, as a necessary component of nutrition, can largely protect against the negative consequences of these phenomena. There must also be high-quality drinking water – an indispensable and essential component of living organisms, plants and animals. In the process of photosynthesis, water, together with atmospheric carbon dioxide and mineral substances of the soil, is involved in the synthesis of organic substances. In organisms, water is the main environment in which the metabolism and energy take place; it is the substrate of most chemical enzymatic reactions that underlie the vital activity of any organism. Drinking hard drinking water is a real preventative measure against cardiovascular diseases. Soft (purified) water is almost devoid of not only the macroelements necessary for the heart - calcium and potassium, but also microelements – copper and manganese, the deficiency of which leads to an increase in the level of cholesterol in the blood, which increases the risk of heart and vascular diseases, etc.

The content of microelements in the human body can vary significantly depending on the place of residence, constant diets and other reasons that determine the level of intake and accumulation of a given microelement, as well as depending on the individual characteristics of the body. The amount of some microelements in the blood is maintained at a relatively stable level (Co, Cu, Fe), while other microelements (Sr, Pb, F) are not subject to such regulation, and their content in the blood can fluctuate significantly depending on the level of intake of the element in the body. The functions of macroelements in the body are very

responsible and diverse. Within the limits of doses of microelements, the effect of the same element can vary significantly. For example, small amounts of manganese stimulate hematopoiesis and immunoreactivity, while large amounts inhibit them.

Sodium salts retain water in the body, so it is recommended to limit the consumption of table salt in case of heart and kidney diseases. Potassium and calcium salts have the opposite effect - they increase urination and promote the removal of water from the body. In many regions, water contains an increased concentration of iron, sometimes exceeding the permissible norm by tens of times. While the iron is in the divalent form, the water is transparent, but when interacting with oxygen, the divalent iron turns into trivalent and rust forms in the water. After the water has stood in an open container, it turns yellow, and iron also changes valence in hot water. With prolonged use of water containing high concentrations of iron, changes in the liver, pancreas, heart and other organs are possible.

A properly balanced diet, i.e. the intake of all the necessary substances in sufficient quantities, including microelements, is a necessary condition for human health. Most of the most important microelements are found in plant-based foods and bread products. The presence of microelement reserves in various organs and systems of the body (the so-called depots) is of great importance. In case of insufficient or monotonous nutrition, for various diseases, medications containing complexes of macro- and microelements are often prescribed. In order for the intake of microelements with food products to be sufficient, it is necessary for the human diet to be varied. This allows you to maintain health, first of all, of the gastrointestinal tract, and in general to restore or maintain health for many years.

Nutrition that is complete in all respects is usually called rational, that is, satisfying the energy, plastic and other needs of the body. It should be noted that in most cases, tasty and satisfying nutrition is requiredVdoes not correspond to the requirement.

One of the principles of rational nutrition is its adequacy. Qualitative adequacy implies that rational nutrition should replenish a person's needs for proteins, fats, carbohydrates, vitamins, mineral salts and microelements, essential amino acids, polyunsaturated fatty acids and water. Quantitative adequacy means that nutrition should correspond to the body's energy expenditure.

1.3. Principles of rational nutrition. Consequences of violation of principles of rational nutrition – alimentary diseases

A balanced diet should meet the following basic principles:

1. Be complete in quantitative terms, that is, in terms of the energy value (caloric content) of the daily diet, meet the body's energy expenditure, taking into account the part of the diet that is not absorbed.

2. Ensure the high-quality completeness (balance) of the diet, that is, the optimal content of all nutrients in optimal quantities and ratios – proteins, fats (including animal fats), carbohydrates (including sugars, fiber, dietary fiber), vitamins, macro-, microelements, flavors.

3. Adhere to a rational diet: meal times should correspond to the biological rhythms of the body; the number of meals should be 3-4 times for adults, 5-6 times

for children depending on age; intervals between meals should be 5-6 hours for adults and 3-4 hours for children. Distribution of the daily diet by individual meals should correspond to the physiological needs of the body: in the morning, lunchtime (the period of physical activity of the body) the energy value should be 30-35% and 45-50%, respectively, at the end of the active period of the day in the evening – 20-25%.

4. Prepared food must meet the enzymatic capabilities of the digestive system. To this end, the preparation of products and their culinary processing must ensure good taste, high nutritional value, digestibility and high assimilation of food.

5. Food must be harmless in terms of toxicity, that is, products and prepared dishes must not contain toxic substances in concentrations harmful to the body.

6. Food must be safe in terms of epidemics: it must not contain pathogens of infectious diseases with an alimentary transmission mechanism - bacteria, viruses, fungi, protozoa, larvae of geo- and biohelminths.

Violation of each of these principles can lead to a decrease in the health of an individual or an organized group, and the emergence of diseases of alimentary origin.

Among these diseases are the following: diseases associated with starvation, quantitative and qualitative malnutrition (marasmus, kwashiorkor, hypovitaminosis, avitaminosis, etc.); - diseases associated with overeating (obesity, gout, hepatitis, cholecystitis, pancreatitis, cholelithiasis, etc.); diseases associated with a violation of the diet (gastritis, gastric ulcer, duodenal ulcer, coprostasis, etc.); diseases associated with a violation of the culinary processing of products (gastritis, peptic ulcer, hypovitaminosis, etc.). Food poisoning: of microbial origin (toxic infections, bacterial toxicosis, mycotoxicosis), non-microbial etiology (products that are poisonous by their nature; products that have become poisonous as a result of improper storage; products contaminated with toxic substances (pesticides, heavy metal salts, etc.); intestinal bacterial, viral, zoonotic infections (typhoid fever, paratyphoid A, B, dysentery; hepatitis A, poliomyelitis, enteroviruses; brucellosis, foot-and-mouth disease, tuberculosis, etc.); geo- and biohelminthiases (ascaris, whipworm, beef and pork tapeworm, trichinella, fish tapeworm, flukes, etc.); damage to products contaminated with weapons of mass destruction in modern warfare – radioactive products of nuclear explosions (RW), chemical warfare agents (CW), especially dangerous bacterial agents (EBA).

This explains the need for constant medical monitoring of the nutritional value and safety of both individuals and organized groups.

The methods of such control include: studying and assessing the nutritional status of the people being monitored; identifying alimentary diseases; determining or calculating energy expenditure and nutritional needs; - assessing actual nutrition using questionnaires, budget, weight, laboratory methods, and calculating methods for assessing the caloric content and nutrient composition of the daily diet.

All products except bread have the property of becoming boring; the same dish should not be repeated more than twice a week.

TOPIC 2. NUTRITIONAL FEATURES FOR PEOPLE OF DIFFERENT AGES AND PROFESSIONS. THERAPEUTIC AND PREVENTIVE NUTRITION

2.1. Nutritional characteristics of children and adolescents

Due to the growth and development of the body, children of different age groups need relatively large quantities of plastic nutrients, primarily proteins, mineral salts, fats, carbohydrates - energy carriers, as well as catalytic substances - vitamins, microelements, because the metabolism in a growing body occurs much more intensively.

If an adult's protein requirement is1.5 gon1 kgbody weight, then for children under 1 year - more than 4 g/kg, 1-3 years - 3.8-4 g/kg, 4-6 years - 3.5 g/kg, 7-10 years – 3.0 g/kg, etc. At the same time, 60-75% of proteins should be of animal origin with the obligatory content of milk and dairy products in the diet.

A child should be fed at least 4-5 times a day in the first years of life, then moving to 3 times a day.

A child has an increased need for proteins, as they are the main "building material" and are necessary for growth and development. The younger the child, the more protein he needs per unit of body weight. The share of animal protein should be at least 60% (meat, eggs, fish, milk).

The amount of fats should also be increased slightly, as they are the main source of energy.

Children should receive a sufficient amount of calcium, which is necessary for the normal functioning of the cardiovascular system and bone formation. A full set of essential amino acids and all vitamins are also necessary. The diet should include a lot of fruits and vegetables, which contain not only vitamins, but also a number of important organic acids and other substances that contribute to proper metabolism.

In childhood, an increased energy value of food is required, which is explained by a more intensive metabolism, significant mobility of children, and an unfavorable ratio between body surface area and weight (Table 5).

Table 5. Daily requirement for nutrients and energy for groups of the child population

Age, gender	Standards of physiological needs (per day)										
	Energy (kcal)	Proteins (g)		Fats (g)	Carbohydrates (g)	Minerals (mg)					
		Total	Including animals			Sa	R	Mg	Fe	Zn	J
0-3 months	115	2,2	2,2	6.5 (0.7)	13	400	300	55	4	3	0.04
4-6 months.	115	2.6	2.5	6.0 (0 7)	13	500	400	60	7	3	0.04
7-12 months.	110	2.9	2,3	5.5	13	600	500	70	10	4	0.05
1-3 years	1540	53	37	53	212	800	800	150	10	5	0.06
4-6 years	1970	68	44	68	272	900	135	200	10	8	0.07
6 years (school)	2000	69	45	67	285	100	150	250	12	10	0.08
7-10 years	2350	77	46	79	335	110	165	250	12	10	0.10
11-13 years old	2750	90	54	92	390	120	180	300	15	15	0.10
11-13 years old	2500	82	49	84	355	120	180	300	18	12	0.10
14-17 years old	3000	98	59	100	425	120	180	300	15	15	0.13
14-17years (girls)	2600	90	54	90	360	120	180	300	18	12	0.13

2.2. Nutrition of the elderly

Physiological features of metabolism of this category of the population are a gradual decrease in the intensity of metabolism, a decrease in physical activity and labor costs, the layering of certain diseases inherent in old age, or their complex. Therefore, the need for nutrients and energy in elderly people gradually decreases. In old age, as a rule, atrophic processes already occur, in particular, in the gastrointestinal tract. Therefore, the amount of proteins, fats and carbohydrates should be reduced. In connection with the course of putrefactive processes, the amount of meat, fats should be reduced. The content of mineral salts and most vitamins in the daily diet does not decrease. This is due to the need for calcification of the skeleton (with age, bone fragility increases) and maintaining the amount of catalytic substances (enzymes, hormones) at the required level, since their synthesis at this age decreases.

The amount of polyunsaturated fatty acids, which help remove cholesterol from the body, should be slightly increased. It is good to replace meat with fish. The body should receive phospholipids, as well as antioxidants - vitamin E, selenium (Tables 6, 7, 8).

Table 6. Recommended daily intakes of vitamins for elderly and old people (per day)

Gender and age	Vitamins									
	thiamine(mg)	riboflavin (mg)	Vitamin B6(mg)	Vitamin B12(mcg)	folate (mcg)	Niacin (niacin equivalent, mg*)	ascorbic acid (mg)	Vitamin A (retinol equiv., mg*)	Vitamin E(mg)	Vitamin D (IU)
		mg		mcg						
Men 60-74 years old	1.4	1.6	1.6	3	200	15	58	1000	15	100
Men 75 years and older	1,2	1.4	1.4	3	200	13	50	1000	15	100
Women 60-74 years old	1.3	1.5	1.5	3	200	14	52	1000	12	100
Women 75 years and older	1,1	1.3	1.3	3	200	12	48	1000	12	100

Table 7. Recommended intake of energy, proteins, fats and carbohydrates for elderly and old people (per day)

Floor	Age groups	Energy *		Proteins (g)		Fats (g)	Carbohydrates (g)
		mJ	kcal	total	of animal origin		
Men	60-74	9.62	2300	69	38	77	333
	75 years and older	8.37	2000	60	33	67	290
Women	60-74	8.79	2100	63	35	70	305
	75 years and older	7.95	1900	57	31	63	275

Table 8. Daily requirement of adults for microelements

(V.I. Smolya, 1991; N.F. Kosheleva and V.A. Dotsenko, 1993)

Microelements	Need,mg	Microelements	Need,mg
Iron	15-20	Aluminum	49.1
Copper	2-2.5	Rubidium	0.35-0.5
Manganese	5-6	Selenium	0.05-0.2
Zinc	10-12	Tin	2
Cobalt	0.1-0.2	Vanadium	0.1-0.2
Nickel	0.6-0.8	Chromium	0.05-0.15
Molybdenum	0.2-0.3	Silicon	30
Iodine	0.1-0.2	Titanium	0.5
Fluorine	2-3	Strontium	1
Chromium	0.8	Mercury	0.02
Tellurium	0.5-1.0	Silver	0.9

2.3. Nutrition of people engaged in intellectual work

People engaged in mental work experience hypokinesis, therefore oxidation of products in the body is much weaker, resulting in accumulation and deposition of substances unnecessary for the body. The energy value and content of proteins, fats, carbohydrates in this group of the adult working population is significantly lower than in people engaged in physical labor. However, the content of minerals and vitamins in the diet is the same as in the latter. This is due to the fact that the function of mental work requires a sufficient amount of enzymes and hormones, the synthesis of which is associated with providing the body with complete proteins, mineral salts, microelements, vitamins

The diet of this group of people should contain a sufficient amount of sugar, vegetables and fruits, but at the same time, the amount of fat should be somewhat reduced. A sufficient amount of amino acids is necessary, primarily those contained in cottage cheese and dairy products. It is also necessary for the body to receive calcium and a sufficient amount of phosphorus. Phosphorus is contained in grain products, cereals, rice and some vegetables. Due to a sedentary lifestyle, the diet should contain a sufficient amount of vegetables and fiber to stimulate intestinal motility. People engaged in mental and operator work, as a rule, work in conditions of hypodynamia, insufficient physical activity, which adversely affects their health and the body's resistance to various diseases. Therefore, in order to prevent such diseases, regular physical training is recommended, which requires additional time and a subjective volitional stimulus, which not all people in this category are capable of.

2.4. Nutrition of people engaged in physical labor

The diet of people engaged in physical labor may contain an increased amount of carbohydrates - by 25-30%, since a large amount of energy is required. The amount of meat products may also be increased. Vegetables are needed in greater quantities to enhance the removal of harmful substances from the body. For people engaged in physical labor and athletes who expend significantly more muscle energy, nutritional standards provide for an increase in the amount of proteins, fats, carbohydrates in the diet, and therefore energy in proportion to the severity and intensity of labor (or training).

The nutritional standards provide requirements for thiamine, riboflavin, vitamin B6, niacin, and ascorbic acid based on recommended energy intakes. The standards include requirements for vitamins A, D, E, B12, and folate (Table 9).

Table 9. Recommended values of vitamin intake for men of working age by work intensity groups (per day))

Labor intensity groups	Age groups	Vitamins									
		thiamine(mg)	riboflavin (mg)	Vitamin B6(mg)	Vitamin B12(mcg)	folate (mcg)	Niacin (niacin equivalent, mg*)	ascorbic acid (mg)	Vitamin A (retinol equiv., mg **)	Vitamin E(mg)	Vitamin D (IU)
		mg			mcg						
1st	18-29	1.7	2.0	2.0	3	200	18	70	1000	15	100
	30-39	1.6	1.9	1.9	3	200	18	68	1000	15	100
	40-59	1.5	1.8	1.9	3	200	17	64	1000	15	100
2nd	18-29	1.8	2.1	2.1	3	200	20	75	1000	15	100
	30-39	1.7	2.0	2.0	3	200	19	72	1000	15	100
	40-59	1.7	1.9	1.9	3	200	18	69	1000	15	100
3rd	18-29	1.9	2,2	2,2	3	200	21	80	1000	15	100
	30-39	1.9	2,2	2,2	3	200	20	78	1000	15	100
	40-59	1.8	2.1	2.1	3	200	19	74	1000	15	100
4th	18-29	2,2	2.6	2.6	3	200	24	92	1000	15	100
	30-39	2,2	2.5	2.5	3	200	23	90	1000	15	100
	40-59	2.1	2.4	2.4	3	200	22	86	1000	15	100
5th	18-29	2.6	3.0	3.0	3	200	28	108	1000	15	100
	30-39	2.5	2.9	2.9	3	200	27	102	1000	15	100
	40-49	2,3	2.7	2.7	3	200	25	98	1000	15	100

* Niacin equivalent is equal to 1 mg niacin, or 60 mg tryptophan
** Retinol equivalent corresponds to 1 mcg of retinol (vitamin A), or 6 mcg of carotene (provitamin A).
1 mcg (microgram) is equal to 0.001 mg.

Table 10. Recommended vitamin intake values for women of working age by work intensity groups (per day)

Labor intensity groups	Age groups	Vitamins									
		thiamine(mg)	riboflavin (mg)	Vitamin B6(mg)	Vitamin B12(mcg)	folate (mcg)	Niacin (niacin equivalent, mg*)	ascorbic acid (mg)	Vitamin A (retinol equiv., mg*)	Vitamin E(mg)	Vitamin D (IU)
		mg			mcg						
1st	18-29	1.4	1.7	1.7	3	200	16	60	1000	12	100
	30-39	1.4	1.6	1.6	3	200	15	58	1000	12	100
	40-59	1.3	1.5	1.5	3	200	14	55	1000	12	100
2nd	18-29	1.5	1.8	1.8	3	200	17	64	1000	12	100
	30-39	1.5	1.7	1.7	3	200	16	61	1000	12	100
	40-59	1.4	1.6	1.6	3	200	15	59	1000	12	100
3rd	18-29	1.6	1.9	1.9	3	200	18	68	1000	12	100
	30-39	1.6	1.8	1.8	3	200	17	65	1000	12	100
	40-59	1.5	1.8	1.8	3	200	16	62	1000	12	100
4th	18-29	1.9	2,2	2,2	3	200	20	79	1000	12	100
	30-39	1.8	2.1	2.1	3	200	20	76	1000	12	100
	40-59	1.7	2.0	2.0	3	200	19	73	1000	12	100
Pregnant women		1.7	2.0	2.0	4	600	19	72	1250	15	500
Nursing mothers		1.9	2,2	2,2	4	600	21	80	1500	15	500

2.5. Therapeutic and therapeutic-prophylactic nutrition

Therapeutic and preventive nutrition -These are specially selected diets that help prevent metabolic disorders and maintain the body's internal environment. Therapeutic nutrition is a scientifically based system of organizing nutrition and differentiated use of certain food products, their combinations, and types of culinary processing for medicinal purposes.

The principles of therapeutic nutrition include:

– full provision of the patient’s body with proteins, fats, carbohydrates, as well as essential nutritional factors (essential amino acids, polyunsaturated fatty acids, vitamins, microelements) in different proportions;

– correspondence of the chemical structure of food products to the functional state of the enzymatic systems of the patient’s body;

– sparing the patient's disease-damaged enzyme systems by introducing or, on the contrary, excluding any specific nutritional factors;

– adaptation of the frequency of food intake and its culinary preparation to the characteristics of the dysfunction of the digestive system;

– a consistent transition from gentle diets to more extensive ones;

– a combination, where necessary, of different methods of introducing food (nutrients).

Therapeutic nutrition is prescribed to patients in the presence of medical indications by the attending physician of the healthcare organization.

The organization of therapeutic nutrition in a medical and preventive institution is an integral part of the treatment process and is one of the main therapeutic measures. Based on the order of the Ministry of Health of the Russian Federation dated August 52003. No. 330 "On measures to improve therapeutic nutrition in medical and preventive institutions of the Russian Federation" in order to optimize therapeutic nutrition, improve the organization and improve the management of its quality in medical and preventive institutions, a new nomenclature of diets (a system of standard diets) is introduced, differing in the content of essential nutrients and energy value, food preparation technology and average daily set of products. Previously used diets of the numbered system (diets No. 1-15) are combined or included in the system of standard diets, which are prescribed for various diseases depending on the stage, severity of the disease or complications from various organs and systems.The peculiarity of the nutrient composition of these diets is that the amount of proteins in most of them is preserved or even increased to 100-120 g, with the exception of diets for diseases such as gout, uric acid diathesis, glomerulonephritis, etc. The amount of fats and carbohydrates is usually reduced, while minerals, microelements, and vitamins are preserved, and in some diseases, such as infectious ones, they are increased, since their losses due to sweating increase during fever.

Along with the basic standard diet and its variations in medical and proIn a phylactic institution, in accordance with their profile, the following are used:

surgical diets (0-1; 0-II; 0-III; 0-IV; in case of ulcerative bleeding flow, with stenosis of the stomach), etc.;

unloading diets (tea, sugar, apple, rice-compote, potato, cottage cheese, juice, meat, etc.);

special diets (potassium diet, magnesium diet, tube diet, diets in case of myocardial infarction, diets for unloading and dietary therapy, vegetarian diet, etc.).

Table 11. Therapeutic diets

Diet No.	Belki vg	FatsG	Coal.	Energy value	NaCI	Indications for use
1 a 16	80-90 90 	80-90 90 	 200 300	1840 1920 2370	 6-8 6-8	Exacerbation of peptic ulcer diseaseno stomach and duodenum, in the first 10-14 days, acute gastritis in the first days of the disease, exacerbation of chronic gastritis (with preserved andincreased acidity) in the first days of the disease. Exacerbation of gastric ulcer and duodenal ulcer in the following 10-14 days, acute gastritis and exacerbation of chronic gastritis in the following days.
2	100	90	400	2800	8	Anacid gastritis in stagemild exacerbation and on-incipient remission
3	100	90	400	2800	8-10	Chronic bowel diseases with a predominance of dyskinesia syndrome, as well as dyskinetic constipation in other diseases
4	100	70	250	2030	6-8	Acute colitis and enteritis withprofuse diarrhea (in the first 3-5 days)
46	100	90	400	2800	8-10	Acute colitis and enteritis at the subsequent stage of treatment- from the 3rd to the 5th day of exacerbation of chronic colitis and enteritis
5a	90	80	350	2600	8	Acute cholecystitis, chroniccholecystitis in the acute stage, acute hepatitis or exacerbation of chronic hepatitis
5	100	90	400	2810	8	Chronic cholecystitis in the stage of mild exacerbation and remission, chronic hepatitis in the stage of remission
5p	120	90	350	2700	8	Pancreatic Diet. Chronic Pancreatitis
5p	120	90	400	2900	8	During gastric resection. Dumping syndrome after resection for gastric ulcer
7a	20	80	350	2200	1.5-2	Chronic renal failure, severe impairmentimprovement of the nitrogen-excreting function of the kidneys
76	40	90	450	2770	2-3	Chronic renal failure, moderate impairment of renal nitrogen excretion function
7v	120	80	400	2800	2-3	Nephrotic syndrome

7g	60	100	400	2740	2-3	Terminal renal failure (hemodialysis)
7	70	90	400	2700	2-3	Other kidney diseases
8	100	80	150	1750	2-3	Obesity
8v	80	60	100	1280	2-3	Obesity
86	60	30	70	800	2-3	Obesity
9.9 a	100	90	300	2410	8	Diabetes mellitus
10a	70	50	300	1950	2-3	Hypertension, chronic cardiovascular failure
10p	BY	70	350	2500	2-3	Rheumatoid arthritis. Rheumatoid arthritis
10s	90	80	350	2500	2-3	Anti-atherosclerotic. Atherosclerosis, coronary
10	90	80	350	2500	2-3	Active phase of rheumatism, chronic heart failure
11	100	100	450	3100	8-10	Anemia, tuberculosis
15	100	90	450	3010	8-10	Rational diet

If there are medical indications and based on the conclusion of a council of doctors, patients are prescribed individual and additional nutrition.

Individual nutrition is a type of therapeutic nutrition that is prescribed for certain diseases that require an increase, decrease or exclusion of certain food products from the diet while maintaining the norms of the average daily food intake.

Supplementary nutrition is a type of therapeutic nutrition that is prescribed for certain diseases that require an increase in individual components of the diet beyond the average daily food intake.

Enteral nutrition is a type of nutritional support in which nutrients, due to the impossibility of adequately providing the body's energy and plastic needs in a natural way, are introduced in the form of enteral nutrition mixtures through the mouth, tube or stoma. It is prescribed by the patient's attending physician if there are medical indications.

Recommended average – Daily food sets are the basis for creating standard diets in medical and preventive institutions.

Control questions

1. Give a definition of the term "rational nutrition".
2. What is the physiological role of nutrition?
3. List the 6 basic principles of healthy eating.
4. Name the most important of the basic principles of rational nutrition.-blowing.
5. What do you mean by nutritional adequacy from a quantitative point of view?
6. What do you mean by nutritional adequacy from a qualitative point of view?
7. What do you mean by nutritional adequacy in terms of balance?diet?
8. What do you mean by nutritional adequacy in terms of diet?
9. What do you mean by nutritional adequacy from the perspective of enzymatic status?organism?
10. What do you mean by nutritional adequacy from the standpoint of its harmlessness?

TOPIC 3. FOOD ADDITIVES

Food additives- natural, nature-identical or artificial substances that are not used as a food product or a regular food component in themselves. They are intentionally added to food systems for technological reasons at various stages of production, storage, transportation of finished products in order to improve or facilitate the production process or individual operations, increase the resistance of the product to various types of spoilage, preserve the structure and appearance of the product or intentionally change the organoleptic properties.

The main purposes of introducing food additives include:

1. Improvement of the technology of preparation and processing of food raw materials, production, packaging, transportation and storage of food products. The additives used in this process should not mask the consequences of using low-quality or spoiled raw materials, or carrying out technological operations in unsanitary conditions;

2. Preservation of the natural qualities of the food product;

3. Improving the organoleptic properties or structure of food products and increasing their stability during storage.

The use of food additives is permissible only if they do not pose a threat to human health even when consumed over a long period of time as part of a product, and provided that the technological tasks set cannot be solved in any other way.

Food additives have been used by humans for many centuries (salt, pepper, cloves, nutmeg, cinnamon, honey), but their widespread use began at the end of the 19th century and was associated with population growth and its concentration in cities, which caused the need to increase the volume of food production, improve traditional technologies for their production using the achievements of chemistry and biotechnology.

The number of food additives used in the production of food products in different countries today reaches 1,500 items (not counting combined additives, individual aromatic substances, and flavorings.

In order to harmonise their use by manufacturers in different countries, the European Council has developed a rational system of digital codification of food additives with the letter "E". It is included in the FAO/WHO food code (FAO - Food and Agriculture Organization of the United Nations; WHO - World Health Organization) as an international digital system of codification of food additives. Each food additive is assigned a digital three- or four-digit number (in Europe preceded by the letter E). They are used in combination with the names of functional classes, reflecting the grouping of food additives by technological functions (subclasses).

Experts identify the E index with the word Europe and the abbreviations EU/EU, which in Russian also begin with the letter E, as well as with the words ebsbar/edible, which translated into Russian (from German and English, respectively) means "edible". The E index combined with a three- or four-digit number is a synonym and part of a complex name for a specific chemical substance that is a food additive. Assigning the status of a food additive and an identification number with the "E" index to a specific substance has a clear interpretation, implying that: this specific substance has been tested for safety; the

substance may be used within the framework of its established safety and technological necessity, provided that the use of this substance does not mislead the consumer regarding the type and composition of the food product to which it is added; purity criteria have been established for this substance, necessary to achieve a certain level of food quality.

Therefore, permitted food additives with index E and identification number have a certain quality. The quality of food additives is a set of characteristics that determine the technological properties and safety of food additives.

The presence of a food additive in a product must be indicated on the label, and it may be designated as an individual substance or as a representative of a specific functional class in combination with the E code. For example: sodium benzoate or preservative E211.

According to the proposed system of digital codification of food additives, their classification, according to their purpose, is as follows (main groups):

– E100-E182-dyes;
– E200 and further – preservatives;
– E300 and further – antioxidants;
– E400 and further – consistency stabilizers;
– E450 and further, E1000 – emulsifiers;
– E300 and further – acidity regulators, leavening agents;
– E600 and above – flavor and aroma enhancers;
– E700-E800 – spare indices for other possible information;
– E900 and further – glazing agents, bread improvers.

Many food additives have complex technological functions that manifest themselves depending on the characteristics of the food system. For example, additive E339 (sodium phosphates) can exhibit the properties of an acidity regulator, emulsifier, stabilizer, complexing agent, and water-retaining agent.

Food additives prohibited for use in the Russian Federation in the production of food products are presented in Table 12.

Table 12. Food additives banned in Russia.

Code	Food supplement	Technological functions
E121	Citrus red	Dye
E123	Amaranth	Dye
E240	Formaldehyde	Preservative
E940a	Potassium bromate	Flour and bread improver
E940b	Calcium bromate	Flour and bread improver

3.1. Food additives that slow down microbiological and oxidative spoilage of food raw materials and finished products

Spoilage of food raw materials and finished products is the result of complex physical, chemical and microbiological processes: hydrolytic, oxidative, development of microbial flora. They are closely interconnected, the possibility and speed of their passage are determined by many factors: the composition and condition of food systems, humidity, pH of the environment, enzyme activity,

features of the technology of storage and processing of raw materials, the presence of antimicrobial, antioxidant and preservative substances in plant and animal raw materials.

Spoilage of food products leads to a decrease in their quality, deterioration of organoleptic properties, accumulation of compounds harmful and hazardous to human health, and a sharp reduction in shelf life. As a result, the product becomes unfit for consumption.

Eating spoiled food attacked by microorganisms and containing toxins can lead to severe poisoning and sometimes even death. Live microorganisms pose a significant danger. When they enter the human body with food, they can lead to severe food poisoning. Spoilage of food raw materials and finished products leads to enormous economic losses. Therefore, ensuring the quality and safety of food products, increasing their shelf life, and reducing losses are of enormous social and economic importance. It should also be remembered that the production of basic agricultural raw materials (grain, oilseeds, vegetables, fruits, etc.) is seasonal, they cannot be immediately processed into finished products and require significant effort and costs for preservation.

3.2. Biologically active additives

Biologically active additives (BAA) are natural (identical to natural) biologically active substances intended for use simultaneously with food or introduction into food products. They are divided into nutraceuticals - BAAs with nutritional value, and parapharmaceuticals - BAAs with pronounced biological activity.

Nutraceuticals are essential nutrients that are natural ingredients of food: vitamins and their precursors, polyunsaturated fatty acids, including w-3 polyunsaturated fatty acids, phospholipids, individual minerals and microelements (calcium, iron, selenium, zinc, iodine, fluorine), essential amino acids, some mono- and disaccharides, dietary fiber (cellulose, pectin, hemicellulose, etc.).

Nutraceuticals allow each individual, even with a standard set of food basket, to have their own individual diet, the optimal composition of which depends on the body's needs for nutrients. These needs are formed by many factors, including gender, age, physical activity, features of the biochemical constitution and biorhythms of a person, their physical condition (emotional stress, pregnancy of a woman, etc.), environmental conditions of their habitat. Consumption of nutraceuticals as part of the diet allows for relatively easy and fairly quick compensation for deficient essential nutrients and ensuring the satisfaction of a person's physiological needs, changing during their illness, and organizing therapeutic nutrition.

Nutraceuticals, capable of enhancing the elements of enzymatic protection of the cell, help to increase the non-specific resistance of the body to the impact of various unfavorable factors of the human environment.

Positive effects include the ability of nutraceuticals to bind and accelerate the elimination of foreign and toxic substances from the body, as well as to specifically change the metabolism of individual substances, such as toxicants, by influencing the enzyme systems of xenobiotic metabolism.

The considered effects of the use of nutraceuticals provide conditions for primary and secondary prevention of various alimentary-dependent diseases, which include obesity, atherosclerosis and other cardiovascular diseases, malignant neoplasms and immune deficiency states.

Currently, a large number of branded products containing individual groups of nutraceuticals and their combinations are produced. Such products include vitamin and vitamin-mineral complexes, phospholipid products, in particular, lecithin, etc.

Parapharmaceuticals are minor food components. They may include organic acids, bioflavonoids, caffeine, peptide regulators, eubiotics (compounds that maintain the normal composition and functional activity of intestinal microflora). The group of parapharmaceuticals also includes biologically active additives that regulate appetite and help reduce the energy value of the diet. The effects that determine the functional role of parapharmaceuticals include: regulation of the microbiocenosis of the gastrointestinal tract (GIT); regulation of nervous activity; regulation of the functional activity of organs and systems (secretory, digestive, etc.); adaptogenic effect.

It should be emphasized that the effectiveness of the regulatory and adaptogenic effects of parapharmaceuticals is limited by the physiological norm. The effects of exposure that exceed these limits are related to drugs. The combination of the listed effects provides the human body with the ability to adapt to extreme conditions. The use of parapharmaceuticals is an effective form of adjuvant therapy.

Why has so much attention been paid to dietary supplements lately? There are medical advances that have shown that adequate nutrition can only be achieved with the widespread use of dietary supplements that can be obtained from any biological substrate (animal, plant, microbiological), and economics (drug synthesis is expensive), and the peculiarities of human development. With the change in lifestyle and diet, humans have apparently lost some enzyme systems. We can say that food has shaped humans, and the metabolic imbalance with nature has become a consequence of human activity. The essentiality of nutrients for today's humans is a reflection of the nutritional status of our ancestors. Changes in lifestyle and diet have led to a sharp reduction in energy expenditure, which today amounts to 2.2-2.5 thousand calories per day. A small amount of natural food does not even theoretically provide the body with all the necessary substances (proteins, polyunsaturated acids, vitamins, minerals, including selenium). Changes in the structure of nutrition (an "achievement" of the food industry) have cut off the flow of exogenous regulators and deprived humans of this form of connection with nature. The widespread use of dietary supplements in food production can solve these issues. At the same time, if the use of nugriceuticals is obvious today, the use of parapharmaceuticals has many unresolved issues of a chemical, biochemical and medical nature.

TOPIC 4. ESSENTIAL MINERALS IN FOOD

Diseases arising from deficiency of vitamins, macro- and microelements, as well as from various abuses in the body

4.1. Macroelements

Sodium.Contained in a variety of food products (meat, fish, vegetables). The main source is table salt added to food.Participates in acid-base balance and regulation of water balance. Activates some enzymes.

Potassium.Vegetables (especially sorrel and spinach), melons, potatoes, fruits (especially prunes, apricots, dried apricots, dried apricots), oats, legumes, nuts, seaweed, milk, mushrooms.Participates in acid-base balance and regulation of water balance. Important for the functioning of the heart and nervous system. Activates some enzymes.

Calcium.Milk and dairy products, including hard cheeses and cottage cheese, green leafy vegetables, dried apricots, nuts, legumes, oats and oat products (oatmeal, etc.).Participates in the work of a number of enzymes, in the immune defense of the body, in the work of the nervous system, blood clotting, in the recognition of the body's cells by each other. Necessary for the formation of bones and teeth. With a deficiency - osteoporosis (loss of mineral salts by bones, brittle bones), in children - rickets

Magnesium.Sea fish, wholemeal bread, cereals (buckwheat, millet, barley, etc.), legumes, nuts, beets, lettuce, spinach, cocoa.Participates in water balance, in acid-base balance. Activates some enzymes. Important for heart function

Phosphorus.Bread, cereals, meat, liver, brains, fish, eggs, milk, cheese, nuts.Participates in the acid-base balance of the body and energy metabolism. Necessary for the functioning of the nervous system, the formation of bones and teeth.

Chlorine.Contained in a variety of food products (meat, fish, vegetables, etc.). The main source is table salt added to food..Participates in the acid-base balance of the body. Necessary for the formation of hydrochloric acid in the stomach, for the destruction of foreign substances by blood leukocytes

4.2. Microelements

Iron.It is well absorbed from animal food (meat, offal - liver, kidneys, etc., fish), worse - from plant food, nuts and eggs.Necessary for the formation of hemoglobin, a substance that carries oxygen in the blood. It is part of enzymes involved in energy metabolism and protecting the body from harmful substances. Iron deficiency causes anemia. The need is increased in women due to menstrual blood loss.

Iodine.Seaweed, products made from it, sea fish (cod, pollock, saury, etc.), squid, shrimp, meat, milk. Chicken eggs and beef liver are poorer in iodine. In areas with low iodine content in water, soil and food products, iodized salt is used - table salt with the addition of potassium iodide. On the seashore, a person receives part of the necessary iodine with inhaled air.Necessary for the formation of thyroid hormones. With a lack of iodine in the body, goiter develops (the thyroid gland is enlarged, but its function is reduced).

Cobalt.It is a component of vitamin B12.

Manganese.Legumes, grain products (barley, oatmeal, etc.), pineapples, apricots, nuts, coffee, tea, chocolate, cocoa. Less in meat, fish, eggs, milk, seafood.Necessary for the functioning of a number of enzymes.

Copper.Liver, seafood, grain products (buckwheat, oats), legumes (peas, beans), nuts, hard cheeses, cocoa, chocolate; very little in milk.Necessary for the functioning of many enzymes and hematopoiesis. Deficiency can contribute to the development of anemia..

Molybdenum.Legumes, liver, kidneys; less in cereals; very little in fruits and many vegetables.Necessary for the functioning of many enzymes, including the oxidation of purines. Promotes the formation of uric acid

Arsenic.Sea fish, shellfish.Small doses have a tonic effect..

Selenium.Liver, kidneys, meat, grains and legumes, nuts, fish (cod, herring, tuna, etc.). In some areas, the selenium content in water, soil and food products is low. In these cases, it is recommended to take selenium preparations.It is necessary for the functioning of a number of enzymes, including protecting the body from harmful substances and radiation (participant in the body's antioxidant systems). The toxic dose is close to the need for this element, so you should not take selenium preparations without a doctor's prescription.

Chromium.Liver, meat, grain products (buckwheat, corn, pearl barley), legumes. Necessary for the functioning of enzymes, participates in carbohydrate metabolism.

Zinc.Liver, meat, grain products (oatmeal, buckwheat), rye bread, legumes (peas, beans), nuts, shrimp, herring, squid, cocoa, chocolate, tea. Less in potatoes, but they are usually consumed in large quantities.Necessary for the functioning of many enzymes, for cell division.

Fluorine.The main source is fluoridated water. Fish, nuts, liver, tea, etc. Gives strength to bones and teeth. Makes teeth resistant to caries. Excessive consumption causes fluorosis - mottling of tooth enamel

Minerals do not have energy value, like proteins, fats and carbohydrates. However, human life is impossible without them. Their role in the construction of bone tissue is especially important. Minerals participate in the most important metabolic processes of the body: water-salt and acid-base. Many enzymatic processes in the body are impossible without the participation of certain minerals.

4.3. Clinical and physiological indicators of vitamin provision of the body

B vitamins. Properties of B vitamins.

There are many B vitamins, but the main ones are considered to be B1, or thiamine; B2, or riboflavin; B3, or PP (nicotinic acid in different forms); B6, or pyridoxine; B5, or pantothenic acid; B9, or folic acid; B12, or cyanocobalamin; H1, or biotin. Other B vitamins are also known - choline, inositol, para-aminobenzoic acid (PABA), etc.

The main properties of B vitamins:

All B vitamins have the following properties: they are water-soluble, are part of enzymes or activate them, affecting vital processes even in the smallest doses.

All B vitamins, except inositol, contain nitrogen, which means they ensure the construction of protein in the body. This group of vitamins is necessary primarily to strengthen the nervous and endocrine systems. With regular consumption of food rich in B vitamins, the aging process can be slowed down and even reversed. Brewer's yeast, liver and cereals are considered good sources of B vitamins. Partial vitamin deficiency is not characterized by specific complaints related to any one vitamin. Most complaints are general: weakness, drowsiness during the day, insomnia at night, irritability, rumbling and vague pain in the abdomen, etc.

Vitamin B1 deficiency leads to the destruction of the nervous system, fears, irritability, fatigue, constipation, leg pain and various manifestations of polyneuritis appear, the aging process accelerates, and children stop growing. Researchers are still debating the minimum that is necessary to prevent beriberi, nervous disorders and other serious ailments, we all need to remember that for every 100 calories 15-20 IU of vitamin B1 is required. We should also not forget that with a large amount of carbohydrates in the food we receive, the need for vitamin B1 also increases. In practice, this means that the more sweets, cereals, bread, pastries, starch, vegetables, potatoes we eat, the more bran and greens should be included in the diet.

Children aged 4 to 7 years, as well as pregnant and breastfeeding women, should receive a double dose of vitamin B1..

All patients need more of this vitamin, especially when taking antibiotics and any medications.

There is a lot of vitamin B1 in greens, hazelnuts, seeds, liver, bran, buckwheat, raw oatmeal, beans, potatoes, meat, and heart.

Vitamin B1 (thiamine) deficiency manifests itself as severe fatigue, especially when walking, pain in the calf muscles, paresthesia, loss of appetite, constipation, shortness of breath, tachycardia, etc.

With hypovitaminosis B2 (riboflavin) or B6 (pyridoxine), increased oiliness (seborrhea) of the face is observed due to hypertrophy of the sebaceous glands, primarily behind the ears, on the forehead, nasolabial folds, which, with the subsequent development of hypovitaminosis, is replaced by atrophy of the sebaceous glands, which is manifested by sloughing of the epithelium, under which shiny areas of skin appear when scraped off.

A fairly specific symptom of hypovitaminosis B2 is pericorneal injection of the vessels of the sclera of the eye, which can be observed using a binocular magnifying glass or a slit lamp: at the place where the cornea transitions to the sclera, as a result of the growth of vessels, a violet-blue halo is formed. This symptom is often accompanied by conjunctivitis with an increase in the injection of vessels from the center to the periphery, in contrast to banal conjunctivitis (injection of vessels – to the center).Vitamin B2 is quite widespread in food products. Vitamin B2 is found in the greatest quantity in dairy and meat products. There is a lot of vitamin B2 in eggs, fish meat, in oat and buck wheat cereals, legumes and green leafy vegetables such as cabbage, tomatoes, mushrooms, apricots, yeast and whole grain bread.

In addition, some herbs, namely dandelion greens, alfalfa, parsley, fennel seeds, catnip, peppermint, burdock root, fenugreek, chamomile, eyebright, hops,

mullein, nettle, red clover, sage and horsetail, contain vitamin B2 in large quantities in the “root of life” – ginseng. The microflora of a healthy intestine is also capable of synthesizing riboflavin.

With hypovitaminos is B2, B6, less often PP (nicotinic acid, niacin) cheilos is observed - the mucous membrane of the lips first becomes pale, and then at the place where the lips close due to maceration of the epithelium and its desquamation, the mucous membrane becomes red. Vertical cracks in the lips appear, angular stomatitis - grayish-yellow papules in the corners of the mouth, with their maceration, cracks appear, covered with yellowish crusts. With a deficiency of these vitamins, changes are observed in the tongue - hypertrophic glossitis develops: the tongue swells, increases in volume, redness with teeth marks along the edges. The papillae of the tongue hypertrophy, first on the tip, and then on the lateral surfaces and back. Deep grooves ("geographic tongue") may appear. Subsequently, papillary hypertrophy is replaced by epithelial desquamation over the entire surface, the tongue becomes “bald”, polished, smooth and shiny, bright red, fiery-flaming (especially with hypovitaminosis PP) or with a raspberry hue (with hypovitaminosis B2). Vitamin B12 (cyanocobalamin) deficiency can lead to the development of megaloblastic hyperchromic anemia. Objectively, at first there is pallor of the mucous membranes, conjunctiva, dry mouth, bright tongue, decreased appetite, diarrhea, polyneuritis. Fig. 1 shows diseases that occur due to insufficiency of micro and macro elements, as well as with various abuses in the diet. nutrition.

With hypovitaminosis C (ascorbic acid), P (thioflavonoids) there is rapidly developing fatigue, pale skin, cyanosis of the visible mucous membranes, hands, feet, swelling and loosening of the gums, near the edge of the incisors on the mucous membrane of the gums appear small isolated red islands. Merging, they form a border near the dental edge of the gums. This border, bright red at first, subsequently becomes bluish, the interdental papillae swell, the mucous membrane becomes red, loosened, easily injured - from a toothbrush, stale bread. In more severe cases, spontaneous bleeding of the gums is observed, which should be differentiated from periodontosis. With a pronounced deficiency of vitamin C in the diet, the clinical picture of scurvy develops: severe weight loss, rheumatoid pain in the muscles and joints, especially during movement, signs of anemia (shortness of breath, tachycardia), a bluish border on the gums, and their spontaneous bleeding are added to the above-described symptoms of hypovitaminosis. Subsequently, the gums rot, a purulent odor appears from the mouth, teeth become loose and begin to fall out. Spontaneous hemorrhages appear in the skin, muscles, joints, and all internal organs and tissues. A secondary infection easily develops.

With hypovitaminosis A (retinol), the following are observed: hyperkeratosis - increased keratinization of the epidermis on the elbows and knee joints. The skin is covered with a network of small longitudinal and transverse mosaic-like cracks; follicular hyperkeratosis - on the skin of the buttocks, thighs, calves, extensor surfaces of the arms in the area of the hair follicles, increased keratinization of the epithelium, the skin becomes rough, "goose", "prickly". When

scraping the epithelium, yellowish spots appear (in contrast to hypovitaminosis C, in which a blue hemorrhage spot appears in this case).

Deficiency of vitamin D (calciferol) and ultraviolet radiation from the sun (work in mines, underground, indoor spaces, especially in winter) in the diet manifests itself in irritability, weakness, sweating, muscle pain, brittle teeth, bones (frequent fractures), in children - delayed development of teeth, a tendency to respiratory diseases. With vitamin D deficiency, rickets develops.

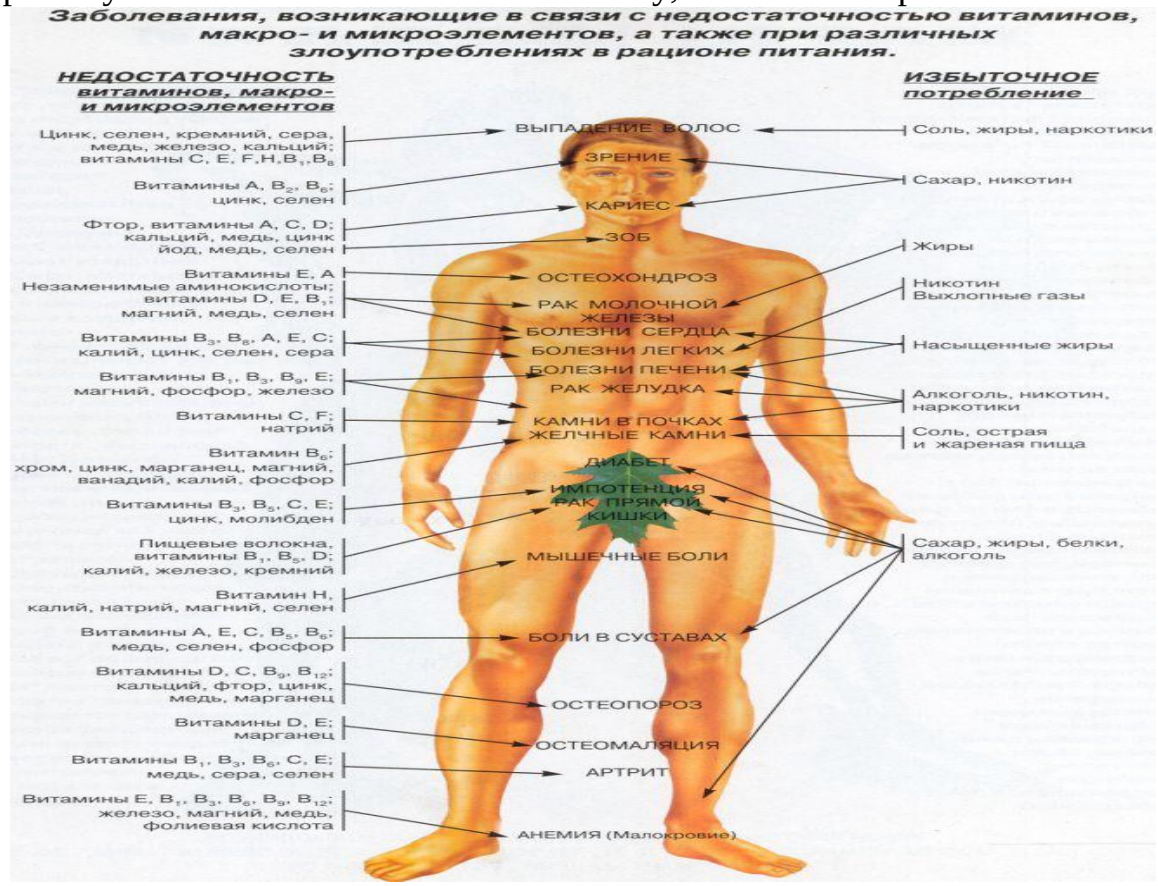


Fig. 1. Diseases arising from deficiency of micro and macro elements, as well as from various abuses in the diet

Control questions

1. What diseases of protein deficiency in nutrition do you know?
2. What diseases of fat deficiency in nutrition do you know?
3. What carbohydrate deficiency diseases do you know?
4. What diseases of vitamin deficiency in nutrition do you know?
5. What diseases of mineral salt deficiency in nutrition do you know?
6. What diseases of micronutrient deficiency do you know?
7. What diseases of overnutrition do you know?
8. What diseases of excess protein in nutrition do you know?
9. What diseases of excess fat in the diet do you know?
10. What diseases of excess carbohydrates in nutrition do you know?
11. What diseases of excess vitamins in nutrition do you know?
12. What diseases of excess microelements in nutrition do you know?
13. What factors determine the body's need for vitamin C?
14. What happens to vitamin C during cooking?

15. What rules must be followed when cooking food?to better preserve vitamin C in them?

16. What should be the average ratio of phosphorus and calcium in the daily diet?

17. What is the importance of iodine in nutrition?

18. What is the importance of fluoride in nutrition?

19. List fat-soluble vitamins?

20. What pathology can develop with a deficiency of vitamin D in the diet?

21. What pathology can develop with a deficiency of vitamin A in the diet?

22. 25. List water-soluble vitamins

26. What pathology develops with a deficiency of vitamin B1 in the diet?

27. What pathology develops with a deficiency of vitamin "PP" in the diet?

28. What pathology develops with a deficiency of vitamin C in the diet?

TOPIC 5. METHODS OF CALCULATION AND HYGIENIC ASSESSMENT OF DAILY ENERGY CONSUMPTION AND INDIVIDUAL NEEDS OF A STUDENT FOR FOOD SUBSTANCES (PROTEINS, FATS, CARBOHYDRATES)

5.1. Determination of daily energy expenditure

Daily energy expenditure consists of 3 main items:

1 - basal metabolic rate,

2 – specifically dynamic action of nutrients (increase in basal metabolism during utilization of the diet by 10-15%) and

3 – energy expenditure on performing various types of human activities during work and rest.

Daily energy expenditure can be estimated using laboratory (direct and indirect calorimetry, etc.) and calculation methods. The most accessible is the calculation method, which allows you to roughly determine daily energy expenditure using special tables that indicate the average energy expenditure in kilocalories (kcal) per 1 minute per1 kg body weight taking into account the basal metabolic rate.

An integral indicator reflecting the state of nutrition is the nutritional status. Nutritional status is the state of the organism determined by nutrition in given specific conditions.

Nutritional status, in turn, depends on dietary status, which is assessed based on the energy value of the diet, diet, and conditions of food intake.

When determining nutritional status, the following points are assessed:

1) Nutritional functions that maintain homeostasis: external digestion and absorption; intermediate metabolism of proteins, fats, carbohydrates, vitamins, minerals

2) Adequacy of nutrition. Established somatoscopically (general examination) and somatometrically (measuring height, body weight, abdominal circumference, shoulder, shin, sternum, fat fold thickness).

The body mass index (BMI) is the ratio of body weight in kg to the square of height in meters: BMI = body weight (kg) / height (m). Normally, it is 20-25.Having measured their weight and length, students calculate their BMI by dividing their weight in kg (P) by the square of their height in m (H). For example: P=82 kg, H=1.78 m BMI = 82 : (1.78)2 = 25.88

This BMI value indicates excess body weight for this person, since the ideal BMI is considered to be close to 21. An index of 24-25 approximately corresponds to body weightaccording to Broca's index. Below is the interpretation of BMI values. Painful exhaustion with an index of less than 16.Underweight from 16 to 19.9

Ideal weight values close to 21. Normal weight from 20 to 24.9. Overweight from 25 to 29.9. Excessive obesity from 30 to 34.9. Painful obesity over 35.

BMI does not depend on gender and is used for individuals aged 18 to 55 years.A decrease in the index below 16 is a sign of pathology.

The thickness of the fat fold is determined above the biceps, triceps, under the scapula, above the inguinal ligament.

3) Functional state of all systems

4) Vitamin status (tongue test, etc.)

5) Protein status (according to the creatinine index)

6) Alimentary morbidity (specific – obesity, protein deficiency, non-specific - gastrointestinal diseases, infectious diseases).

There are three types of nutritional status:

1. Normal (usual) – body functions are normal, adaptive reserves are maintained at a high level.

2. Optimal – a state of the body in which the stress factor has the least impact on a person due to his high non-specific resistance.

3. Unbalanced (excessive or insufficient). In this case, there is a deterioration in the body's functions, a decrease in adaptive abilities.

5.2. Evaluation of the menu layout.

Having established your ideal weight using the formula:: BMI = body weight (kg) / height (m),students begin to determine their daily requirement energy, proteins, fats and carbohydrates.

Since students in the "Norms" belong to the 1st group by work intensity, for which the physical activity coefficient (PAC) is 1.4. We find the value of the basal metabolism in a special table of "Norms" and multiply it by the PAC. The result obtained is the desired value of daily energy expenditure. Example: Let's assume that the body weight of a 20-year-old student is55 kg. In table 3 we find the value of the basic metabolism corresponding to her data. For her, this indicator is 1300 kcal. We multiply 1300 by the CFA, equal to 1.4 (1 g according to the intensity of labor, since she is a student), and we get the value of her daily energy expenditure (1820 kcal).

Using tables, the following indicators characterizing the nutritional value of the diet are calculated:

1. Energy value of the daily diet and its compliance with energy expenditure

2. Qualitative composition of the diet

The total amount of proteins, its compliance with standards, the ratio of animal and plant proteins.

Total fat content, its compliance with standards. Content of vegetable fats among all fats.

Total carbohydrate content, its compliance with standards. Ratio of proteins, fats and carbohydrates. Content of calcium, iron, phosphorus and compliance with standards. Content of vitamins A, Bl, B2, PP, C, compliance with standards.

3. Power supply mode:

Frequency of meals

Distribution of energy value of nutrients among individual meals.

The calculation technology consists of four stages.

First stage– compiling a detailed time-keeping record of a person's activities over one day (24 hours). The time-keeping record should reflect all types of a person's activities and their duration in minutes over the specified day, including sleep.

Example of timing:

24.00 – 7.30: sleep - 450 min.

7.30 – 8.00: morning exercises - 30 min. etc.

_____etc._____

Total: 1440 min. (24 hours)

Second stage– calculation of energy consumption values (energy expenditure) in kilocalories per1 kghuman body weight for each activity using tables.

Calculation example:

Type of activity	Duration min.	Energy costs kcal/min/kg	Total kcal/kg
Dream Morning exercises etc.	450 30	o,0155 0,0646	6,975 1,138

Total: (for example) 36.18 kcal/kg

Third stage– calculation of the total energy expenditure taking into account body weight.

Let's say the body mass of a given person is68 kg. Total energy consumption will be: 36.18 kcal/kg, multiplied by 68 kg = 2460.24 kcal.

The fourth stage– calculation of actual (gross) daily energy expenditure (kcal/day) using the specific dynamic action of nutrients, which increases total energy expenditure by an average of 10%.

In this example:

2460.24 +246.02 = 2706.26 kcal/day

5.3. Determining individual nutritional requirements

Knowing the daily energy expenditure, you can calculate the amount of proteins, fats and carbohydrates, the utilization of which by the body will release energy that will completely cover the daily energy expenditure.

It is known (physiologically substantiated) that 14% of all daily energy expenditure should be provided by proteins in the diet, 30% by fats, and 56% by carbohydrates.

The technology for calculating the amount of proteins, fats and carbohydrates required by the body consists of two stages:

First stage– calculation of the amount of energy in kcal that must be released during the utilization of proteins, fats and carbohydrates in the body.

Second stage– calculation of the amount of proteins, fats and carbohydrates required by the body in grams.

Calculation example:

First stage– Let's say a person's daily energy expenditure is 2185 kcal, of which:

– the share of proteins should be 14%. We make up and solve the proportion:

2185 kcal – 100%

x-14% X=_2185 x14= 305.9 kcal

100

– the share of fats should be 30%. We make up and solve the proportion:

2185 kcal - 100%

X-30%

X=_2185 x30= 655.5 kcal

100

– the share of carbohydrates should be 56%. We make up and solve the proportion:

2185 kcal - 100%

X-56%

X=_2185 x56= 1223.6 kcal

100

Second stage. Knowing the number of calories that must be released when the body utilizes proteins, and considering that 4 kcal are released when 1 gram of protein is burned, we find the individual need of the body for proteins:

305.9 kcal: 4 =76,475 gproteins

Knowing the amount of calories that must be released when the body utilizes fats, and taking into account that1 gramfats release 9 kcal when burned, we find the individual body's need for fats:

655.5 kcal: 9 =72.83 gfats

Knowing the amount of calories that must be released when the body utilizes carbohydrates, and taking into account that when burned1 gramcarbohydrates release 4 kcal, we find the individual need of the body for carbohydrates:

1223.6 kcal: 4 =305.9 g carbohydrates

Thus, in order for the body to receive 2185 kcal from the diet, it must include76,475 gproteins,72.83 g fats and305.9 g carbohydrates, while the ratio of proteins, fats and carbohydrates will be 1:0.95:4, i.e. meet the physiological needs of the body.

Control questions

1.What is the technology for calculating the amount of proteins in the daily

diet?

2.What is the technology for calculating the amount of fat in the daily diet?

3.What is the technology for calculating the amount of carbohydrates in the daily diet?

4.What factors determine the body's need for energy and essential nutrients?substances?

5.What is "basal metabolic rate"?

6.What factors does basal metabolism depend on?

7. How does a person’s basal metabolic rate change depending on age?

8.What is the role of proteins in nutrition?

9.What is the role of fats in nutrition?

10.What is the role of carbohydrates in nutrition?

Table 13. Chemical TOPIC 6. METHODS OF CALCULATING THE CHEMICAL COMPOSITION AND CALORIC CONTENT OF A HUMAN'S DAILY DIET ACCORDING TO THE MENU LAYOUT

It is known that rational nutrition should be complete in quantity and qualitative aspects. It should fully cover the energy expenditure of the human body and contain all the necessary nutrients in known proportions.

There are various ways to determine the chemical composition and caloric content of food products and diet. The most accurate is the laboratory method, when using special reagents, methods and modern equipment, they determine the amount of proteins, fats, carbohydrates, vitamins, mineral salts, and microelements in a particular product (dish).

At the same time, there are less accurate, but much simpler methods, which, however, give figures close enough to laboratory data - these are calculation methods using special tables of chemical composition and energy value of food products. The tables provide information on the percentage content of proteins, fats, carbohydrates, mineral salts, vitamins (average data from numerous studies) of a wide variety of products. Some tables contain information on their amino acid, fatty acid and microelement composition. In practice, calculation methods are used to assess the adequacy of nutrition to daily energy expenditure.

The nature of the diet is studied using a menu layout (a list of products included in the dietary dishes indicating their raw weight - gross weight, i.e. meat with bones, potatoes in their skins, percentage of waste during cooking or net weight).

6.1. The calculation technology consists of the following stages:

Drawing up a menu layout according to the menu (list of dishes for the daily diet).

Calculation of the net weight of products (i.e., the weight of the edible portion of products), while for educational purposes the percentage of waste during culinary processing can be taken as follows:

a) for meat and fish - 20%; b) for vegetables - 30%.

Bread, cereals, pasta, fats, sugar have virtually no waste, so the net weight of these products remains the same as the gross weight.

3.Using Table 13, for each meal separately (breakfast, lunch, dinner) determine the chemical composition and caloric content of all products included in the menu layout. In particular, calculate the amount of proteins, fats, carbohydrates, vitamins, mineral salts, microelements and kilocalories (kcal).

For convenience, when making calculations, the obtained data are presented in the form of a table, with two columns allocated for proteins - the total amount of proteins and, separately, for proteins from animal products (meat, fish, dairy products, eggs), as well as for fats - the total amount of fats and, separately, from plant products (vegetable oil, bread, cereals, vegetables, etc.). The results are summarized both by meals and in total for the day.

To check the correctness of their calculations, they use a simple technique that takes into accountKnowing that proteins and carbohydrates release 4 kcal/g when burned, and fats - 9 kcal/g, the total amount of proteins and carbohydrates is summed up, the resulting value is multiplied by 4, and the total amount of fats is multiplied by 9, and both figures are added together. In this case, the result should coincide with the sum of the energy value of all products in the daily diet.

composition and caloric content of products (per 100 g.)

Naimenovanie	**Proteins, g**	**Fats, g**	**Carbohydratesyea**	**Sa, mg**	**Vitamin °C", mg**	**Kcal**	**Iodine, *mcg/100 g**
Meat	18.6	16.0	0.9	9	0.7	220,0	6.9
Sausage	11.0	21.0	1.8	17	-	240.2	-
The fish is	17.0	2,2	0.4	40	1.5	89.4	460 (hake)
Salted herringnaya	7.9	2.8	0.4	80	0.8	58.0	-
Margarine	-	78.4	-	140	-	705.6	-
The oil	-	94.8	-	-	-	853.2	-
Milk	2.8	2.5	4.7	120	1.3	52.5	9.0
Sour cream	2.8	20.0	3.2	86,	0.3	204.0	7.0
Kefir	3.0	1.0	3.8	126	0.7	36.2	9.0
Cottage	16.7	9.0	2.0	164	0.5	155.8	-
Butter	0.5	78.8	0.5	18	-	713.2	"
Cheese	23.0	29.0	-	1000	1.6	353,0	-
Egg	12.7	11.5	0.7	55	0.2	157.1	20.0
Black bread	4.7	0.7	39.2	40	-	181.9	4.5
White bread	7.8	0.9	49.4	18	-	236.9	4.5
Flour	11.7	1.8	64.3	32	-	230.2	1.5
Starch	0,1	-	79.6	40	-	318.8	-
Cereals	6.5	1.5	66.5	42	-	305.5	3.0
Pastaed.	9.4	0.8	71.2	25	-	329.6	1.5

The potatoes are fresh.	2.0	0.4	17.3	10	20.0	80.8	5.0
Cabbage is fresh	1.8	0,1	5.7	48	24.0	30.9	3.0
Cabbage kvaShenaya	1.8	-	3.2	48	30.0	20.0	*
Beet	1.5	0,1	10.0	63	10.0	46.9	7.0
Zucchini	0.6	0.3	5.0	15	23.0	26.7	-
Green peas	5.0	0.2	13.0	26	25.0	73.8	8.0
Tomatoes	1,1	0.2	3.8	14	25.0	21.4	2.0
Parsley	2.6	-	6.5	245	150.4	37.0	-
Onion	1.4	-	9.0	31	10.0	41.6	-
Carrot	1.3	0,1	8.4	51	5.0	39.7	5.0
Cucumbers	0.8	0,1	3.4	23	10.0	17.7	3.0
Fresh fruits	0.4	0.4	10.4	16	6.5	46.8	5.0
Dried fruits	2.1	-	51.2	8.5	8.0	213.2	-
Sugar	-	-	98.9	-	-	395.6	

* - in 100g of edible part of the product

Calculation example

Tomorrow*To -Menu*: fried meat with mashed potatoes, bread, tea without sugar Menu layout: 2nd grade bread -200 g; meat -100 g; potato -200 g.

Name of the product and its weight (gross)	Net weight)	Quantity							
		Proteins, g		Fat, g		Carbohydrates, g	Sa, mg	Vit.C , mg	Kcal
Bread 2c,200	200	9.4	-	1.4	1.4	78.4	80.0	-	363.8
Meat, 100	80	14.8	14.8	12.8	-	0.72	7.2	0.56	177.6
Potatoes, 200	140	2.8	-	0.56	0.56	24,22	14.0	28.0	113,12
Total		27.08	14.88	14.76	1.96	103.34	101.2	28.56	654.52

Total:proteins-27.08 g, of which proteins of animal origin-14.88 g, or - 54.95%; fats-14.76 g, of which fats of vegetable origin-1.96 g, or - 13.28%;carbohydrates-103.34 g; calcium - 101.2 mg; vitamin "C" - 28.56 mg; energy content of the diet - 654.52 kcal.

TOPIC 7. HYGIENIC ASSESSMENT OF NUTRITION ADEQUACY

A balanced diet must meet the basic requirement - it must be adequate to the body's needs in quantitative and qualitative terms.

Quantitative adequacy of nutrition provides for compliance with caloric content of the diet to daily energy expenditure.

Quality adequacy of nutrition provides for the intake of all nutrients (proteins, fats, carbohydrates, vitamins, minerals) into the body with the daily diet in a balanced state and satisfaction ofthe body's needs for these substances depending on age, gender, profession, climate, etc.

Food must correspond to the enzymatic status of the organism. The diet must be followed.

Naturally, the food must be harmless and safe for organism.

All of the above constitutes the basic principles of rational nutrition.

In order to provide a quantitative and qualitative assessment of individual nutrition and scientifically substantiate recommendations for its optimization, it is necessary to have data on the daily energy expenditure of a specific person, to know his body's need for nutrients, as well as the chemical composition and caloric content of the diet being assessed.

The energy content of proteins, fats and carbohydrates in the diet should be optimal:

14% of the gross caloric content of the diet should come from protein calories,

30% – caloric content of fats,

56% – calories from carbohydrates.

The amount of proteins, fats and carbohydrates should correspond to the individual physiological needs (based on daily energy expenditure).

The composition of proteins in the diet should include proteins of animal origin (at least 50%). The composition of fats in the diet should include fats of plant origin (at least 30%). The ratio of proteins, fats and carbohydrates in the daily diet should be optimal (in our case – 1:1:4).

Distribution of daily caloric intake by meals should provide the most optimal conditions for the functioning of all systems and organs. For those working on a day shift with 3 meals a day: for breakfast – 30%, for lunch – 45%, for dinner – 25%. The content of mineral salts and vitamins in the diet should meet physiological standards (in our case, Ca – 800 mg, iodine – 2000 mcg, vitamin "C" – 70-100 mg). It is also necessary to take into account the loss of vitamin "C" during culinary processing of food products (on average – 50%). Based on the results of 3 works, a table is compiled .

Control questions

Concepts, principles and conditions of rational nutrition.

1. Definition and indicators of the nutritional status of the organism.

2. Indicators of protein adequacy of the body's nutritional status.

3. Indicators of fat and carbohydrate adequacy of the body's nutritional status.

5. 4igns and indicators of the body's provision with macroelements, microelements and vitamins.

6. Biochemical indicators of the nutritional status of the body.

7. Methodology for medical assessment of human nutritional status

9. What should be the distribution of daily caloric intake among meals?

8. What should be the ratio of proteins, fats and carbohydrates in the daily diet?

9. What percentage of your daily diet should come from protein?

10. What percentage of your daily diet should come from fat?

11. What percentage of your daily diet should come from carbohydrates?

12. What is the average daily requirement of an adult for proteins, fats and carbohydrates (in grams per kg of body weight) to compensate for the basal metabolic rate?

TOPIC 8. METHODOLOGY OF EXPERT EVALUATION OF FOOD PRODUCTS AND FINISHED

Dishes based on the results of their laboratory analysis

8.1. Hygienic examination of food products and prepared meals is carried out:

periodically, on a planned basis; sporadically, during raid inspections of food service facilities, public catering establishments; urgently, in cases of food poisoning, diseases of alimentary etiology, in case of gross violation of the sanitary regime of food facilities (canteens, cafes, restaurants, hospital food service facilities, etc.)

The purpose of hygienic examination of food products may be: determination of the commercial quality of products; registration of certificates; detection of counterfeiting; violations of the chemical composition of products; control of product expiration dates; determination of the degree of spoilage of products during their storage and the possibility of subsequent storage; determination of the epidemiological and toxicological hazard of products (microbial contamination, contamination with pesticides, other toxicants, storage pests, mold, etc.); determination of the degree of harmfulness of containers, utensils, equipment, inventory, etc.

Methods of sampling for laboratory analysis depend on the type of product (bulk, liquid, individual samples in containers, without containers, etc.). An average sample is prepared, reflecting the quality of the entire batch of food.

Bulk and solid food products (cereals, grain, flour, solid fats, etc.) are selected with special probes, knives (Fig. 1), scoops from different places of the container or batch of food (up to 10 samples, from which an average sample weighing up to is obtained by mixing).1 kg).

Liquid and soft food products are first mixed (with a slotted spoon, by shaking), and then taken from different containers and batches of the product, obtaining an average sample.

Closed canned products are selected from the batch one by one, first of all, suspicious ones - swollen (bombed) cans, canned goods in damaged containers.

Meat samples are taken by cutting from the carcass (half carcass) and with the obligatory selection of bones and joints.

Bulk, solid products without containers and individually are collected in polyethylene bags, liquids - in glass containers. Samples must be sealed and stamped. A sampling report is drawn up, which is signed by the person who collected the sample and the responsible person of the food facility. An accompanying form is attached to the sample, which contains the passport data of the food facility, the weight or number of samples, the purpose of the laboratory study, the address of the laboratory where the sample is sent, the date and time of sampling, the signature of the person who collected the sample.

Organoleptic studies of food products (and prepared meals) do not require special equipment and therefore can be carried out not only in the laboratory, but also at the food facility itself during sampling.

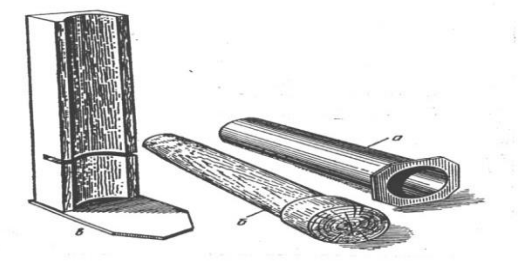


Fig. 2. Zhuravlev's cylindrical knife for sampling bread

First, it is necessary to familiarize yourself with the documentation of the food facility, with the invoices, certificates for the food batch, the delivery date. Then, they inspect the storage conditions, processing of products, the presence of refrigerators, the sanitary condition of the facility, the condition of the container, the marking (shelf life and product sales, etc.).

They study the appearance of the product samples (in daylight), their color, shades, as signs of staleness, spoilage or falsification, suspicious inclusions, spots that are distinctive from the color of the product, etc. Using a magnifying glass, they identify the presence of barn pests, finns, and with a compressorium - trichinella larvae (Fig. 3, 4.5, 6).

Consistency is determined by palpation - by pressing on the product (bread pulp, meat). In fresh products the pit straightens out, in stale products it remains. Fresh food products have a pleasant, specific smell, in stale products it is unpleasant, even putrid. A number of products in fresh form should have no smell at all. Taste is determined last of all, having made sure that the product is safe. If there is a suspicion of spoilage or contamination by microbes, toxic substances, taste is not determined.

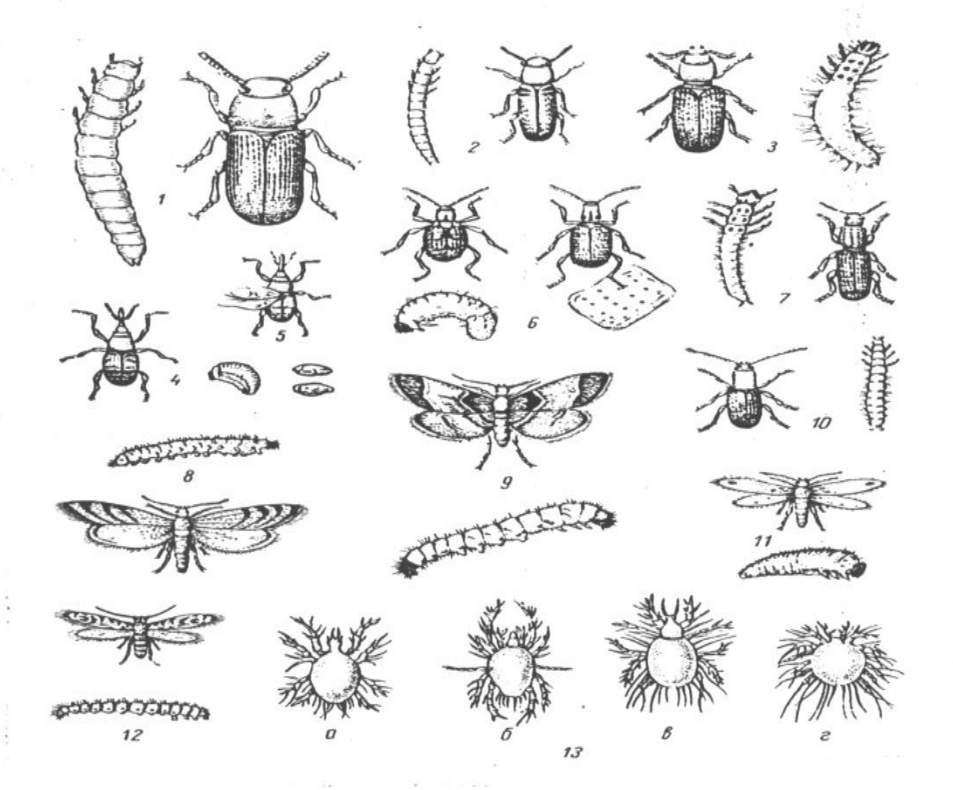
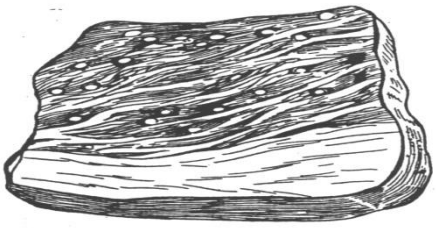


Fig. 3. Granary pests and their larvae

(1 - large flour beetle; 2 - Suriman flour beetle; 3 - small flour beetle; 4 - granary weevil; 5 - rice weevil; 6 - pea weevil; 7 - red flour beetle; 8 - grain moth; 9 - flour moth; 10 -pretender thief; 11 – grain moth; 12 – mill moth; 13 – flour mites).



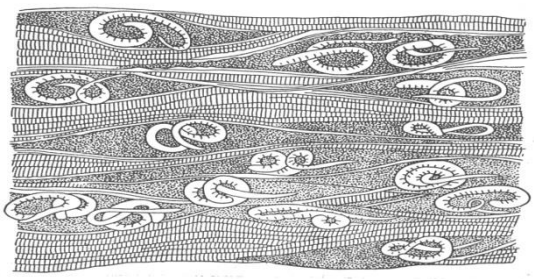


Fig. 4. Meat affected by Finns Fig. 5. Trichinella embryos in pork (embryos of the pork or beef tapeworm)

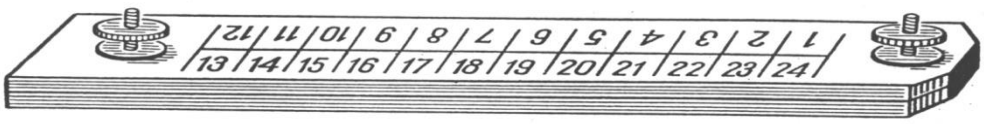


Fig. 6. Compressorium for detection of Trichinella larvae in pork.

Sometimes hearing is used to assess the quality of a product: they determine the splash in tin cans when they are not full enough, the absence of hissing in carbonated drinks, the presence of hissing during fermentation of the starter, etc. During organoleptic studies in the laboratory, they also use trial cooking of broths from the products being studied, primarily meat.

8.2. Laboratory studies of nutritional value, commercial quality and freshness food products

Among the integral indicators of food product quality, the following are determined:

– humidity, by drying or distillation to a constant mass of a pre-weighed sample; and liquid products - using hydrometers, lactodensimeter (milk) (Fig. 6).

– dry residue – also by drying, determining the specific gravity with a hydrometer or calculating by humidity.

– ash residue – burning of dry residue to light-gray ash of mineral substances.

The protein content of a food product or a ready-made dish is determined by the total nitrogen content of the product, which is determined using the Kjeldahl or Lowry method (set out in special manuals). The amount of protein is determined by multiplying the amount of nitrogen by a factor of 6.25.

The fat content in products is determined by the classical Soxhlet method by extracting fat from a sample of the product with ether in a Soxhlet apparatus or by other methods, also described in special methodological and educational manuals, and in milk - using a butyrometer (Fig. 7). Carbohydrates in food products (mono-, di-, polysaccharides) are determined by the iodometric method, by their inversion, by hydrolysis. Details of the methods are also described in the relevant manuals.

In laboratory analysis of canned vegetables, milk, and prepared meals, in most cases the content of vitamins and, first of all, ascorbic acid and carotene is determined.

Mineral salts and microelements are usually determined for special purposes (for example, for scientific purposes).

Specific indicators of quality, freshness, epidemiological and toxicological contamination of food products are determined taking into account the type of product and the indicators corresponding to it.

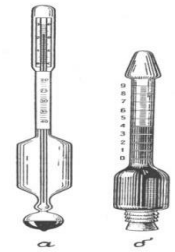


Fig. 7. Lactodensimeter (a) – a device for measuring the density of milk, butyrometer (b) – a device for determining the fat content of milk

TOPIC 9. RESEARCH METHODS AND HYGIENIC EXPERTISE OF COW'S MILK

One of the most important and widely used products of animal origin is cow's milk, which, due to its biological and nutritional properties, is considered one of the most valuable food products for all groups of the population. It is especially important in the nutrition of children, the elderly, and in dietary nutrition. Milk contains all the necessary nutrients that are well absorbed by the body. It contains proteins (an average of 3.2%), represented by casein, albumins,

globulins (including immunoglobulins); emulsified fats (3-4%); carbohydrates (primarily a disaccharide capable of suppressing putrefactive flora in the human intestine - lactose - about 4.5-4.8%); mineral salts and microelements, including easily absorbed forms of calcium and phosphorus in a favorable ratio; fat- and water-soluble vitamins, as well as enzymes (phosphatase, peroxidase, reductase). At the same time, milk is a perishable product, an excellent environment for the development of microorganisms, including pathogenic ones, which can get into milk from animals and people, so it can cause mass diseases and food poisoning (staphylococcal toxicosis). Some infectious diseases are transmitted with milk from sick animals (anthrax, brucellosis, tuberculosis, foot-and-mouth disease, Q fever, leukemia, mad cow disease, etc.). Milk is subjected to special treatment at dairies, in particular, pasteurization (heating at a temperature of 60-70 0C), while vegetative forms of bacteria die, and the natural properties of the product are preserved better than when boiling. Dairy enterprises produce pasteurized milk of varying fat content and other dairy products. It should be noted that milk is easily falsified (fat removal, dilution with water, addition of starch, soda, etc.). Milk must comply with the requirements and standards of GOST R 52090 - 2003 "Drinking milk. Technical conditions".

When examining the quality of cow's milk, a hygienic assessment is given of organoleptic, physicochemical and microbiological indicators.

To characterize the organoleptic properties of cow's milk, its appearance, color, smell, taste, and consistency are assessed and the degree of fur environmental pollution.

Appearance is assessed by examining milk in a transparent vessel; homogeneity, the presence of sediment, contamination and impurities and their nature are noted. The color is determined on a white background in a cylinder of colorless glass or a beaker, into which 50-60 ml of milk is poured after shaking. Normal fresh milk should be white with a slight yellowish tint. A pinkish color is usually associated with an admixture of blood, with the composition of feed, the use of medicinal substances (rhubarb) or with the development of pigment-forming bacteria. A bluish tint indicates dilution with water or fat removal.

Consistency is determined after shaking the milk by the trace left on the walls of the flask or the nail of the thumb where a drop of milk is applied. With a normal consistency, a white trace remains. Diluted milk quickly flows down without a trace. With the development of mucus-forming bacteria in milk or the presence of colostrum in it, its consistency can be slimy or viscous. The smell is determined in a beaker or conical flask. 25-50 ml of milk is covered with a watch glass after heating to room temperature and shaking. Fresh milk has a slightly specific smell. When souring, a sour smell appears. The development of putrefactive bacteria causes the smell of ammonia, hydrogen sulfide. Storage and transportation of milk near strong-smelling substances leads to the appearance of foreign odors (soap, kerosene, fish, oil, perfume, etc.).

Taste is determined with a small amount of milk. Good-quality milk has a pleasant, slightly sweet taste. The presence of foreign tastes (bitter, salty, rancid, soapy, fishy) is caused by the composition of the animal's feed, its illness, lactation

period (colostrum, old milk), contamination of milk with impurities, improper collection and storage.

The main defects of cow's milk and their possible causes

Vices	Probable causes
	Consistency defects
Mucous (traction)what)	Mucus-forming lactic acid and putrefactive microorganisms, admixture of colostrum, mastitis in animals.
Foamy	Bacteria from the coli group, yeast, butyric acidfermentation.
Watery	Dilution with water, thawing of incorrectly frozen milk, predominance of watery feeds in the diet of animals.
	Color defects
Bluish and Bluish	Pigment-forming microorganisms, dilution with water,fat removal, storage in galvanized containers, feed pigments.
Richly Yellow	Pigment-forming microorganisms, colostrum admixture, medications (rhubarb, etc.), feed pigments (bison grass, etc.)
	Defects of smell
Ammonia	Coliform microorganisms, long-term storage in closed containers
Smoky	Violation of pasteurization technology and preparation of "frying" dishes
Fish	Hydrolysis of lecithin to form trimethylamine, odor absorption due to improper storage (near fish), excessive addition of fishmeal to animal feed
Putrefactive	Putrefactive microorganisms
Musty	Microbiological processes during storage of milk in closed vessels
	Defects of taste
Bitter	Putrefactive bacteria, potato and hay bacilli, yeast, admixture of colostrum, medicinal substances (sabur, rhubarb), feed admixtures (wormwood, field mustard, onions, etc.).
Rancid	Rancidity of the fat system of milk under the influence of lipolytic enzymes of microorganisms, bacteria of butyric acid fermentation, exposure to direct sunlight, high air temperature
Soapy	Addition of soda, presence of horsetail in animal feed, tuberculosis of the udder
The taste of feed	Turnip, radish, garlic-onion, beetroot, etc.
Metal	Storage in poorly tinned containers, giving animals water with high iron content
Brackish	Colostrum admixture, mastitis, udder tuberculosis, dilution with highly mineralized water

Degree of mechanical contamination (purity) of milk is determined using the "Record" device, which is a milk bottle without a bottom, on the neck of which a metal mesh with a tight seal is put on, a cotton or flannel filter is first placed on the mesh (Fig.). The device is fixed on a tripod (or held by hand) with the narrowed part with a cotton filter held by a metal mesh down, and 250 ml of well-mixed milk heated to 35-40 0C is filtered. The filter is carefully removed, dried and compared with standard standards characterizing the degree of contamination of milk with mechanical impurities. Depending on the amount of impurities on the filter, milk is divided into three groups (according to the standard)

To the first group refers to milk of impeccable purity, when there is no filter detect particles of mechanical impurities. The second group includes milk, after filtration of which individual particles of impurities remain on the filter. The third group includes milk, after filtration of which a significant number of particles of mechanical impurities in the form of sand, particles of hay, hairs, etc. are detected on the filter (Fig. 8). According to the standard, bottled milk (or milk in other sealed packaging) must correspond to the first degree of purity, flask milk (or milk from a barrel) - not lower than the 2nd degree of purity.

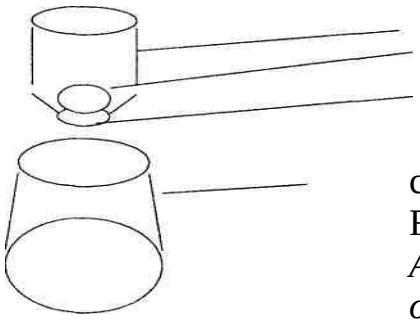


Fig.8. Schematic diagram of the "Record" device

According to GOST, milk must have the following organoleptic propertiessva: appearance and consistency: homogeneous, without sediment; taste and smell: without foreign tastes and smells not typical of milk; color: white, with a slightly yellowish tint; for baked milk with a creamy tint, for skimmed (low-fat) with a slightly bluish tint; degree of purity: first. (Table 15).

Table 15. Milk quality indicators

Indicator	Standard for the variety		
	Higher	First	Second
Acidity, degrees Turner, not more than	16-17	19	20
Degree of purity according to the standard	I	I	II
Bacterial contamination, thousand/cm3, no more than	300	500	3000
Somatic cell count, thousand/cm3, no more than	400	600	800
Mass fraction of dry matter, %, not less than	11.8	11.5	10.6
Dry fat-free residue, %, not less than	8	8	8
Specific gravity of milk, g/cm3	1,028-1,033	1,028-1,033	1,028-1,033
Fat content, %, not less than	3.2	3.2	2.5

Note: In order to detect adulteration in milk, the presence of soda, borax (used to hide increased acidity), starch and flour (to hide fat removal) is determined.

To characterize the physicochemical properties of milk, a study is conducted of its density (specific gravity), fat content, acidity, amount of dry matter (residue

after evaporation), admixture of soda and starch or flour, a pasteurization test is carried out, etc.

Density (specific gravity) milk is determined at 20°C with a special milk hydrometer with a thermometer in its upper part – a lactodensimeter. In the middle, dry in its lower part there is a scale with divisions from 20 to 40, which correspond to the last two digits of the density, for example, the number 29 means a density of 1.029.

400 ml of thoroughly mixed milk is poured into a clean and dry 500 ml graduated cylinder (avoiding foaming), the cylinder with milk is placed on a horizontal surface and carefully, holding the lactodensimeter by the upper part, the device is immersed in it up to the 30 mark so that it does not touch the walls, after which the lactodensimeter is released. After 5 minutes, the lactodensimeter readings and the temperature of the milk are recorded. Due to the fact that the density of milk is determined at a temperature of 20°C, a correction of 0.0002 is introduced for each degree of temperature difference. If the temperature of the milk is higher than 20 degrees, then the correction should be added to the obtained density readings, if lower, then subtract it. For example, the density at 15°C was 1.030, then the true density at 20°C will be equal to 1.030 - (20-15) • 0.0002, i.e. 1.029.

Fat content in milk (%) is determined using a device – a butyrometer (oil meter), the narrowed end of which is graduated and has divisions from 0 to 6, each large division corresponds to 1%, small - 0.1% fat.

In the acid-free method, 8 ml of 10% soda solution, 10 ml of milk, 3-3.5 ml of alcohol mixture (1 part amyl and 6 parts ethyl alcohol) and 2-5 drops of phenolphthalein are poured into the butyrometer, trying not to wet the neck. The device is carefully closed with a special rubber stopper, the contents are shaken well until the mixture is completely transformed into a homogeneous liquid and placed with the stopper down in a water bath for 5 minutes at a temperature of 65-70° C. After this, the butyrometer is centrifuged for 5 minutes in a special milk centrifuge, placing the butyrometer in the cylinder socket with the graduated end down. Then it is carefully removed, holding the stopper down, placed again for 4 minutes in a water bath at the above temperature and readings are taken, holding the butyrometer vertically in the left hand against the light, and with the right, screwing or unscrewing the stopper, setting the fat column on the lower border of the narrowed part of the device.

In practice, the Gerber method is more often used to determine fat in milk. Using concentrated sulfuric acid and amyl alcohol. 10 ml of concentrated sulfuric acid, 10.77 ml of milk (carefully pouring it down the walls into the butyrometer, which must be kept in a towel to avoid burns to the skin of the hands from the mixture heated in the device), 1 ml of amyl alcohol are poured into the butyrometer using a special Mironenko device (automatic pipette). Then the device is tightly closed with a special rubber stopper, the contents are thoroughly mixed, holding the stopper. The liquid in the butyrometer after mixing should be transparent, brownish. Dark brown or even black color of the liquid indicates a very high concentration of sulfuric acid. Light or cloudy liquid indicates insufficient

concentration of the acid. In both cases, the results of the determination will be inaccurate.

Carefully opening the cork releases the gas bubbles that have formed in the mixture. During the reaction, the device is tightly closed with a stopper again, kept in a water bath at a temperature of 65-70°C for 4-5 minutes, centrifuged in a milk centrifuge, and the fat concentration is determined in the narrowed part of the butyrometer, as in the acid-free method.

Milk acidityis determined in Turner degrees. 10 ml of milk is poured into a 100 ml flask, 20 ml of distilled water and 3-4 drops of 1%phenolphthalein solution. Titrate from a burette with 0.1 N sodium hydroxide solution until a slightly pink coloration does not disappear within 1 minute. The resulting value is multiplied by 10, since acidity in Turner degrees is determined by the amount of 0.1 N alkali solution used to titrate 100 ml of milk.

The amount of dry matter is determined using the Farrington formula:

$$C = \frac{(4.9\ F) + P}{4} + 0.5$$

; where: C is the amount of dry matter, %; F is the fat content, %; P is the density of milk in degrees of lactodensimeter (the last two digits of the true density of milk at 20 °C); 4.9; 4 and 0.5 are empirical coefficients.

Pasteurization test. It is carried out according to the Roy and Keller reaction: 5 drops of iodine-potassium starch are added to 2 ml of milk in a test tube (3 gstarch is boiled with 100 ml of water and added 3 g potassium iodide), shake thoroughly until add 1 drop of 2% hydrogen peroxide and shake again. Raw milk immediately colors the contents of the test tube dark blue. Milk heated above 80°C does not change color for 1-2 minutes.

The pasteurization test is also carried out with cream, kefir and other dairy products.

Reductase test. This is an indirect indicator of the freshness of milk. Milk contains the enzyme reductase, produced by milk microflora, is produced, which has the ability to decolorize the methylene blue solution. To determine the amount of reductase (and, consequently, the number of microflora), 20 ml of milk and 1 ml of methylene blue solution are poured into a sterile test tube, mixed, placed in a thermostat at a temperature of 37 ° C or in a water bath. Observe the decolorization for 2 hours. Milk of satisfactory quality should not decolorize the methylene blue solution earlier than 2 hours. If decolorization occurs within 20 minutes to 2 hours, such milk is assessed as poor, containing from 4 to 20 million bacteria in 1 ml. If decolorization occurs within 20 minutes, such milk is assessed as very poor, containing more than 20 million bacteria in 1 million, and is not allowed for sale to the population.

Reaction to soda admixture.5 ml of milk and 5 drops of 0.2% solution of rosolic acid in 96% alcohol are poured into a test tube. The contents are shaken. Milk containing soda is colored pink, if it is absent, it is slightly yellow.

Admixture of starch or flour.10 ml of milk is poured into a flask and brought to a boil. After cooling, a few drops of Lugol's solution are added. The appearance of bluecoloration indicates the presence of starch.

According to GOST, regular pasteurized milk must have the following physical and chemical properties:

– temperature: no more than 8 degrees;

density: 1.024-1.037;

fat: 2.5%-3.2%; 6%:

acidity: 20 - 21 degrees Turner (for protein milk - 25 degrees);

amount of dry residue in natural milk: 12-12.5%; a) in milk 2.5% fat: not less than 9.75%; b) in milk 3.2% fat: not less than 10.59%. the presence of soda and starch is not allowed; phosphatase is absent.

Diseases transmitted through contaminated milk and dairy products

Contaminated food products can cause both single and multiple diseases. Therefore, food-borne infectious diseases can be both sporadic and outbreak-like.

Most often, food epidemics occur when consuming contaminated milk. The high epidemiological danger of milk and dairy products is explained by the following circumstances:

– being a liquid substance, milk becomes infected with the pathogen throughout its entire volume;

– milk is a good nutrient medium and already at a temperature of 18-20 degrees C, a fairly intensive reproduction of a number of pathogenic microorganisms begins in it.

In terms of the emergence of anthroponotic intestinal infections, secondary infection of milk is the most dangerous. Obtained from healthy animals, but contaminated during collection, transportation, and processing, it often becomes a factor in the spread of shigellosis, typhoid fever, and paratyphoid fever, and the emergence of staphylococcal toxic infection. Raw milk that has not undergone heat treatment, obtained from sick animals, can serve as a factor in the infection of tuberculosis, brucellosis, and tick-borne encephalitis.

Control questions

1. What is milk?
2. What is the composition of cow's milk?
3. What is the protein concentration in cow's milk?
4. What is the composition of cow's milk proteins?
5. The role of milk in the nutrition of the population, including children.
6. List the main nutrients found in milk (chemical milk composition),
7. Is milk an easily or difficult to digest food?
8. Causes of bacterial contamination of milk.
9. What animal diseases can be transmitted through milk?
10. Milk from which sick animals is subject to destruction?
11. Milk from which sick animals is suitable for consumption after appropriate treatment?
12. What diseases are transmitted through milk from sick people or bacilli carriers?telev?
13. What measures are aimed at preventing milk-borne diseases?
14. The importance of fermented milk products in the nutrition of the population, including children.

15. List and describe the organoleptic and physicochemical properties of milk.
16. What is milk adulteration?
17. What is the purpose of adding soda to milk?
18. How to determine the presence of soda in milk?
19. Is it possible to consume milk with soda added to it?
20. For what purpose is starch added to milk?
21. How to determine the presence of starch in milk?

TOPIC 10. RESEARCH METHODS AND HYGIENIC EXPERTISE MEAT QUALITIES

Meat is one of the main food products. It is usually not accepted is given. Meat consists of muscle, fat, connective, bone tissue and blood of slaughtered animals and poultry.

The chemical composition of meat is represented by proteins (14 - 20%), fats (3-14%), and carbohydrates waters (glycogen - up to 1%), vitamins (B1, B2, B6, B12, PP), minerals (phosphorus, iron, etc.), microelements (copper, zinc, cobalt, etc.), extractive substances.

The most important nutritional and biological value is muscle tissue, which contains complete proteins (myosin, actin, globulin). The proteins include besides replaceable ones - all essential amino acids.

Adipose tissue contains mainly saturated fatty acids. The composition of fat. The tissue contains phosphatides, lipoproteins, zoosterols, fat-soluble vitamins - A, D, E, K.

Meat is easy to heat treat and can be used to prepare many different products (sausages, smoked meats, etc.) and dishes.

During the processing process, the meat undergoes veterinary and sanitary control and is branded.

After slaughter, carcasses are usually placed in refrigeration chambers, where they are cooled and matured. Maturation is a complex physical and chemical process that occurs in meat under the influence of its enzymes. As a result of maturation, the meat becomesbecomes softer, acquires taste and a specific aroma.

At the same time, meat as a food product has a number of disadvantages. First of all, it belongs to the category of perishable products. Meat can be a source of infectious diseases (anthrax, brucellosis, foot-and-mouth disease, tuberculosis, glanders, salmonellosis, etc.), food poisoning (botulism), helminthic invasions (tennidiasis, trichinosis, echinococcosis).

In this regard, a sanitary examination of meat is necessary. It consists of an assessment of organoleptic indicators, physicochemical, bacteriological and helminthological research.

The organoleptic properties of meat are assessed based on the information in Tables 16 and 17.

Of the physicochemical studies, the following are used: Andrievsky's test, determination of the concentration of hydrogen ions (pH), a test for the presence of

pyroxidase, bound ammonia. A bacterioscopic study of meat is carried out - determination of microorganisms on the surface and in the depth of meat according to GOST 23392-78 "Meat. Methods of chemical and microscopic analysis of freshness". They determine the presence offinn in meat, as well as trichinella (using a trichinelloscope), while examining the root of the tongue or the legs of the diaphragm. Test cooking of meat is carried out, the properties of the broth are assessed, etc.

Table 16. Characteristics of fresh meat, meat of questionable freshness and stale meat (GOST 7269-79 "Methods of sampling and organoleptic methods for determining the freshness of meat")

Signs	Fresh	Suspicious freshness	Spoiled
Appearance	The meat has a dry surface with a drying crust. The color on the surface and on the cut is characteristic for the type of animal, from pink (pork) to dark red. The cut surface is slightly moist, not soft. The juice is clear	The surface is covered with a dark weathered crust or mucus, sticks to fingers. The cut surface is sticky to the touch	The surface of the muscles is very dry or very wet. Dull gray or greenish color. There is mold. When cut, the meat is dark in color, the juice is cloudy
Consistency	Dense, elastic, the pit quickly evens out when pressed with fingers.	Softened, slightly elastic, pit at pressure equalizes slowly	Soft, sometimes astringent. The pit when pressed is deep
Smell	Specific to fresh go meat	Slightly putrefactive on the surface, felt on the cut near the bone. Absent on the cut in the deep layers	Smell from the surface and in the deep layers sour, musty or putrid
Fat	Cattle, white or yellow in color, crumbles when crushed. Pork - soft, elastic, white or pink. Smell of burnt absent	Grayish with a matte shade, smears when crushed. Smell of aged or slightly salted fat	Gray with a dirty tint. Its smell rancid or strongly nauseating

17. Quality indicators of meat and fish

Indicators	Meat	Fish
Appearance, color	Pale pink crust drying, moist, not sticky	Shiny, close-fitting scales, bulging, transparent eyes, pink meat, moist gills but without mucus
Consistency	Flexible, the dimple quickly straightens out when pressed	Flexible, the dimple quickly straightens out when pressed
Smell	Pleasant, characteristic of each animal species	Characteristic ("fishy"), but not putrid
Fat	White, yellowish color, solid consistency, no smell of rancidity or oxidation	White, soft, with a "fishy" smell, almost does not smudge
Bone marrow	Yellow, elastic, fills the lumen of tubular bones, does not peel off from the bone walls	-
Tendons, joints	Elastic, dense. Articular surfaces are smooth, shiny.	The muscles near the spine are not blackened
Broth during cooking	Transparent, without flakes, with a pleasant smell and taste. Fat on the surface - in large drops	Transparent, with large drops of fat on the surface, with a pleasant characteristic smell
pH (by litmus)	5.8-6.4 (but not more than 6.7)	-
Ammonia	Ammonium chloride (ammonium chloride) – no more than "++"	-
Hydrogen sulfide	Lead sulfide (lead sulfide) – should not be present, if present – brown color	-
Reaction with benzidine	Blue-green color - fresh meat	-
Reaction with copper sulfate	The broth is clear, without flakes.	-
Trichinella	0 in 24 meat cuts	If there are helminth embryos, the fish is rejected.
Finns	No more than 3 per 40 cm2 of cut	If there are helminth embryos, the fish is rejected.

Diseases, transmitted to humans through meat

HelminthiasisThe consumption of meat is associated with the occurrence of certain helminthiases in humans: taeniasis, trichinosis, echinococcosis, fascioliasis.

Taeniasis(finnosis) can occur in humans from eating meat infected with tapeworm larvae: beef and pork tapeworm. The larval forms of these helminths are called cysticerci or finns. Finns are transparent bubbles of a round or oval shape, located in the interfibrillar connective tissue of skeletal muscles, and can often be concentrated in the muscles of the heart, tongue, diaphragm, lumbar, and intercostal muscles.

When eating untreated finnose meat, a sexually mature form of the tapeworm develops in the human intestine, reaching several meters in length. One of the frequent complications of taeniasis is the development of malignant anemia. The helminth's body contains a significant amount of cobalt coming from the human intestine, which disrupts the endogenous synthesis of vitamin B12.

If more than three finns (live or dead) are found in a carcass or organs over an area of 40 cm2, the carcass and all by-products containing muscle tissue are subject to technical disposal. If no more than three finns (live or dead) are found in the same area, the carcass and all by-products containing muscle tissue are subject to rendering harmless by boiling, freezing or salting. Rendering harmless of meat containing finns can be done by boiling in pieces weighing no more than2 kg, thickness up to8 cmin open boilers for 2 hours, in closed boilers – for 1.5 hours (at a steam pressure of 1.5 atm).

Trichinosis- a disease caused by the larval form of a small round helminth. When eating trichinellosis meat, the larvae in the human intestine turn into sexually mature forms in 2-3 days. Already 5 days after consuming infected meat, fertilized females give birth to larvae directly in the lymphatic vessels of the intestinal mucosa, from where the larvae enter the blood through the thoracic duct and then into the muscles.

Severe forms of trichinellosis occur most often when eating raw or undercooked pork products that are heavily infested (up to 6,000 trichinella in 1 g).

If even one trichinella is detected during trichinoscopy, the meat is rejected and sent for technical disposal.

Echinococcosis– a disease that occurs as a result of damage to parenchymatous organs, most often the liver, by the larval form of a small helminth – Echinococcus granulosis. The final hosts of these parasites are dogs and some predatory animals, intermediate hosts are cattle and small cattle, pigs, less often rodents and humans.

In case of massive echinococcosis of the muscles and organs, the carcass and organs are subject to technical disposal or destruction. In case of partial damage, only the affected parts of the carcass or organs are subject to technical disposal.

Fascioliasis– a disease of animals, consisting of damage to the liver (bile ducts) by the helminth Fasciola hepatica (liver worm). After excision of the altered parts, the liver and lungs can be used for food, since adult forms and eggs of fasciola do not pose a danger to humans.

Infectious disease s(anthrax, foot and mouth disease, brucellosis, tuberculosis, etc.) can also be transmitted through animal meat.

If anthrax is detected in an animal carcass, urgent emergency measures must be taken to immediately eliminate the infection on site (disinfection, destruction and rendering harmless the carcass, burning manure, etc.), as well as urgent measures to localize the infection and stop contacts (quarantine, etc.) of persons involved in slaughtering animals and skinning.

When carrying out a sanitary assessment of meat obtained from tuberculous animals, the following provisions are followed:

- In the case of generalized tuberculosis with signs of exhaustion, the entire carcass and organs are not allowed for food purposes and are subject to technical disposal.
- In the absence of exhaustion in the generalized form of tuberculosis, the use of meat for food purposes is permitted after thorough cooking.
- In the case of localized tuberculosis, only the affected organs and tissues are subject to destruction; healthy parts of the carcass are allowed for food purposes without restrictions.

Carcasses of all animals with clinical or pathological signs of brucellosis are considered conditionally suitable and after careful heat treatment they do not pose a danger to human health.

The meat of animals infected with foot-and-mouth disease is sent for processing into cooked sausages, canned goods and other products rendered harmless by boiling.

Meat and offal of pigs infected with plague are not used raw. If salmonella is found in meat or organs, the meat is boiled and used for canning, internal organs are destroyed or subjected to technical disposal.

If the bacteriological test is negative, raw meat and internal organs are allowed to be sold for food purposes only after being rendered harmless by boiling. Intestines and blood are sent for technical disposal in all cases.

Control questions

1. The role of meat in the nutrition of the population, including children.
2. Name the main nutrients that are part of meat (chemical composition)-(stav).
3. What is the digestibility of meat?
4. What proteins are found in meat?
5. What is the process of meat maturation?
6. What fats are found in meat?
7. What diseases can be transmitted through meat?
8. What minerals are found in meat?
9. What vitamins are found in meat?
10. What extractive substances are included in the composition of meat, their physiological functionstions?
11. The meat of which animals is considered conditionally fit?
12. What helminthiases can be transmitted through meat?
13. Can diphyllobothriasis and opisthorchiasis be transmitted through meat?
14. What kind of meat is rejected based on helminthological indicators?
15. What indicators are used to assess the freshness of meat?
16. Describe the organoleptic properties of fresh meat.

17.Describe the organoleptic characteristics of meat of suspicious freshness.
18.Describe the organoleptic properties of stale meat.
19.What does the hot knife test give?
20.Describe the results of a trial cooking of fresh meat.
21.What is Andrievsky's test based on, what is its result for fresh meat?
22.What is the reaction of fresh meat and how does it change when it spoils?
23.What does a positive test for ammonia in meat filtrate mean?
24.How are positive and negative peroxidase tests assessed?
24.How are positive and negative copper sulfate tests evaluated?
25.How is bacteriological testing of meat carried out?
26.How is helminthological examination of meat carried out?
27.What document regulates the quality of meat and meat products?
28.What foods and meats are considered "perishable"?
29.What animal meat is the source of trichinosis infection in humans?
30.What areas of the meat carcass are examined for the presence of Trichinella?
31.What device is used to detect the presence of trichinella in meat?
32.The role of fish in the nutrition of the population, including children.
33.Features of fish muscle tissue proteins.
34.The presence of which amino acids in fish proteins allows fish to be considered a product,necessary in baby food?
35.Features of fish fats.
36.Features of the mineral composition of fish muscle tissue.
37.What diseases and helminthiases are transmitted to humans through fish?

TOPIC 11. RESEARCH METHODS AND HYGIENIC EXPERTISE OF FLOUR QUALITY

Flour is a product of grinding (crushing) grain of bread cereals. The amount of flour obtained from grinding 100 weight parts of grain is called "yield", which is expressed as a percentage. The lower the flour yield, the more the grain is freed from the germ, peripheral parts and crushed, the less biologically active substances, vitamins, minerals, microelements, cells in the flour.chatki, etc. But the digestibility and caloric content of flour increases with a decrease in the "output" (Table 18).

Table 18. The most common types of flour have the following yield:

Wheat	Exit, %	Rye flour	Exit, %
semolin	10	baked	60
top	25	seeded	63-65
1st	72	peeling	85-87
2nd	85	wallpaper	95-96.5
wallpap	97.5		

Depending on the type of grain and the percentage of flour yield, the protein content in wheat and rye flour ranges from 6.9 to 12.5%, carbohydrates - from 68

to 76.5%. Fat -*from 0.9 to 1.9%*,moisture - from 13 to 15%, ash (mineral substances) - from 0.5 to 1.5%.

The organoleptic properties and chemical composition of flour depend ondepending on the type of cereal, the quality of the grain, the degree of its grinding, shelf life and the presence of impurities.

An important indicator of the freshness, quality and baking properties of flour isgluten is a special protein insoluble complex that gives the dough elasticity and flexibility. High-quality wheat flour contains more than 25 - 30% gluten. The higher the grade of flour, the more gluten there is. Rye flour has less gluten and therefore does not have high baking properties.

When examining the quality of flour, an assessment is made of its organoleptic and physicochemical indicators (GOST 26574-85 "Wheat flour, bakery").

Color of flour*evaluate*as follows. A small amount of flour (5 -10 g)a thin, even layer (no more than 3-5 mm) poured onto black paper and determine the color, presence of foreign inclusions. Each type and grade of flour has its own color. Thus, wheat flour of grades 1 and 2 has a yellowish-white color, wholemeal flour is white with a yellowish or grayish tint, particles of shells are visible; rye flour is usually grayish-white.

To determine the smell flour is placed on the palm or clean paper, warmed with breath and the smell is determined. To enhance it 15-20 gflour is placed in a glass, pouredhot water, shake and cover the glass with glass. After 2-3 minutes, drain the water and determine the smell. Fresh, high-quality flour has a pleasant, very weak specific smell. Musty, sour, moldy, wormwood or other foreign smells indicate a poor-quality product. To characterize the taste, a pinch of flour is slowly and thoroughly chewed, paying attention to the taste and the presence of crunch. High-quality flour has a pleasant, slightly sweet taste, without crunching on the teeth, without bitter, sour or other tastes.

Table 19. Quality indicators of grain products

Indicator	Cereals	Flour
Humidity, %, not more than	14-15.5	15
Ash content, %, within limits	0.65-2.25	0.6-2.0
Contamination, %, no more than	0.2-0.5	0.2-0.5
Spoiled grains, %, no more than	0.2-0.4	-
Harmful fungi, %, not more than: - ergot, smut - bitterling, elm - cockle - heliotrope	 0.05 0.02 0,1 not allowed	 0.05 0.02 0,1 not allowed
Mineral impurities (earth, sand, glass), %	0,1	0,1
Iron filings, %, not more than	0.3	0.3
Ticks, insects	not allowed	not allowed
Acidity, degrees, no more	-	2.5-6
Gluten, %, not less than	-	25-30

To characterize the physical and chemical indicators, studies are conducted on the moisture content of flour, its acidity, gluten content, the presence of foreign impurities and contamination with granary pests.

Other characteristics of flour (Table 19).

Determination of humidity. Flour in quantity5 gplaced in a pre-dried and weighed metal cup (weighing bottle) with a lid placed underneath. Then the open weighing bottle with a lid placed underneath (write down its number) is placed in a drying cabinet at a temperature of + 105 0C. After 30 minutes, the weighing bottle is closed with a lid, cooled in a desiccator and weighed. Then the lid is opened and placed back in the drying cabinet. Drying and weighing are continued until the weight stops changing (until the weight is constant). The moisture content of flour is calculated using the formula:

(M1-M)x100X= M =…….. %, Where: X - humidity, %;M1 – weight of sample before drying, g;

M is the mass of the dried sample, g; 100 is the coefficient for converting to percentages.

The humidity of all types of flour should not exceed 15%. High humidity makes it unstable for storage, reduces baking properties, and worsens the quality of bread. Such flour is more easily affected by barn pests, mold, etc.other microorganisms.

Determination of acidity. 5 gflour is placed in a 100 ml conical flask, 50 ml of distilled water is added. The contents are shaken until a homogeneous mass (mixture) is formed, 5 drops of 1% alcohol solution of phenolphthalein are added and titrated with 0.1 N solution of caustic soda (or potassium) until a pink color appears, which does not disappear within a minute. The acidity of the flour is expressed in degrees,which correspond to the number of milliliters of 1N alkali solution used to neutralize acids in100 gflour, and calculated using the formula:

$$X = \frac{A \times 100}{B \times 10} = \frac{A \times 100}{B \times 10} = A\ 2 = \ldots\ldots.\%$$

where: X is the acidity of flour in degrees;A - the number of ml of 0.1 N alkali solution used for titration;

B – weight of the sample (5 g); 10 - conversion factor of 0.1 N NaOH solution to 1 N solution;

100 – conversion factor100 gflour.

In practice, the acidity of flour can be calculated without a formula by multiplying by 2 the amount of ml of 0.1 N alkali used to titrate the taken sample of flour (5 g). Wheat flour has an acidity of 2.5 to 4.5 degrees, rye flour - from 3.5 to 5 degrees. The acidity level can be used to judge the freshness of flour, since with long-term storage, especially at elevated temperatures and humidity, it can increasethief.

Determination of gluten. A weighed portion of flour (10 g) is taken from a well-mixed sample and placed in a porcelain cup; 5 ml of water is added to the sample, and the dough is kneaded until it stops sticking to the fingers. The lump of dough is left in the cup for 20 minutes to ensure that the flour is evenly soaked in water and the gluten swells. Then, gradually adding water to the cup, the dough is

kneaded with the fingers, washing the gluten from the starch until the water is completely transparent, which is changed several times. Starch must be washed off carefully, preventing loss of gluten. The gluten washed from starch is squeezed out of the water with the fingers and weighed on a technochemical scale. The gluten content is expressed as a percentage and is determined by the formula:

$$X = \frac{A}{B} \times 100 = \ldots\ldots\ \%,$$

where X is the percentage content of gluten in flour; A is the weight of raw gluten, g; B is the flour weight, g; 100 is the conversion factor to %.

After determining the mass of gluten, its color, smell and elasticity are characterized. The gluten of good-quality, fresh flour has a yellowish-white color, is elastic, easily stretched into a thread, but does not tear, it has no musty smell and is not sticky.

Definition of foreign impurities: Mineral impurities. They are revealed when chewing 1-2 gflour. Crunching on the teeth indicates a significant admixture of sand. More precisely it can be determined onthe appearance of sand if placed in a test tube1 gflour and add 6-8 ml of chloroform.After closing the test tube with a stopper, the contents are shaken and left for 30 minutes. Sand and other impurities, as well as particles of cockle, settle to the bottom. If the sediment dispersesis assumed to be within the ring line at the bottom of the test tube, then the amount of mineral impurities does not exceed 0.2%. Usually, flour containing mineral impurities (sand) is used only for technical purposes.

Metallic impurities. They are detected using a horseshoe magnet, which is immersed in a known (for example,500 g) a sample of flour, scattered in a layer of 0.5-1.0 cm on a sheet of paper, moving the poles of the magnet in the thickness of the flour layer. The collected particles are weighed. No more than 3 mg of metal impurities per1 kgflour.

Admixture of poisonous weed seeds (ergot, smut, cockle, etc.). 2-3 g Place flour in a test tube, add 6-8 ml of chloroform and shake. The cockle settles to the bottom, and the ergot floats to the surface. If sulfuric acid is added, the ergot particles turn pink. The content of ergot or ergot together with smut, bitterling or corymbose in flour is allowed to be no more than 0.05%, cockle - 0.1%.

Determination of infestation by granary pests (from the orders of beetles, butterflies and ticks).

1 kgflour is sifted through a sieve with holes of diameter1.5 mm. The remaining granary pests on the sieve, such as the large flour buckwheat, grain moth, miller moth, granary moth are detected with the naked eye, and the granary weevil - with the help of a magnifying glass. The presence of granary pests in flour is not allowed.

Control questions

1.Which flour yield (high or low) has the highest biological value?
2. What is gluten?
3. What is the gluten content of wheat flour?
4. What is the gluten content of rye flour?
5. What determines the baking qualities of flour?
6. What is the method for determining gluten?

7. What is the color of premium wheat flour?
8. What color is rye flour?
9. What is the method for determining the smell of flour?
10. What is the method for determining the taste of flour?
11. What is the method for determining mineral impurities in flour?
12. What is the method for determining metal impurities in flour?
13. What is the method for identifying granary pests in flour?
14. List the barn pests.
15. What amount of granary pests is allowed in flour?
16. How is flour moisture content determined?
17. What is the hygienic significance of increased flour moisture?
18. How is the acidity of flour determined?
19. What is the normal moisture content of wheat flour?
20. What is the normal moisture content of rye flour?
21. What is the normal acidity of wheat flour?
22. What is the normal acidity of rye flour?
23. What weed seeds may be present in flour?
24. What is the maximum permissible concentration of weed seeds in flour?

TOPIC 12. METHODS OF RESEARCH AND EXPERTISE OF BREAD QUALITY

Bread and bakery products are baked from dough (a homogeneous mass that is obtained after adding the appropriate amount of water to flour and thoroughlymixing) using various technologies (with or without yeast).

Bread occupies an important place in the diet of the population of most countries in the world. This food product has a relatively high caloric value, is one of the main suppliers of plant proteins, carbohydrates, vitamins E and B, minerals and microelements in the human diet. About 1/3 - 1/4 of the energy value of the daily diet of the population of our country is provided by bread. An important advantage of bread is that it does not become boring, is well digested and causes a feeling of satiety.

The nutritional and biological value of bread and bakery products depends mainly on the type of flour used and the added substances (eggs, amino acids, in particular lysine, vitamins, sugar, salt, raisins, etc.). If the dough preparation technology, baking temperature and time are violated, the nutritional and biological valuebread and bakery products is significantly reduced.

Thus, with an increase in humidity and a decrease in the porosity of bread, its digestion and absorption by the body worsens. Stale bread is also absorbed worse. Increased acidity of bread has a negative effect on the secretory function of the stomach.

Fresh bread goes stale and spoils quite quickly.

After baking, the bread is free of microorganisms. If the installation instructions are not followed,Due to the sanitary requirements, during storage, transportation and trade, bread can become contaminated, including by microflora, for which it is an excellent nutrient medium.

Contaminated bread can develop:

A) *mold fungi*(they usually develop when the bread has high humidity and the crust is damaged, through which the mold penetrates into the crumb, causing mold “disease”);

b) potato bacillus, which usually develops in wheat bread whenits high humidity, low acidity and storage at elevated temperatures (35-40 °C) in poorly ventilated areas ("potato disease");

c) pigment-forming bacteria ("magic wand"), which develop inwheat bread with high humidity and when stored in a damp and warm warehouse (the surface of the bread becomes covered with reddish colonies of bacteria).

Bread contaminated with these microorganisms is not used in food.

The technological process of making bread consists of several stages: a) preparing the dough, b) fermenting the dough, c) baking the bread.

Making the dough. One of the most important stages in the technological process of baking is making the dough. The quality of the bread depends on the properties and condition of the dough ready for cutting. Dough from wheat flour can be made using the sponge or straight dough method. When making dough using the straight dough method (a one-time method), all the raw materials (flour, water, yeast, salt, sugar, fats, etc.) are taken at once in accordance with the recipe. When using the sponge method, the sponge is first weighed (part of the water, flour, and all the yeast), and then the dough is kneaded on the ready-made fermented sponge, i.e. the rest of the water and flour are added to the sponge, as well as salt and everything else provided for by the recipe (fats, sugar, raisins, flavorings – vanilla, caraway, etc.). A comparative assessment of these methods of dough science showed that the sponge method is longer, less economical, but allows for higher quality bread. This is explained by the fact that with longer fermentation of the sponge and then the dough, a greater amount of fermentation products accumulates in it, which determine the better taste and aroma of the bread, as well as a more developed and thin-walled porosity of the crumb.

When making rye dough, instead of yeast, a starter is used, i.e. old fermented dough left over from the previous bread making. Making dough from rye flour can be two-phase (starter-dough) or three-phase (starter-dough-dough). Rye starters contain yeast and acid-forming bacteria. Rye flour contains a significant amount of the amino acid tyrosine and an enzyme that oxidizes it, tyrosinase. As a result of this oxidation, the amino acid turns into a dark-colored substance, melanin, which determines the color of rye bread.

To resolve the issue of bread quality compliance with the requirements of GOST "26987-86 "White bread made from premium, 1st and 2nd grade wheat flour", it is necessary to conduct a studydetermination of its organoleptic and physicochemical properties.

Organoleptic studies

Using your senses, evaluate the following indicators:

1. The flour it is made from (grade), the method of production (sponge or yeast) howl), baking method (hearth, mold).

2. The shape of the bread (must be correct, without lateral bulges or other defects).

3. The surface of the bread should be even, smooth, without swelling, large cracks, burnt spots and excessive paleness; the crust should be uncontaminated and free offoreign inclusions (coal, ash, etc.).

4. Colour of wheat bread: light or dark yellow; rye bread: dark brown; uniform, with some shine on the upper and side crusts.

5. Condition of the crumb. The crumb should be uniform, without any "undermixed" material – lumps of flour, pieces of old bread and foreign inclusions visible to the naked eye. with a clear eye, well baked, evenly porous, not sticky, not wet to the touch, elastic. The pit from light finger pressure should quickly level out, not have the so-called "hardening", i.e. dense non-porous doughy layers. The top crust should not lag behind the crumb.

6. Thickness of crusts: upper, lower (the thickness of the crusts should not exceed0.5 cm).

7. Smell (should be pleasant, correspond to the type of bread, without mustiness and constant (ranny shades).

8. Taste (should be pleasant, characteristic of this type of bread, not oversalted, without signs of bitterness, foreign taste, when chewing - no crunching on the teeth from mineral impurities).

Physicochemical research

1. Determining the moisture content of bread. To determine the moisture content, pieces of crumb taken from different parts of the bread, finely chopped with a knife and mixed, are placed in a pre-weighed weighing bottle (metal cup) together with the lid and numbered, and 5 g are weighed out. This sample is weighed in an open weighing bottle (write it down)number) with a lid placed under the bottom is placed in a drying cabinet for 45 minutes at T+130 °C. After drying, the weighing bottle is closed with a lid, cooled in a desiccator and weighed again. Humidity is calculated using the formula:

$$X = \frac{(A-B)\ x100}{WITH}$$

where: X is the moisture content of bread, %; A is the weight of the weighing bottle with a lid and a sample of bread before drying, g; B is the weight of the weighing bottle with a lid and a sample of bread after drying, g; 100 is the coefficient for conversion to %; C is the weight of the sample of bread taken for the study, g.

The moisture content of wheat bread made from premium, 1st and 2nd grade flour should not exceed 43-45%, wheat bread made from wholemeal flour - 48%, rye-wheat bread - 49%, rye bread - 51%.

2.Determination of bread porosity. From a bread sample no closer1 cma cube of crumb with sides along the crust is cut out3 cm(a piece of bread of volume27 cm), remove the pores from this bread sample by rolling it into dense balls with a diameter of 0.5-1 cm. Then they are lowered into a 100 ml graduated cylinder, into which 40 ml of vegetable oil (or water) are poured beforehand. The difference in

liquid levels before and after immersing the bread balls will indicate the volume of the bread without the porous part. The porosity is calculated using the formula:

$$X = \frac{(27-B) \times 100}{27}$$

where: X is the porosity of bread, %; 27 is the volume of crumb with pores, cm3.

B is the volume of displaced liquid, cm3; 100 is the conversion factor to %. The porosity of wheat bread should not be lower than 55%, rye bread - 45%.

3.Determination of bread acidity.25 gof crushed and mixed crumb taken from different parts of the bread is placed in a 500 ml flask. Add 50 ml of distilled water and thoroughly rub with a glass folder with a rubber tip until a homogeneous mass is obtained. Then add another 200 ml of distilled water. The flask is closed with a stopper and the contents are shaken vigorously for 3 minutes. The sample is left alone for 10 minutes. The settled upper layer of liquid carefully pour into a beaker and filter through cheesecloth; 50 ml of the filtrate is transferred to a 100 ml flask, 3 drops of a 1% alcohol solution of phenolphthalein are added and titrated with a 0.1 N solution of caustic soda until a slightly pink color does not disappear within 1 minute. The number of ml of 0.1 N alkali solution used for titration is multiplied by 2. The resulting figure corresponds to the acidity of the bread. Itscan also be calculated using the formula:

$$X = \frac{p \times 25 \times 4 \times 50}{250 \times 10} = 2 \times n,$$

where: n is the amount of ml of 0.1 N alkali used for titration, ml;

25 – bread weight, g; 4 - conversion factor from25 gbread on100 g;

50 – volume of filtrate taken for titration, ml; 250 – volume of water taken to extract acids from the sample, ml; 10 – coefficient for converting 0.1 N alkali solution to 1 N solution. Acidity should not exceed 3 degrees for wheat bread, 9-11 degrees for rye-wheat bread, and 12 degrees for rye bread (Table 20).

Table 20. Standard requirements for bread, pasta

Standard No.	**Type of flour**	**% flour yield (grade)**	**Product shape**	**Crust thickness, mm, no more**		**Humidity, %, not more than**	**Porosity, %, not less than**	**Acidity, degrees, no more**
				top	**lower**			
5107	Rye	95 (wallpaper)	Hearth	4	5	49	42	12
5108	-“-	-“-	Formed	4	3	49	42	11
5139	Wheat	96 (wallpaper)	Hearth	5	5	47	55	6
5139	-“-	-“-	Formed	5	4	47	55	6
7972	-“-	75 (1st grade)	Loaf	2	3	43	70	3
	-“-	-“-	Pasta	-	-	13	-	3-6

Control questions

1. What is the biological and nutritional value of bread?
2. What nutrients are found in bread?
3. What is meant by the term “bread moisture content”?
4. What is meant by the term “bread acidity”?
5. What is meant by the term “porosity of bread”?
6. What is meant by the term “tempering” in relation to bread crumb?
7. What is meant by the term “under-mixed” in relation to bread crumb?
8. What vitamins does the human body get from bread?
9. What causes pores to form in bread?
10. Which type of bread is better absorbed by the body – high-porosity or low-porosity?
11. Which bread is better absorbed by the body – with high or low acidity?
12. Which bread is better absorbed by the body – with high or low moisture content?
13. What is meant by the term “bread diseases”?
14. What are the known “bread diseases”?
15. What should be the thickness of the top and bottom crusts of bread normally?
16. What studies are carried out to assess the quality of bread?
17. List the organoleptic indicators of bread quality.
18. List the physical and chemical methods for studying the quality of bread.
19. How is the moisture content of bread determined?
20. How is the acidity of bread determined?
21. How is the porosity of bread determined?
22. What should be the acidity of wheat bread?
23. What should be the acidity of rye bread?
24. What should be the porosity of wheat bread?
25. What should be the porosity of rye bread?
26. What should be the moisture content of wheat bread?
27. What should be the moisture content of rye bread?
28. What are the known methods of making bread?
29. What are the known methods of baking bread?
30. What is the main property of bread as a food product?

TOPIC 13. FOOD POISONING AND ITS PREVENTION

Food poisoning refers to acute (less often chronic) diseases, non-contagious, that occur when consuming food heavily contaminated with microorganisms or containing toxic substances of microbial or non-microbial nature.

Diseases transmitted through food may be caused by bacteria, viruses and rickettsia, protozoa, helminths in various stages of development and microscopic fungi. Various diseases and health problems may be associated with food consumption, arising as a result of harmful or toxic impurities of various origins entering food products and prepared food. Food may acquire harmful properties

during the cooking process. For example, if the rules of smoking and frying are violated, harmful substances with carcinogenic, toxic and other unfavorable properties may form in products. A significant part of this pathology is attributed to a large group of diseases called food poisoning or food intoxication.

Food poisoning can occur in the form of mass outbreaks, affecting a significant number of patients, or in the form of family and group diseases, as well as individual sporadic cases.Their fundamental difference from intestinal infections is the lack of contagiousness; a sick person is not a source of secondary cases of the disease in his environment.

Common signs of food poisoning

1. Simultaneous occurrence and acute, sudden onset.
2. Connection with one institution, with one territory.
3. All sick people eat the same common dish.
4. Short-term course of the disease (except botulism).
5. The outbreak is localized when the causative food product is identified and the transmission factor is excluded.

The main sanitary and epidemiological risk factors for food poisoning:

1. Transportation, reception and storage of food products;
2. Culinary processing of food products;
3. Sale and storage of prepared food;
4. Sanitary improvement and maintenance of enterprises;
5. Personal hygiene, health literacy and staff health

According to the degree of epidemiological danger, food products are divided (in descending order):

– milk and dairy products;
– meat and meat products;
– fish, fish products and oysters;
– eggs (duck, goose, chicken);
– vegetables, berries and canned products;
– bread and other flour products.

Classification of food poisoning

In practice, food poisonings are divided into two main groups: microbial and non-microbial origin. However, in practice, poisonings of mixed and unspecified etiology are encountered (Table 21).

Table 21. Classification of food poisoning

<table>
<tr><td colspan="2">Пищевые отравления</td><td></td><td></td></tr>
<tr><td>Микробной этиологии</td><td rowspan="5">Немикробной этиологии

Отравления примесями химич. веществ
Отравления ядовитыми растениями и тканями животных
Отравления ядовитыми при определенных условиях растительными и животными продуктами</td><td rowspan="5">Смешанной этиологии</td><td rowspan="5">Неустановленной этиологии</td></tr>
<tr><td>токсикоинфекции</td></tr>
<tr><td>токсикозы</td></tr>
<tr><td>микотоксикозы</td></tr>
<tr><td>бактеротоксикозы</td></tr>
</table>

food poisoning: of microbial origin (toxic infections, bacterial toxicosis, mycotoxicosis), non-microbial etiology (products that are poisonous by their nature; products that have become poisonous as a result of violation of storage rules; products contaminated with toxic substances (pesticides, heavy metal salts, etc.);

– intestinal bacterial, viral, zoonotic infections (typhoid fever, paratyphoid A, B, dysentery; hepatitis A, poliomyelitis, enteroviruses; brucellosis, foot-and-mouth disease, tuberculosis and others); geo- and biohelminthiases (ascaris, whipworm, bovine, pork tapeworm, trichinella, fish tapeworm, flukes and others);

– damage by products contaminated with weapons of mass destruction in modern warfare – radioactive products of nuclear explosions (NE), chemical warfare agents (CWA), and especially dangerous bacterial agents (EBA).

<table>
<tr><td colspan="3">A. MICROBIAL ETIOLOGY</td></tr>
<tr><td>1. Toxic infections</td><td>2. Food toxicosis intoxication</td><td>3. Mixes</td></tr>
<tr><td colspan="3">Factor causing food poisoning</td></tr>
<tr><td>Microbes and their toxins</td><td>Microorganism toxins</td><td>Microbes and their toxins</td></tr>
<tr><td>-E.coli (enteropathogenic serotypes);</td><td>Staphylococcus aureus;</td><td>You.cereus+Staphylococcus aureus;</td></tr>
<tr><td>-Proteus vulgaris</td><td>Cl.botulinum</td><td rowspan="3">-Proteus vulgaris +Staphylococcus aureus;</td></tr>
<tr><td>-Proteus mirabilis</td><td></td></tr>
<tr><td>-Enterococci: Strept. Fecalis, faciens, etc.;</td><td>Fungal mycotoxins</td></tr>
<tr><td>-Spore-bearing aerobes Bac.cereus;</td><td>-Claviceps purpurea</td><td></td></tr>
<tr><td>-Spore-forming Anaerobes: C1.perfringens</td><td>-Fusarium graminearum</td><td></td></tr>
<tr><td>-Pathogenic halophiles: vibrio parahaemoliticus</td><td>- Fusarium sporotrihella</td><td></td></tr>
<tr><td>- Little-studied microorganisms: Hafnia, Klebsiella, Edvarsiella, Yersinia, Citro-bacter, Pseudomonas, Aeromonas, etc.</td><td>- Aspergillus flavus</td><td></td></tr>
<tr><td colspan="3">B. NON-MICROBIAL ETIOLOGY</td></tr>
<tr><td colspan="3">1. POISONING WITH PRODUCTS THAT ARE POISONOUS BY THEIR NATURE
OF PLANT ORIGIN</td></tr>
<tr><td colspan="3"><u>Poisonous plants</u>;henbane, belladonna, hemlock, poison hemlock, datura, chilibuha, nightshade, chemeritsa, etc. Cause of poisoning: toxic alkaloids
Weeds of cereal cropswith poisonous seeds: - trichodesma, heliotrope,</td></tr>
</table>

sophora,bitterling, etc. Cause of poisoning: toxic alkaloids
Poisonous mushroomsы:pale toadstool (phalloidin), fly agaric (muscarine), pigweed, etc. **Conditionally edible mushrooms, not properly cooked:**- morels, russula, volnushki, milk mushrooms, etc. The cause of poisoning is toxic alkaloids
OF ANIMAL ORIGIN
Roe and milt of some fish:marinka, Sevan lame fish, barbel, puffer fish, etc. **Some endocrine glands of slaughter animals:**- adrenal glands, pancreas, etc.
***2. POISONING WITH FOODS THAT ARE TOXIC UNDER CERTAIN CONDITIONS* OF PLANT ORIGIN**
Bitter kernels of stone fruits such as peaches, apricots, almonds, etc., containing a poisonous alkaliid amygdalin;
Nuts (seeds) of beech, tung, ricinin, etc., containing the poisonous alkaloid ricinin;
Raw kidney beans containing the poisonous alkaloid phasin;
Sprouted (green) potatoes containing the poisonous alkaloid solanine
OF ANIMAL ORIGIN
Liver, caviar and milt of some fish species (burbot, pike, mackerel, etc.) during the spawning period. Reasonsfor poisoning - toxic hormones and other biologically active substances. Honey (when bees collect nectar from poisonous plants, such as rhododendron flowers)
3. POISONING WITH CHEMICAL IMPURITIES
Pesticides;
Food additives (unauthorized or their use in unauthorized doses);
Impurities migrating into food from equipment, inventory, containers, etc.;
Heavy metal salts: arsenic, lead, etc.
Chemicals from synthetic polymeric materials from containers, food packaging
B. POISONING OF UNKNOWN (UNSPECIFIED) ETIOLOGY(link to diet proven, but causal factor not established)
Yuksovsky (Sartland) disease; alimentary paroxysmal toxic myoglobinuria (Haff disease);
Urovskaya (Kashin-Beck) disease
Watermelon poisoning
Poisoning by quail meat

A. MICROBIAL FOOD POISONING

The transmission of pathogens of food poisoning of microbial origin can be divided into three interrelated and successive stages: contamination of products with microorganisms, presence of pathogens in the product, and infection of people when consuming the contaminated product. Hence, reliable prevention of toxic infections and bacteriotoxicoses is achieved by a set of measures that ensure the protection of food and prepared food from infection, prevention of the reproduction of pathogens of microorganisms that have entered the products and

prepared dishes, destruction of pathogens and their toxins during the culinary processing of food. In reality, microbial contamination can affect all food products without exception and is possible at any stage of their movement from the place of receipt to the consumer. Penetration of the pathogen into food products is directly related to the second stage – the presence of the pathogen in the products. Food products often serve as a substrate in which the process of accumulation of some pathogens occurs. This is important, since a certain infectious dose is needed for the occurrence of a clinically expressed lesion. At the same time, the initial massiveness of food contamination is usually less than the minimum infectious dose. Achieving the specified dose is possible only due to the accumulation of the pathogen in food products and depends on a number of conditions.

These diseases account for up to 90% of the total number of food poisonings (toxic infections). The distinguishing feature of food toxic infections from intestinal infections is the lack of contagiousness, suddenness, connection with a certain product, sometimes – mass character and almost simultaneous appeal for medical help of all persons who consumed the defective product (food).

The incubation period is on average 6-24 hours. Clinically manifested by symptoms of short-term acute enteritis, gastroenteritis or enterocolitis. In most cases, they proceed relatively easily, the duration of the diseasenia 1 - 2 days. Complaints of nausea, sometimes vomiting, pain in the epigastric region, diarrhea, sometimes headache. Body temperature is elevated.

By sending material (vomit, feces, washings, suspiciousproduct, blood) for testing in the sanitary service laboratory, the doctor is obliged to make a presumptive diagnosis.

The leading factor of poisoning in toxic infections is the massive contamination of the product with live microbes and the release of significant quantities of enterotoxin into the gastrointestinal tract during their massive death under the influence of gastric juice and digestive enzymes.

Foodborne toxic infections can be associated with contamination and massive dissemination.the proliferation of microbes on various food products and prepared dishes when the technology of culinary processing and storage is violated (meat, fish, dairy, salads, vinaigrettes, jellied meats, etc.). The source of contamination of products and prepared dishes is a sick person or a carrier of bacteria.

Foodintoxications or toxicoses occur when consuming a product containing a toxin that has accumulated in it as a result of preliminary seeding and favorable conditions for the vital activity and reproduction of a specific pathogen. Staphylococcal toxicosis, for example, occurs when consuming milk from animals with mastitis. If this milk is stored at room temperature, it will accumulate enterotoxigenic exotoxin (in a few hours) in quantities sufficient for food poisoning. Even after boiling, such milk causes poisoning, since staphylococcal exotoxin is heat-stable and is destroyed only after prolonged (more than an hour) boiling. The source of contamination of products may be kitchen or farm workers suffering from skin and pustular diseases. Cakes, pastries with butter cream, milk, sour cream, cottage cheese, ice cream, minced meat products, fish, and canned

food in oil serve as a medium for the development of staphylococci and the formation of enterotoxin.

The incubation period is 2-4 hours. The disease is acute, manifested by nausea, sudden (sometimes multiple) vomiting, diarrhea, pain in the epigastrium, general weakness, headache. Body temperature is usually normal or low. All symptoms of poisoning disappear after a few hours (after the toxin is removed from the body or destroyed) and recovery usually occurs within 1-2 days.

Toxic infections and staphylococcal toxicosis do not require specific treatment. Gastric lavage, symptomatic treatment, and rest are usually used.

*Botulism*is the most dangerous and severe food toxicosis, the clinical picture of which is not similar to food poisoning. Anaerobic spores, getting on products under appropriate conditions (lack of contact with atmospheric oxygen), germinate. The multiplied vegetative forms of the microbe release a neurotropic toxin into the product.

Poisoning is observed when consuming dry-cured sausages, hams,sturgeon fish, dried fish, balyk, canned home-made products (mushrooms, squash caviar, compotes, etc.).

Botulinum toxin affects the central nervous system (bulbar region of the medulla oblongata). The incubation period is from 4 hours to 10 days. Clinical picture: diplopia (oculomotor nerve paresis), accommodation disorder, unilateral or bilateral eyelid ptosis (paresis of the nerves of the muscles that lift the eyelid), dysphagia (paresis of the soft palate), dysphonia (paresis of the vocal cords), rapid pulse against the background of normal or low temperature, constipation (intestinal paresis), bloating, nausea (sometimes vomiting), lack of rigidity of the neck muscles.

Treatment is specific.The use of antibotulinum polyvalent serum, especially in the early stages, has reduced mortality from botulism from 75 to 20%.

Basic principles of prevention

1. Isolation of the source of the infectious agent;

2. Interruption of the routes of contamination of food products with pathogens causing food poisoning;

3. Prevention of the proliferation of microorganisms and toxin formation;

4. Neutralization of potentially epidemically dangerous products

Mycotoxicosis is a chronic food poisoning caused by toxins of microscopic fungi that affect grain crops at the root or under unfavorable storage conditions.

1. Alimentary-toxic aleukia develops as a result of poisoning with the toxin of the fungus Fusarium sporotrichella. The tonsils, soft palate and back wall of the pharynx are affected with the development of necrotic processes, hemorrhages on the skin, damage to the hematopoietic organs and the development of aleukia.

2. Poisoning from "drunken bread" occurs after eating foods containingcontaining the toxin of the fungus Fusarium graminearum. When poisoned by "drunken bread" there is a sharp excitement causeless laughter, dancing, singing, unsteady gait, depression, loss of strength, anemia, mental disorders. They arise as a result of eating products from cereals that have overwintered in the field (rye, wheat, millet).

3. Aflatoxicosis is a poisoning caused by aflatoxins produced by microscopic fungi of the genus Aspergillus flavus. Aflatoxins (several types) arehave a pronounced hepatotoxic and carcinogenic effect. First isolated from peanuts, then found in wheat, corn, rice, buckwheat and other cereals, especially in a state of moisture, self-heating and mold. The permissible dose of aflatoxin is set at 0.25 μg/kg. Baby food products should not contain aflatoxin.

4. Ergotism - poisoning with ergot (Claviceps purpurea). Long-term useEating bread baked from flour containing ergot alkaloids causes chronic poisoning: insomnia, abdominal pain, dizziness, sometimes vomiting and loss of appetite. Poisoning can occur in convulsive and gangrenous forms.

Basic principles of prevention

consists of timely harvesting, preventing overwintered grain from being used in the population's diet, storing grain in a dry, ventilated area, and monitoring the content of mycotoxins in food products.

B. NON-MICROBIAL FOOD POISONING

1. Poisoning by poisonous mushrooms is characterized by seasonality (early spring - morels, late summer - death cap, fly agaric, etc.). The incubation period for poisoning by fly agaric is 2-4 hours, morels and death cap – 8-12 hours. Symptoms of poisoning are characterized by acute gastroenteritis, to which, depending on the type of mushroom, other symptoms are added, for example, in case of poisoning by death cap – cholera-like diarrhea, in case of poisoning by morels – jaundice and hemoglobinuria. Poisoning by death cap is accompanied by high mortality, one of the causes of which is fatty degeneration of the liver and acute liver failure.

2. Poisoning by poisonous plants is more often observed among children, especially preschool age.

3. Poisoning by animal tissues and organs of some fish, primarily marine fish, is associated with the fact that they produce poison during their life or during the spawning period.

4. Eating large amounts of stone fruit kernels causes poisoning.amygdalin, which breaks down in the digestive tract to form hydrocyanic acid. Symptoms in the form of dizziness and nausea appear 2-5 hours after consuming the kernels. In severe cases (loss of consciousness), the mortality rate reaches 30%.

5. Sprouted green potatoes contain solanine, which causes irritation of the lining of the digestive tract, a bitter taste, nausea, vomiting, and diarrhea.

6. Due to the widespread use of pesticides, cases of poisoning by these agrochemicals have become possible. Acute poisoning is characterized by irritation of the mucous membranes of the gastrointestinal tract and nausea, vomiting, damage to the central nervous system and morphological changes in the parenchymatous organs. Chronic poisoning may occur if sanitary rules for working with pesticides are not observed.

7. Poisoning with impurities of toxic metals (lead, copper, zinc) occurs whentheir salts get into food from dishes, food containers and equipment. The incubation period is from several minutes to 2-3 hours. There is a metallic taste in the mouth, vomiting, diarrhea, abdominal pain, blood in the vomit and feces.

8. Nitrate poisoning can occur as a result of their entry into plant foods when grown in soil abundantly fertilized with nitrogen substances. In recent years, nitrosamines, found in large quantities in smoked and canned meat, fish products and spinach, have attracted particular attention due to their proven carcinogenic properties.

Basic principles of prevention:

sanitary and educational work, compliance with sanitary rules for the procurement, processing and sale of mushrooms, exclusion of children playing outdoors without parental supervision, exclusion of the use of home-made copper utensils, control of the content of nitrates in food products, residual amounts of pesticides, etc.

Diagnostics of toxic infections

Correct diagnosis of diseases is of primary importance both for the elimination of outbreaks and for the prevention of food poisoning. Of great importance for the correct diagnosis of toxic infections are:

1. Epidemiological data, i.e. the identified patterns of the emerging epidemiological process. Based only on epidemiological data, in some cases it is possible to diagnose the disease and presumably indicate the source of infection;

2. Clinical data are also of great value for diagnosis and outbreak decoding. But since the clinical picture of toxicoinfectious diseases of different etiologies is sometimes similar to each other and is not sufficiently studied, diagnostic errors may occur when making a diagnosis. Therefore, along with epidemiological and clinical data, very important objective material in the diagnosis of food toxicoinfections are

3. Laboratory data. Moreover, laboratory diagnostics of toxic infections is of great importance, since an outbreak is considered fully deciphered if the laboratory succeeds in: detecting certain pathogenic strains of microbes in samples taken from patients (blood, vomit, urine, wash water, etc.), as well as in food products, swabs from inventory, equipment, dishes; establishing the identity of the cultural and serological properties of strains isolated from the products that caused the toxic infection, from isolated patients, equipment, hands of personnel, etc.; proving an increase in agglutination titers of the blood serum of victims in relation to the suspected culture on the 3-7th day.

Food poisoning is not:

1. Diseases associated with intestinal enzymopathy (for example, lactase deficiency).

2. Various forms of food allergies.

3. Diseases associated with excessive intake of certain substances (hypervitaminosis A, D, etc.).

4. Diseases associated with the intentional or mistaken use of poisonous substances.

5. Diseases associated with gross violations of the diet (excessive food consumption, consumption of unripe fruits, etc.)

6. Conditions associated with excessive alcohol intoxication.

Control questions

1. Give a definition of the term "Food poisoning".
2. Who is the author of the world's first classification of food poisoning?
3. What are the three groups of food poisoning?
4. What groups of food poisoning are classified as "Microbial food poisoning"?
5. Why is the group of food poisonings called "Toxic infections"?
6. Give a definition of the term "Toxic infections".
7. Why is the group of food poisonings called "Food toxicosis"?
8. Give a definition of the term "Food toxicosis (intoxication)".
9. Provide a classification of "Food poisoning".
10. What is meant by food poisoning from the "Mixed" group?
11. What is the difference between food "Toxic infections" and intestinal infections?
12. What pathogens cause "Toxic infections"?
13. What conditions are necessary for the occurrence of "Toxic infection"?
14. What conditions must be created to exclude "Toxic infection"?
15. What foods are most often the cause of "Toxic infection"?
16. What is the incubation period for "Toxic infections"?
17. What is the typical clinical picture of "Toxic infection"?
18 What should be the actions of a doctor if a case(s) of "Toxicinfections"?
19. What material should be sent to the State Sanitary and Epidemiological Surveillance Center if a case of "Toxic infection" is suspected?
20. What is the doctor's treatment strategy when diagnosing "Toxic infection"?
21. What is the average duration of a typical case of "Toxic infection"?
22. Prevention of "Toxic infection".

The causative agent of "Botulism"?

23 What type of microorganism does the causative agent of "Botulism" belong to in relation to atmospheric oxygen?

24. What conditions are necessary for the occurrence of "Botulism"?
25. What foods, when eaten, usually cause "Botulism"?
26. To what type of toxin does the "Botulinum" toxin belong according to the point of application (mechanism of action)?
27. What pathogens cause "Mycotoxicoses"?
28. What is the cause and clinical picture of poisoning with "drunken bread"?
29. What is the cause and clinical picture of alimentary toxic aleukia?
30. Which food poisoning from those listed in paragraphs 54 and 55 is the most dangerous in terms of clinical presentation, treatment, and prognosis of outcome?
31. Prevention of fusarium toxicosis.
32. What causes ergotism?
33. What forms of ergotism do you know?
34. Prevention of ergotism.
35. The cause of food poisoning when eating the death cap mushroom.

36. The cause of food poisoning when eating the fly agaric mushroom.

37. The cause of food poisoning is eating unripe beans.

38. The cause of food poisoning when eating sprouted potatoes,

39. The cause of food poisoning when eating stone fruit kernels.

40. Cause of food poisoning when eating beech nuts.

41. The cause of food poisoning when eating certain fish during their spawning period

42. The cause of food poisoning is eating poisonous plants.

TOPIC 14. HYGIENE OF PUBLIC CATERING FACILITIES

The wide network of public catering establishments determines the need to monitor their sanitary and hygienic condition in order to prevent foodborne diseasespoisoning.

When conducting a sanitary inspection of the canteen, students must know the basic requirements for food enterprises.

The territory of the public catering establishment must be paved or have another hard surface. It must be thoroughly cleaned daily. In summer, such cleaning must be wet. Garbage containers must be located on a concrete platform and be removed from the entrance through which products enter the canteen by at least 25 mScrapers, grates or metal nets should be installed near the entrances to the canteen to clean dirt from shoes.

Currently, canteens are divided into the following types: full-cycle canteen, preparatory canteen, distribution canteen, and finishing canteen.

In the dining room with full The technological cycle of food preparation includes the entire process of food preparation from raw materials to the sale of finished products.***In the canteen – preparation room***The processing of raw materials and production of semi-finished products in quantities exceeding own needs are mainly carried out. The use of these semi-finished products is carried out in canteens – finishing cooking. In canteens – distribution, heating and sale of food is carried out.

Catering establishments are usually located in separate buildings, as well as in buildings that serve the population.

The dining room premises must be wet-cleaned daily, and furniture must be wiped, cobwebs removed, and dust must be swept from the walls. General cleaning must be done at least once a week using cleaning agents approved by the sanitary service. Glass must be washed as it gets dirty, but at least once a month. Dining tables must be cleaned after each diner. All cleaning equipment must have permanent markings (e.g. for cleaning tables, for cleaning floors in the dining room, for cleaning floors in the lobby, etc.).

The premises of public catering establishments are divided into: commercial, production, warehouse, administrative and household.

The shopping center includes a dining room, a lobby, a cloakroom and a bathroom.for visitors, buffet.

The production group includes: a kitchen where a hob is installed above the kitchen stoves.They pour a special umbrella (exhaust ventilation), production shops (meat, fish, vegetable, flour, confectionery, cold appetizers), bread slicing,

distribution, washing of dining and kitchen utensils, containers for semi-finished products.

The administrative and household group includes the director's office, office, staff room, cloakroom, showers, and toilet for service personnel.

In the dining room, tables are set at a distance of 1.5 m from each other. 1.2-1.8 msq.

The food facility must adhere to the following principles: flow production, excluding the meeting and intersection of flows of raw materials with finished products, clean and dirty dishes, as well as ensuring optimal production movement of service personnel separately from the movement of visitors.

The premises are grouped according to their production purpose. It is envisagedcold and hot water supply, sewerage.

Of great importance is the marking of equipment - cutting tables, boards, knives, scales, etc. - (VM - boiled meat, SM - raw meat, SR - raw fish, VR - boiled fish, SO - raw vegetables, VO - boiled vegetables, etc.).

Food facility workers must comply with personal hygiene rules: keep the skin of the body and hands clean; keep work clothes and personal belongings clean;

monitor the condition of the oral cavity; observe sanitary and hygienic conditions during work; the robe must be buttoned, the cap (kerchief) must completely cover the hair; when using the toilet, take off sanitary clothing and hang it on a hook near the outer door of the toilet; after visiting the toilet, wash your hands usingusing a disinfectant solution; workers with cuts, pustules, or burns on their hands are not allowed to work with food products.

All persons working at food facilities are subject to medical preventive examination before employment, then once per quarter, chest X-ray once per year and periodic (as directed by the state sanitary and epidemiological surveillance center) examination for bacterial and helminth carriage. Medical examination data must be entered into the individual health record book of each employee. Health records must be kept by the head of the food block.

Perishable products: meat, milk, dairy products, poultry and cooked sausages, hot dogs, etc., fish, semi-finished products - are stored in refrigerated rooms, refrigerated cabinets, refrigerated counters.

It is prohibited to store raw products and semi-finished products together with finished products. Spoiled products or products of suspicious quality - with good quality products.It is permissible to store products with a specific smell (cheese, herring) together with other products (eggs, butter, cottage cheese, flour, salt, sugar, etc.) that easily absorb odors.

In the period from May to September, it is not allowed to use the remains of butchering meat carcasses and meat from heads for making mince. Such meat can only be used in finely chopped and thoroughly cooked form.

During this same period (May-September) preparation and use is prohibited.jellies, pates, pies with offal filling.

Raw and pasteurized milk must be boiled. Cottage cheese made from unpasteurized milk is prohibited from being used as food in its natural form; it can

be used to make cheesecakes and vareniki, which are subjected to high temperatures.perature processing.

When serving, the temperature of first courses should not be lower than 76°C, and second courses should not be lower thanbelow 65°C, third courses and cold appetizers – from 7 to 14°C.

Before serving, first and second courses can be kept on the bain-marie orhot stove for no more than 3 hours.

Before the distribution of prepared food, its quality is checked and a corresponding record is made.in the marriage register.

To prevent the possibility of using food leftovers from the previousthe same dish should not be repeated on the menu two days in a row. The menu should be varied by day of the week.

Each food product received by a catering establishment must have documents and certificates.

The shelf life and sale dates of perishable products are presented in Table 22.

Table 22. Shelf life and sale of highly perishable products

Item No.	**Product name**	**Shelf life, hour**	**Storage temperature,°C**
1.	Semi-finished products from beef, pork, lamb: large-piece, portioned, small pieces, minced meat	 48 36 24 12	from+2 to+6
2.	Culinary products from beef, pork, lamb: boiled meat fried meat meat offal	 12 24 18	from+2 to->6
3.	Sausage and sausage products: cooked sausage of the highest grade, cooked sausage of the 1st and 2nd grades, sausages and	 72 48	."."
4.	Fish products and fish by-products: all types of chilled fish, all types of fried fish	 48 36	."."
5.	Milk and dairy products: milk, cream, kefir kumiss sour cream cottage cheese	 36 48 72 36	."."
6.	Vegetable products: peeled sulphited potatoes carrots, beets, onions peeled	 48 24	."."

7.	Flour confectionery: cakes and pastries without cream decoration with butter cream with custard, with whipped cream	 72 36 6	.".
8.	Dishes and culinary products produced at the enterprisevatii	2-4	-"-

To prevent contamination and spoilage of food products during transportation, they are transported in specially equipped vehicles. For the transportation of perishable food products, vehicles equipped with refrigeration units (refrigerated vehicles) must be used.

When conducting ongoing sanitary supervision of compliance with current sanitary rules at a public catering establishment, it is important to know the significance of individual sanitary and epidemiological risk factors.

Conventionally, there are 19 complex risk factors for the possibility of food poisoning occurring at a specific food facility, combined into 5 groups. The risk possibilities are assessed in points.

The sum of the points determines the sanitary and epidemiological risk group: Group A (high risk) – more than 20 points, Group B (moderate risk) – from 20 to 10 points, Group C (low risk) – from 9 to 0 points (Table 23).

Table 23. Sanitary and epidemiological risk factors in public catering

Groups	Risk factors	Evaluation coefficient, points
1 group	Transportation, reception and storage of food products (10 points) 1. Violation of food transportation rules. 2. The invoice does not contain information about the production and sale dates of perishable products. 3. Absence of a brand on meat carcasses, conclusion of veterinary supervision. 4. Use of products of questionable quality. 5. Violation of the procedure for the sale of non-standard products. 6. Violation of temperature storage conditions, shelf life and product proximity.	 1 1 1 1 1 5
2 group	Culinary processing of food products (20 points). Violation of the rules for cold and heat processing of products. Violation of the flow of food processing in space and time. Violation of the technological scheme for culinary processing of products.	 5 5 10
Group 3	Sale and storage of prepared food (50 points) Violation of the expiration dates for ready meals.	 20

	Failure to maintain temperature control for food when serving. Violation of the terms of sale and temperature conditions for storing buffet products.	10 20
4 group	Sanitary improvement and maintenance of the enterprise (10 points) Failure to comply with sanitary rules for maintaining the territory. Non-compliance of the enterprise layout and equipment with sanitary norms and rules Violation of rules for maintaining enterprise premises Failure to comply with sanitary requirements for technological equipment, inventory and utensils. Presence of flies, cockroaches, rodents at the enterprise	 1 2 2 3 2
Group 5	Personal hygiene and sanitary literacy of the staff, their healthvie (10 points). Failure to comply with personal and industrial hygiene rules. 2. Untimely medical examinations and preventive tests, vaccinations, identification of patients and persons in the family who have had contact with patients with intestinal infections, etc.	 4 5

Sanitary and hygienic requirements for technological equipment of public catering establishments

Food processing, preparation of semi-finished products and ready-made dishesThe washing of non-ferrous products must be carried out in isolation in special rooms (workshops) equipped with separate washing baths, cutting boards and tables.

In large catering establishments, raw vegetables must be processed separately from meat and fish, in vegetable and meat sections isolated from each other.fish workshops.

In small enterprises, the joint processing of meat, fish and vegetables is permitted, provided that they are processed on separate cutting tables and are availablekah.

Cutting tables for food processing must have a smooth, even and easy to clean and wash work surface, without cracks, potholes, or unevenness, in which food residues or dirt could accumulate. The most hygienic are cutting tables with removable lids made of stainless steel on a metal frame. It is allowed to use tables with marble lids, as well as tables covered with stainless steel, aluminum, duralumin or galvanized iron.

Wooden tables without metal covering are allowed only for cutting dough and vegetables. Their covers should be made of wide, well-fitted boards of hard wood (oak, beech, hornbeam, etc.) with a smoothly planed surface.

Cutting boards should also be made of hardwood and be flat, smooth, and free of cracks and crevices. Cutting boards are stored innymi "on the edge". Storing them in bulk is prohibited.

The chopping block should be made of hard wood, without cracks, thoroughly cleaned after each working day, and its working surface sprinkled with salt.

The axe for cutting up meat carcasses should be kept clean and stored in a safe place.in a rubbed case in a suspended state.

All equipment (washing tanks, cutting tables, boards, knives, etc.) is mandatory.must be labeled in a strict order and without exception.

Cutting equipment must be assigned to individual work stations and stored in each production workshop in a specially designated place.

Sanitary and hygienic requirements for culinary processing of food products

Cooking of food products plays an important role in preventionfood poisoning.

Maximum removal of contaminants, complete preservation of biological, nutritional, taste value and neutralization are the main requirementsrelated to culinary processing of food products.

Food products received in the canteen are first subjected to primaryor "cold" processing, which involves sorting, cleaning and washing vegetables, defrosting frozen food products (meat, fish, vegetables, fruits), soaking pickles, etc.

Incorrect primary processing inevitably reduces the nutritional value of products. For example, excessive peeling of potatoes leads to partial loss of carbohydrates. When meat, fish and other products are defrosted incorrectly, some of the nutrients and extractive substances are lost. When salted products are soaked for a long time or vegetables are stored in water for a long time, "washing out" occurs.water-soluble vitamins.

Insufficient cleaning and washing of food products can lead to contamination of prepared food. Microbial contamination of products is especially dangerous.

In order to prevent food poisoning, it is necessary to strictly adhere to the rules of technological processing of products, to ensure the flow of the production process, in which the intersection of flows of raw materials, semi-finished products is completely excluded.ricates and prepared foods.

Heat treatment is the final stage of cooking for most food products. The following methods of heat treatment are distinguished:ki: boiling, stewing, frying, baking.

Thermal processing of food products has important epidemiological significance. When heated to a high temperature, all vegetative microflora and microorganisms – pathogens of intestinal diseases - die.

With significant bacterial contamination of raw materials and semi-finished products, insufficiently high temperatures during heat treatment of products, and a reduction in the time of heat treatment, part of the microflora may remain viable. ThereforeThe observance of sanitary conditions, certain temperature standards and

the time of heat exposure during food processing should be given exceptionally great importance.

Sanitary and hygienic requirements for washing dishes

All kitchen utensils are divided into kitchen utensils (not in contact with visitors) and dining utensils (in contact with visitors). These types of utensils must be processedmust be kept strictly separate. In tableware, there are dishes that come into contact with the mucous membrane of the visitor's mouth (spoons, forks, glasses, goblets, etc.), and those that do not come into contact with the mucous membrane of the visitor's mouth (plates, etc.).

Tableware. When monitoring the quality of dishwashing, attention is drawn to the necessity of completing the following steps:

A) cleaning of food debris;

b) degreasing;

V) disinfection;

G) scalding with boiling water;

d) drying.

Food residues are removed from plates with wooden spatulas or rubber brushes, collecting them in special tanks or buckets with lids. After rough mechanical cleaning, the dishes are washed in three-slot wash basins. The first one is used for degreasing, the second one for disinfection, and the third one for scalding.

The water temperature in the first and second baths should be 45-50°C. At lower temperatures, degreasing is not done well enough. For better degreasing of dishes, it is recommended to add detergents to the first wash bath: 1% solution of trisodium phosphate or soda ash, 0.5% solution of Progress, Posudomoy detergent or other detergents approved by sanitary authorities.supervision for these purposes.

Despite good degreasing and cleaning after treatment in the first bath, some organic matter and microbes may remain on the dishes,therefore, in order to render the dishes harmless, they must be treated a second time with water and disinfectants – a 0.2% solution of bleach or chloramine.

Degreased and disinfected dishes must be scalded in the third bath at a water temperature of at least 70°C. Scalding has an additional disinfecting effect and, very importantly, ensures deodorization of dishes previously treated with chlorine-containing preparations. Scalding of dishes in the third bath is carried out by immersing plates placed on their edges in special baskets with handles.

Washed dishes must be dried well. For this purpose, catering establishments must be provided with drying cabinets, counters with electric heating, or special grates where dishes are placed on edge after scalding. It is prohibited to dry dishes with a towel, since this process, if the towel is not clean enough, can contaminate the washed dishes.

Particular attention should be paid to the quality of processing of glassware (glasses, shot glasses, wine glasses, etc.) and cutlery, which are in direct contact with the oral mucosa and therefore can be most infected.

Cutlery – spoons, forks, knives should be treated in the same way as tableware. They should be cleaned of food residues with brushes,Wash in hot water with degreasers and disinfectants and subject to mandatory boiling. Drying

of cutlery should be done on grates or in drying cabinets. Before washing, metal parts of knives and forks should be cleaned in a special machine (knife cleaner) or manually with sandpaper. Cutlery made of metal that is easily subject to corrosion may be wiped with a clean towel. Cleanly washed and dried dishes and cutlery should be immediately served or placed in a closed cabinet for storage. Glasses, shot glasses, wine glasses with chipped edges are not allowed for use.

Machines can be used in large catering establishments.methods of processing dishes in dishwashers and glass washers. The most productive and most hygienic of them are shower-type machines. In these machines, the dishes are placed on lattice trays, moved along a conveyor and washed from above and below with water supplied under pressure. When leaving the machine, a sterilizing shower is automatically turned on, the main purpose of which is to disinfect the dishes. The water temperature of the sterilizing shower should not be lower than 90-95 ° C.

Kitchenware should be processed separately from dining utensils. They are first cleared of food residues, then degreased and rinsed. Since kitchenware does not come into contact with the consumer and does not need to be disinfected, two baths are sufficient to wash kitchenware. The water temperature for washing kitchenware should not be lower than 45-50°C, and when rinsing - not lower than 70°C. When washing kitchenware, it is prohibited to remove food residues from the tinned surface with hard objects to avoid damaging it. Burnt or dried food residues may be removed only after preliminary soaking. Washed dishes are dried on racks-shelves in an inverted position. Brushes and sponges used for washing dishes should be boiled daily after work for the purpose of degreasing and dried. Before starting work, they should be boiled again in a 1% solution of soda ash for better degreasing.

Medical examinations and preventive screenings of workers in public catering establishments

Catering workers involved in the production of food products, as well as persons involved in the storage, transportation and sale of products, including workers involved in the sanitization of inventory and equipment, are subject to mandatory preventive medical examinations.

Medical examinations and screenings are conducted to protect public health and identify diseases that can be transmitted by contact and other routes, including through food and food. When applying for a job at a public catering establishment, persons subject to examination are sent by the administration to undergo tests for carriage of intestinal infection pathogens, helminthiasis, tuberculosis, as well as for a general examination by a general practitioner. Waiters, cooks, and barmaids, in addition, upon applying for a job, undergo an examination by a dermatovenereologist with laboratory tests for gonococcus and syphilis. After the examination, a certificate from the relevant medical institution on admission to work is presented.

In the future, these workers undergo quarterly medical examination and tuberculosis testing once a year, as well as testing for bacterial carriage,

helminthiasis and preventive vaccinations within the timeframes established by local state sanitary inspection bodies. Waiters, cooks and buffet workers are also examined by a dermatovenerologist once a quarter with laboratory tests for medical reasons.

All employees subject to medical examination must be provided with personal medical records of the established form, where the results of the examinations are recorded. Personal medical records are kept at the enterprise and are issued to employees only as needed (when sent for examination or to work at points outside the enterprise).

Control questions

1. List the types of public catering establishments (canteens, food service units).
2. Name the requirements that are imposed on the site of a public enterprisenutrition.
3. What groups of premises are distinguished in public catering establishments?
4. What are the hygiene requirements for cleaning premises?
5. What do you understand by the term "full technological cycle" in relation tofood block?
6. What is the structure of a food block operating on a full technological cycle?
7. What premises are included in the commercial group of premises of the food block?
8. What premises are included in the production group of food industry premises?ka?
9. What premises are included in the administrative and household group of premises of the food block?
10. What is the standard area per seat in the dining room?
11. Name the basic hygiene principles that should be observed in foodchippings.
12. How is equipment and inventory marked?
13. What personal hygiene rules should food service staff follow?
14. What are the special features of conducting medical preventive examinations of food service workers?
15. Name the features of storing perishable products.
16. What is product proximity?
17. What are the special features of using meat by-products from May to September?
18. List the features of using milk.
19. Specify the temperature of hot dishes when serving.
20. What is the shelf life of prepared meals?
21. Where and when is the quality of the prepared food recorded?
22. Is it possible or not and why to use leftover food from the previous day?

23. How often can the same dish be repeated within 7-10 days?

24. What documents should be on products when they are received at the enterprise? essential nutrition?

25. How should food products be transported?

26. What is meant by shelf life and sales periods of products and prepared foods?

27.What are the shelf life and sale dates for semi-finished products made from beef, pork andlamb.

28.What are the shelf life and sale dates for culinary products made from beef and pork?and lamb.

29.What are the shelf life and sale dates for sausages and sausage products?

30.What are the storage and sale periods for fish and fish products?

31.What are the storage and sale periods for milk and dairy products?

32.What are the storage and sale periods for vegetable dishes?

33.What are the shelf life and sale dates of flour confectionery products?

34.Specify the shelf life and sale period of dishes and culinary products produced at the enterprise.

35. Specify the sanitary and hygienic requirements that apply to the technological equipment of the food block?

36. List the basic requirements for culinary processing of food.

37.What is meant by primary processing of food products, and what are the requirementswhat are the claims against her?

38. How is tableware washed (processing stages)?

39. How is tableware degreased?

40. How is tableware disinfected?

41. How is tableware scalded?

42. Where and how is tableware dried and stored?

43. How is cutlery processed?

44. What is the machine method of processing dishes?

45. How are kitchen utensils processed?

46.Where are kitchen utensils stored?

47. What hygienic requirements apply to a chopping block and an axe for cutting meat carcasses?

48. How should defrosting (defrosting) of frozen meat be carried out?sa?

49. How should frozen fish be defrosted?

APPENDIX 1

Features of conducting a rejection test to control the quality of prepared food in school kitchens

Form for filling out the journal for quality control of prepared food(rejection journal)

General Provisions

1. Quality control of prepared food in school kitchens is carried out using the method of culling or organoleptic analysis.

2. The rejection test (hereinafter referred to as the assessment) in school kitchens is carried out on the basis of an organoleptic or sensory assessment of public catering products, flavoring and aromatic substances using the sense of smell, taste, sight, touch and hearing.

Organoleptic indicators of products include: appearance (color, shape, transparency, shine, cross-sectional view, etc.), consistency, smell, taste.

3. When assessing the quality of school food products, it is necessary to comply with certain requirements, including those for specialists, premises, devices, materials and the assessment system.

4. Daily assessment of school food products should be carried out by a nurse who has certain skills, knows the methodology for organoleptic analysis and the quality assessment system, and does not have any restrictions due to medical indications (chronic diseases and allergies).

Before conducting a rejection test, the nurse must familiarize herself with the current technical documents for the school food products being tested, including the requirements for their quality. A weekly (on the first or fifth day of the week) assessment is conducted by a rejection committee, which includes the school principal, a nurse, and a representative of the school's parent committee.

5. The room in which the assessment is carried out must be well ventilated, but without drafts. At the same time, the room must be well lit, preferably with diffused daylight without direct sunlight. The illumination of the work places must be uniform and not less than 500 lux. Artificial light must not change the natural color of the product, which is especially important when detecting differences in color shades. To ensure uniform, diffused light, the walls of the room must be painted in light colors.

6. To conduct the assessment, it is necessary to use the following auxiliary devices, inventory and materials: a chef's needle, spoons made of stainless steel or other metal alloys for sampling liquid dishes; knives, forks made of stainless steel or other metal alloys for sampling dishes with a dense consistency; a kettle with boiling water for rinsing utensils; plates or dishes for sampling; ladles for sampling from cooking vessels; neutralizing products that restore taste sensitivity (white wheat bread, still mineral drinking water, cold black leaf tea); paper napkins; a notebook and pencil for notes.

7. The quality assessment of finished products based on organoleptic indicators is determined for each batch immediately after its production before sale.

8. At the beginning of the assessment, the indicators determined by sight (appearance, shape, color, transparency, shine, etc.) should be taken into account, then the indicators determined by smell and touch, and finally the properties assessed only by tasting (juiciness, crumbliness, friability, fineness, tastiness, and such specific indicators as the saltiness of meat, fish, vegetable and fermented products, rancidity of fats, etc.).

9. First, they taste (try) dishes (products) that have a delicate, mild taste and smell (for example, cereal soups).

It is not allowed to present a sour dish for evaluation after a sweet dish, and a bitter dish before a sweet or sour dish. Sweet dishes are evaluated last. The sample should be chewed well, spreading it over the entire surface of the oral cavity and holding it in the mouth for 5-10 seconds so that the soluble substances of the product pass into saliva and the resulting solution affects the taste buds. It is not recommended to take a large amount of the product into the mouth (more than 5 g). To detect bitterness, the product should be chewed slowly, it should be in the mouth longer than when determining sweet and salty tastes.

10. When assessing a dish that is clearly of poor quality, as determined by its appearance and smell, a taste test is not carried out.

11. Taste buds can adapt to different taste sensations, so it is necessary to take breaks during the analysis: rinse your mouth with boiled water or chew slightly dried wheat bread.

12. General rules must be observed in the process of assessing various groups of dishes and culinary products. The assessment must be carried out at the same temperature at which these dishes (products) are sold and consumed. The assessment of dishes at the service station begins with an assessment of the correctness of their portioning, presentation and serving: the suitability of dishes, the arrangement of garnish, decorations, etc.

Features of the evaluation of school food products

13. To conduct an assessment*seasoning soups*(cabbage soup, borscht, rassolnik, solyanka, etc.) the contents of the container (pot) are carefully but thoroughly mixed and poured into a plate. First, the liquid part is separated with a spoon and tasted (tested). Tasting is done without adding sour cream, as it masks possible defects. Then the solid part is disassembled and its composition is compared with the recipe (for example, the presence of onions, parsley, etc.). Each component is examined separately, noting the ratio of liquid and solid parts, the consistency of the products, the shape of the cut, the taste. Finally, the dish is tasted as a whole with the addition of sour cream, if it is required by the recipe.

14. Key quality indicators*clear soups*are transparency, concentrated taste due to the presence of extractive substances (for meat and fish broths) and smell. During organoleptic analysis of clear soups, attention is primarily paid to the

appearance of the broth, its color, the absence of suspended particles, and glitter of fat. All side dishes for soups are tasted (tested) separately, and those that are poured with broth when served are also tasted together with it, paying attention to whether they spoil the appearance of the dish: whether they make it cloudy, whether fat floats to the surface from them, etc.

15. When assessing quality*cream soups*The contents of the container (pot) are thoroughly mixed with a ladle and a sample of the soup is taken. Then, pouring it out in a stream, the consistency is determined, the thickness, viscosity, homogeneity, presence of dense particles, and color are assessed. After this, the smell is determined and the soup is tasted. Garnish for cream soups, which according to the recipe is not strained, is tasted separately.

16. When assessing*cold soups*evaluate their appearance and taste the liquid and solid parts separately. The solid part is disassembled and its composition is determined, the thoroughness of cleaning, the shape of the cut, the consistency of vegetables, meat products and fish products are checked. After this, the soup is tasted (tested) without sour cream and then with sour cream. If the production facility has semi-finished products for soups (for example, sliced products for okroshka, botvinya, etc.), their quality is also checked.

17. When assessing*sauce dishes*determine their consistency by pouring them in a thin stream and tasting them. Then determine the color, smell and consistency of the fillings, the shape of their cutting, the composition (onions, cucumbers, root vegetables, etc.) and taste.

18. Evaluation of main, cold and sweet dishes: dishes with a dense consistency (*second*, *cold*, *sweet*) after assessing the appearance, they are cut into pieces on a common plate, which the assessor then transfers to his own plates.

19. Evaluation of dishes from boiled and fried vegetables. When checking the quality of dishes from boiled and fried vegetables, the correctness of the technological processing of raw materials is first assessed, and then the consistency, smell, taste and compliance of the dishes with the recipe are examined in the established order.

20. When evaluating dishes made from stewed and baked vegetables, the vegetables and sauce are tasted separately, and then the dish is tasted as a whole.

21. When evaluating dishes made from cereals and pasta, they are spread in a thin layer along the bottom of the plate and the absence of foreign impurities and inclusions, and the presence of lumps are established. In the case of pasta, attention is paid to their consistency: how easily it cooks and sticks together, as well as the specifics of the technology, for example, pasta of Italian cuisine.

22. When evaluating fish dishes, check for correct cutting and compliance with recipes; correct preparation of semi-finished products (slicing, breading); degree of readiness; smell and taste of products; compliance of garnish and sauce with a given product.

23. For meat dishes, first evaluate the appearance of the dish as a whole and the meat product separately: the shape of the cut, the condition of the surface, the breading. Then check the degree of readiness of the products by piercing the

consistency and color of the cut with a chef's needle. After that, evaluate the smell and taste of the dish, including the compliance of the culinary use of the semi-finished meat product with the type of product, the technological feasibility of the selection of sauce and garnish.

24. For meat sauce dishes, all of its components (main dish, sauce, side dish) are tasted separately, and then the dish is tasted as a whole.

25. When assessing*cold dishes*The general scheme for conducting organoleptic analysis is applicable, but taking into account the features that reflect the specificity of this group of dishes. Particular attention is paid to the appearance of the dish: the care with which it is decorated, the correct slicing of the main products; their consistency, the compatibility of products, sauces and side dishes, the selection of decorations.

26. When evaluating sweet hot dishes (soufflé, puddings, croutons, hot desserts, etc.), first examine the appearance: nature of the surface, color and condition of the crust; mass on the cut (break): bakedness, lack of tempering. Then evaluate the color, smell and taste.

27. When evaluating flour dishes and flour culinary products, their appearance is examined (the nature of the dough surface, the color and condition of the crust of pies, etc., the shape of the product), attention is paid to the ratio of minced meat and dough, the quality of the minced meat (its juiciness, degree of readiness, composition), and then the smell and taste are determined.

28. Evaluation of flour confectionery and bakery products: characterizing the appearance of flour confectionery and bakery products,pay attention to the condition of the surface, its finish, color and condition of the crust, absence of crust separation from the crumb, thickness and shape of the products. Then evaluate the condition of the crumb: bakedness, absence of signs of undermixing, nature of porosity, elasticity, freshness, absence of tempering.

Evaluation system for the results of defective assessment

29. The basis of the applied scoring system for the analysis results is the establishment of a relationship between the quality of a dish (product) and the corresponding score.

30. Each quality indicator of dishes and culinary products (appearance, color, smell, consistency, taste) is assessed on a five-point scale: 5 - excellent quality; 4 - good; 3 - satisfactory; 2 - unsatisfactory; 1 - very poor (defective).

31. During organoleptic analysis, a comparison is made of the actually established quality indicators of the analyzed dishes and products with the data provided in the technological documents (technological maps, technical and technological maps, technological instructions).

32. It is recommended that the reduction in the point rating of the quality indicators of dishes (culinary products) for detected defects be carried out in accordance with Tables 1 and 2, given in paragraphs 32 and 33. In Tables 1 and 2, various defects are grouped according to the main quality indicators, taking into account the group characteristics of dishes and products.

33. The overall quality assessment of the analyzed dish (product) is calculated as the arithmetic mean with an accuracy of one decimal place.

1) Score"5"evaluate dishes (products) prepared strictly according to the approved recipe and technology. Organoleptic indicators must comply with the requirements of technical and technological documents.

2) Score"4"dishes (products) prepared in compliance with the recipe and technology, but having minor or easily correctable deviations are assessed. For example, such deviations may include a characteristic but weak smell and taste, uneven slicing, a slightly undersalted dish (product), etc.

3) Score"3"evaluate dishes (products) with more significant deviations from the requirements of the recipe and technology, but suitable for sale without processing. The disadvantages of such dishes include non-compliance with individual ratios of components, drying out of the surface of the products, distortion of the shape of the products, improper cutting of vegetables, weak or excessive smell of spices, the presence of liquid in salads, tough consistency of meat, etc. If the taste and smell of a dish (product) are evaluated at 3 points each, then, regardless of the value of other indicators, the dish (product) is evaluated at no more than 3 points.

4) Score"2"evaluate dishes (products) with significant defects: with an unusual taste or smell, products that are oversalted, undercooked or underdone, burnt, have lost their shape or characteristic consistency. Such products are classified as defective, and a product rejection report is issued. Persons who have allowed defects to occur are held liable in accordance with current legislation.

5) Dishes (products) are rejected and removed from sale if at least one of the organoleptic quality indicators is assessed at 2 or 1 point.

APPENDIX 2.

SOME INDICATORS USED TO STUDY HUMAN NUTRITIONAL STATUS

Table 24. Ideal body weight of men and women depending on height, kg

Height, cm	Men			Height, cm	Women		
	asthenics	normosthenics	hypersthenics		asthenics	normosthenics	hypersthenics
155.0	49.3	56.0	62.2	152.5	47.8	54.0	59.0
157.5	51.7	58.0	64.0	155.0	49.2	55.2	61.6
160,0	53.5	60.0	66.0	157.5	50.8	57.0	63.1
162.5	55.3	61.7	68.0	160,0	52.1	58,58	64.8
165.0	57.1	63.5	69.5	162.5	53.8	60.1	66.3
167.6	59.3	65.8	71.8	165.0	55.3	61.8	67.8
170,0	60.5	67.8	73.8	167.5	56.6	63.0	69.0
172.5	63.3	69.7	76.8	170,0	57.8	64.0	70.0
175.0	65.3	71.7	77.8	172.5	59.0	65.2	71.2
175.5	67.3	73.8	79.8	175.0	60.3	66.5	72.5
180,0	68.9	75.2	81.2	177.5	61.5	67.7	73.7
182.5	70.9	77.2	83.6	180,0	62.7	68.9	74.9
185.0	72.8	79.8	85.2				

:he age of over 30 years, an increase in body weight is allowed from2.5 kgto5 kgfor women, from 2.5 to6 kgfor men

Table 25. Assessment of nutritional status by biomass index (BMI)

Biomass index Quetelet		Nutritional status assessment
Women	Men	
< 16	< 16	Hypotrophy III degree.
16–17.99	16–16.99	Hypotrophy II degree.
18–20	17–18.49	Hypotrophy stage I
20.1–24.99	18.5–23.8	Range of changes with adequate nutrition
22.0	20.8	Optimal average value of adequate nutrition
25–29.99	23.9–28.5	Obesity stage I

Biomass index Quetelet		Nutritional status assessment
Women	Men	
30–39.99	28.6–38.99	Obesity stage II
>40	>39	Obesity stage III

Table 26. Maximum permissible body weight by age groups depending on gender, age and height, kg

Height, cm	Body weight by age groups, kg									
	20-29		30-39		40-49		50-59		60-69	
	m	and	m	and	m	and	m	and	m	and
148	50.8	48.4	55.0	52.3	56.6	54.7	56.0	53.2	53.9	52.2
150	51.3	48.9	56.7	53.9	58.1	56.5	58.0	55.7	57.3	54.8
152	53.1	51.0	58.7	55.0	61.5	59.5	61.1	57.6	60.3	55.9
154	55.3	53.0	61.6	59.1	64.5	62.4	63.8	60.2	61.9	59.0
156	58.5	55.8	64.4	61.5	67.3	66.0	65.8	62.4	63.7	60.9
158	61.2	58.1	67.3	64.1	70.4	67.9	68.0	64.5	67.0	62.4
160	62.9	59.8	69.2	65.8	72.3	69.9	69.7	65.8	68.2	64.6
162	64.6	61.6	71.0	68.5	74.4	72.2	72.7	68.7	69.1	66.5
164	67.3	63.6	73.9	70.8	77.2	74.0	75.6	72.0	72.2	70.0
166	68.8	65.2	74.5	71.8	78.0	76.5	76.3	73.8	74.3	71.5
168	70.8	68.5	76.2	73.7	79.6	78.2	77.9	74.8	76.0	73.3
170	72.7	69.2	77.7	75.8	81.0	79.8	79.6	76.8	76.9	75.0
172	74.1	72.8	79.3	77.0	82.8	81.7	81.1	77.7	78.3	76.3
174	77.5	74.3	80.8	79.0	84.4	83.4	82.5	79.4	79.3	78.0
176	80.8	76.8	83.3	79.9	86.1	84.6	84.1	80.5	81.9	79.1
178	83.0	78.2	85.6	82.4	88.0	86.1	86.5	82.4	82.8	80.9
180	85.1	80.9	88.0	83.9	89.9	88.1	87.5	84.1	84.4	81.6
182	87.2	83.3	90.6	87.7	91.4	89.3	89.5	86.5	85.4	82.9
184	89.1	85.5	92.0	89.4	92.9	90.9	91.6	87.4	88.0	85.8

Height, cm	Body weight by age groups, kg									
	20-29		30-39		40-49		50-59		60-69	
	m	and	m	and	m	and	m	and	m	and
186	93.1	89.2	95.0	91.0	96.6	92.9	92.8	89.6	89.0	87.3
188	95.8	91.8	97.0	94.4	98.0	95.8	95.0	91.5	91.5	88.8
190	97.1	92.3	99.5	96.6	100.7	97.4	99.4	95.6	94.8	92.9

The constitutional type is determined by measuring the angle formed by the costal arches with the apex at the end of the xiphoid process of the sternum. Evaluation of the results: angle 900 – normosthenic type; acute (<900) – asthenic type; obtuse (>900) – hypersthenic type.

The harmony of the physique is determined by the formula: GT = $\frac{A}{P} \cdot 100$,

where: GT – body composition harmony, %

A – chest circumference during breathing pause, cm

R – height, cm

Evaluation of results: GT within 50-55% - harmonious;

GT < 50% – disharmonious, insufficient development;

GT> 55% – disharmonious, excessive development.

The relative amount of the fat component of body mass based on the sum of the four skin-fat folds named above (p. 2) is estimated using Table 4.

Table 27. Thickness of fat folds as an indicator of the degree of obesity, mm

Total thickness of folds, mm	Amount of fat, %	
	for men	in women
20 – 30	6.7 – 12.0	9.2 – 15.0
50 – 60	18.0 – 20.2	22.0 – 24.6
90 – 100	25.0 – 26.2	30.3 – 31.8
130 – 150	29.4 – 31.1	35.4 – 37.4
180 – 200	33.2 – 34.5	40.0 – 41.5

3. Physiometric indicators of nutritional status. The energetic and plastic completeness of nutrition is assessed by determining muscle strength (manual, back dynamometry, ergometry), changes in pulse and respiration after physical exertion, indicators that characterize fatigue - tremometry, chronoreflexometry, number search and others (discussed in detail in the section “Occupational Hygiene”).

The body's supply of vitamins is assessed using a number of functional tests - capillary resistance, adaptometry and others (discussed in the next lesson).

4. Clinical indicators –determination of symptoms of diseases of alimentary origin (gastritis, stomach ulcers, duodenal ulcers, liver diseases, gall bladder, gout, hypo-, avitaminosis and others).

5. Biochemical indicatorsblood and urine,hematological and other indicators of nutritional status

6. The nutritional status of an individual or a group characterized by the same diet and work regime can also be studied and assessed by comparing the body's energy expenditure, determined by the severity and intensity of the work performed, and the needs for nutrients calculated on their basis and laboratory studies of the quantity and quality of components of the daily food ration.

FOOD HYGIENE TESTS

1. Rational nutrition:

A) corresponds in caloric content to the energy expenditure of a person;

b) contains all nutrients in the required quantities;

V) balanced in terms of the content of essential nutrients;

G) requires adherence to a certain regime.

2. Daily energy expenditure consists of:

A) from the basal metabolic rate;

b) specific dynamic action of food;

V) the severity of work activity.

3. The qualitative composition of food is characterized by:

A) fats;

b) proteins;

V) vitamins;

G) mineral salts;

d) carbohydrates.

4. The biological role of proteins is as follows:

A) are plastic material;

b) participate in the synthesis of hormones;

V) participate in the synthesis of enzymes;

G) participate in the synthesis of antibodies.

5. With protein deficiency the following disorders occur:

A) development of fatty infiltration of the liver;

b) changes in the chemical composition and morphological structure of bones;

V) changes in the endocrine glands and a decrease in their functional capacity;

d) decrease in the immunobiological reactivity of the body;

6. Rich sources of complete protein are:

A) cereals and their processed products;

b) meat and meat products;

V) milk and dairy products;

G) fish and fish products;

d) vegetables and fruits.

7. The biological role of fats is as follows:

A) are an important source of energy;

b) improve the taste of food;

V) are a source of phosphatides and polyunsaturated fatty acids;

G) are a source of B vitamins;

d) are sources of fat-soluble vitamins.

8. Along with fats, the body receives:

A) polyunsaturated fatty acids;

b) phosphatides;

V) tocopherols and sterols;
G) calcium salts;
d) fat-soluble vitamins.

9. The biological role of polyunsaturated fatty acids is as follows:

A) participate in carbohydrate metabolism;
b) promote the removal of cholesterol from the body;
V) increase the elasticity of blood vessel walls.

10. Rich sources of polyunsaturated fatty acids are:

A) butter;
b) vegetable oils;
V) mutton fat;
G) fish oil.

11. The daily fat content should be vegetable fats, %:

A) 10-15;
b) 25-30;

12. BiologicalThe role of carbohydrates is as follows:

A) are a rich source of energy;
b) are a structural element of cells and tissues;
V) are a source of vitamin C.

13. The main sources of carbohydrates are:

A) vegetables and fruits;
b) meat and meat products;
V) cereals and their processed products;
G) milk and dairy products;
d) sugar and confectionery.

14. The biological role of calcium is as follows:

A) participates in the formation of skeletal bones;
b) participates in the blood clotting process;
V) necessary for maintaining normal neuromuscular excitability;
G) promotes the absorption of proteins.

15. The absorption of calcium in the human body is influenced by its ratios:

A) with fats;
b) phosphorus;
V) carbohydrates;
G) magnesium.

16. Products— rich sources of easily absorbed calcium are:

A) milk and dairy products;
b) vegetables and fruits;
V) grain legumes;
G) meat and meat products;
d) fish and fish products.

17. The diet should be understood as:

A) frequency of meals;

b) maintaining minimum intervals between meals;
V) distribution of calories between meals.

18. Causes leading to the occurrence of C-hypovitaminosisin winter-spring time, are:

A) decreased body resistance;
b) reduction in the content of vitamin C in foods;
V) increase in UV radiation in spring.

19. Products with a vitamin C content of over 100 mg% are:

A) strawberry;
b) lemons;
V) rose hip;
G) black currant;
d) sea buckthorn.

20. The destruction of vitamin C in foods is facilitated by:

A) alkaline environment;
b) acidic environment;
V) oxygen access;
G) ascorbinase;
d) heavy metal salts.

21. The following factors help preserve vitamin C in first courses:

a) adding starch;
b) presence of heavy metal salts;
V) prolonged heating of products;
G) adding egg whites;
d) acidic environment.

22. The average amount of vitamin C lost during cooking is,%:

A) 10-15;
b) 30;
V) 50.

23. The main sources of vitamin P are:

A) cranberry;
b) potato;
V) cowberry;
G) chokeberry;
d) plum.

24. Animal products that are rich sources of vitamin Bt are:

A) pork;
b) liver;
V) butter;
G) eggs;
d) beef.

25. The following diseases are associated with Bi-vitamin deficiency:

A) scurvy;
b) rickets;

V) alimentary polyneuritis;
G) fatty infiltration of the liver;
d) hemeralopia.

26. The following foods are sources of vitamin B2:

A) liver;
b) buckwheat groats;
V) tomatoes;
G) green peas;
d) eggs.

27. Causes of impaired vitamin B synthesis in the body-This:

A) treatment with sulfonamides;
b) antibiotic treatment;
V) bowel diseases;
G) acute respiratory diseases.

28. Animal products that are sources of vitamin PP are:

A) meat;
b) fish;
V) milk;
G) potato;
d) liver.

29. Good sources of vitamin PP are plant-based foods:

A) bread;
b) vegetables;
V) legumes;
G) cereals;
d) fruits.

30. Sources of the active form of vitamin A are the following products:

A) carrot;
b) red pepper;
V) tomatoes;
G) eggs;
d) liver.

31. Sources of carotene are:

A) carrot;
b) red pepper;
V) tomatoes;
G) eggs;
d) liver.

32. Diseases associated with vitamin D deficiency in the body are:

A) rickets;
b) osteoporosis;
V) osteomalacia;
G) cirrhosis.

33. To eliminate the epidemiological danger of milk, the following sanitary rules must be observed:

A) prevention of infection and contamination of milk during milking, storage and transportation;

b) keeping milk before transportation for at least 24 hours;

V) mechanized milking, straining milk through cloth.

34. Specific gravity of skimmed milk:

A) will not change;

b) will increase;

V) will decrease.

35. Milk freshness is assessed:

A) by organoleptic properties;

b) acidity;

V) dry residue;

G) reductase test;

d) coagulation when boiled.

36. The following helminthiases can be transmitted to humans through fish:

A) diphyllobothriasis;

b) opisthorziasis;

V) tenniidosis.

37. The ratio of calcium and phosphorus in milk

A) 1:2;

b) 1:4;

V) 1.0:0.8.

38. A batch of meat obtained from animals suspected of being infected with foot-and-mouth disease:

A) recognized as conditionally fit for food purposes;

b) sent for technical disposal;

V) are used for the production of canned goods and cooked sausages.

39. Humans can be infected with helminthiasis through pork:

A) tenniidosis (tennisosis);

b) trichinosis;

V) echinococcosis;

G) diphyllobothriasis;

d) opisthorchiasis.

40. Microorganisms that cause foodborne toxic infections are:

A) enterotoxigenic staphylococcus;

b) salmonella;

V) E. coli;

G) microorganisms of the Proteus group;

d) O. perfringens.

41. The causative agents of food poisoning are microorganisms-organisms:

A) enterotoxigenic staphylococcus;
b) Cl. perfringens;
V) E. coli;
G) Cl. botulinum;
d) salmonella.

42. Signs characteristic of food poisoning include: are:

A) mass character;
b) contagiousness;
V) sudden onset of disease;
G) acute course of the disease;
d) connection of the disease with food intake.

43. Most often, the occurrence of salmonella infection is associated with the following products and dishes:

A) animal meat;
b) jellied meats, head cheese, aspic dishes;
V) eggs of waterfowl;
G) vegetable salads, vinaigrettes;
d) minced meat products.

44. Most often, the occurrence of food poisoning caused by Cl. perfringens is associated with the following products:

A) meat products;
b) confectionery with cream;
V) fish;
G) salads and vinaigrettes;
d) canned vegetables.

45. Most often, the occurrence of food poisoning caused by B. cereus is associated with the following food products:

A) salads and vinaigrettes;
b) semi-finished meat and fish products;
V) eggs;
G) milk and dairy products;
d) canned vegetables.

46. The most common causes of staphylococcal intoxication are the following products:

and dishes:

A) eggs;
b) minced meat products;
V) cakes and pastries with custard;
G) milk and dairy products;
d) canned fish in oil, laid out in rows.

47. Sources of milk infection with staphylococci on a dairy farm are:

A) milkmaids with pustular lesions on their hands;

b) healthy people are carriers of enterotoxigenic staphylococci;
V) animals suffering from mastitis;
G) animals sick with brucellosis;
d) farm workers with sore throat.

48. The permanent habitats of botulism pathogens are:

A) soil;
b) water of rivers, lakes;
V) animal intestines;
G) fish intestines;
d) human intestine.

49. The most common causes of botulism are the following products:

A) mushrooms, home-canned;
b) milk and dairy products;
V) canned meat, lard and homemade hams;
G) cold smoked fish;
d) Homemade canned vegetables and fruits.

50. General measures for preventing food poisoning of bacterial origin are:

A) preventing the entry of microorganisms that cause food poisoning into food products;
b) preventing the growth of microorganisms in food products by using cold;
V) destruction of microorganisms in food by heat treatment.

GLOSSARY

Food safety is the state of reasonable confidence that food, under normal conditions of use, is not harmful and does not pose a danger to the health of present and future generations.

Biological value is an indicator of the quality of food protein, reflecting the degree to which its amino acid composition corresponds to the body's need for amino acids to form protein.

Biological efficiency is an indicator of the quality of food fats, reflecting their content of essential polyunsaturated fatty acids.

Biologically active food supplements are natural (identical to natural) biologically active substances intended for consumption simultaneously with food or introduction into food products and used as an additional source of food and biologically active substances to optimize all types of metabolism in various functional states in order to increase the effectiveness of therapeutic and preventive nutrition for the population.

Total Quality Management (TQM) is a concept that provides for the comprehensive, targeted and well-coordinated application of quality management systems and methods in all areas of activity from research and development to after-sales service.

State control (supervision) - conducting an inspection of the compliance by a legal entity or individual entrepreneur in the course of their activities with mandatory requirements for goods (works, services) established by federal laws or regulatory legal acts adopted in accordance with them (hereinafter also mandatory requirements).

Dietary products are specialized products intended to replace in the diet of sick people conventional products that are not recommended or are restricted for medical reasons and that differ from them in chemical composition and/or physical properties.

Acceptable Daily Intake (ADI) is the amount of a food additive, calculated on a body weight basis, that can be consumed daily throughout life without risk to health (standard weight 60 kg). Estimated by the Joint FAO/WHO Expert Committee on Food Additives.

Food quality is a set of characteristics of food products that can satisfy human needs for food under normal conditions of their use.

Correction is an action taken to eliminate a nonconformity.

A critical control point (CCP) is a stage of production where control can be applied to prevent or eliminate a safety hazard or reduce it to an acceptable level.

Therapeutic nutrition is nutrition adapted in terms of chemical composition, energy value of the diet, technology of preparation of dietary dishes and dietary regimen to the clinical and pathogenetic features of the disease and the stage of the disease.

Control measures are a set of actions by officials and state control (supervision) bodies related to the verification of compliance by a legal entity or

individual entrepreneur with mandatory requirements and the adoption of measures based on the results of the control.

Regulatory documents - technical regulations, state standards, sanitary and veterinary rules and regulations that establish requirements for the quality and safety of food products, materials and products, quality and safety control, conditions of their manufacture, storage, transportation, sale and use, disposal or destruction of low-quality, dangerous food products, materials and products.

Fortified foods are foods enriched with biologically active food components.

Human nutritional status is the degree to which the body is provided with energy and essential nutrients.

Food additives are natural or artificial substances and their compounds, specially introduced into food products during their manufacturing process in order to impart certain properties to food products and/or to preserve the quality of food products.

Food products are products, in natural or processed form, consumed by humans (including baby food, dietary food products), bottled drinking water, alcoholic beverages (including beer), soft drinks, chewing gum, as well as food raw materials, food additives and biologically active additives.

Good Manufacturing Practice (GMP) - the use of disposable sanitary clothing, shoe covers, latex gloves, gauze masks when working with perishable products that are not subject to further heat treatment.

Prebiotics are food substances that selectively stimulate the growth and/or biological activity of representatives of the protective intestinal microflora, thereby helping to maintain its normal composition and biological activity.

Probiotic products are food products made with the addition of live cultures of probiotic microorganisms and prebiotics.

Preventive nutrition is nutrition intended to prevent the impact on the body of unfavorable production and environmental factors, as well as risk factors for the development of diseases.

Technical documents are documents in accordance with which the production, storage, transportation and sale of food products, materials and goods are carried out (technical conditions, technological instructions, recipes and others).

Technical regulation is the legal regulation of relations in the field of establishing, applying and fulfilling mandatory requirements for products, production processes, operation, storage, transportation, sale and disposal, as well as in the field of establishing and applying on a voluntary basis requirements for products, production processes, operation, storage, transportation, sale and disposal, performance of work or provision of services and the legal regulation of relations in the field of conformity assessment.

A process flow chart is a schematic overview of production operations or processes, a description of raw materials, processing stages and packaging.

LITERATURE

1. Food safety. L.V. Donchenko, V.D. Nadykta. - M.: Pishchepromydate, 2001.

2. Hygiene. Ed. G.I. Rumyantsev. - M.: GEOTAR Medicine, 2000.

3. Hygiene. R.D. Gabovich, S.S. Poznansky, G.Kh. - Kiev. - Higher School.- 1984. 4. 4. Hygiene of nutrition. K.S. Petrovsky, V.D. Vanhanen - M.: Medicine, 1981

5. Hygiene and the Basics of Human Ecology. Yu.P. Pivovarov, V.V. Korolik, L.S. Zinevich.- Rostov n/D: "Phoenix", 2006, 2010.

6.Doctrinefood security of the Russian Federation (adopted by the Decree of the President of the Russian Federation dated 30.01.2010 No. 120);

7. Dunien D. - Food products and their impact on human health.//Questions of nutrition, 2001, No. 6, pp. 11-13.

8. Kuchma V. R., Serdyukovskaya G. I., Demin A. K.Guide to hygiene and health protection of schoolchildren. - M.: Medicine, 2008.

9. Kuchma V.R.Theory and practice of hygiene of children and adolescents at the turn of the millennium / Scientific Center of Health of the Russian Academy of Medical Sciences. - M., 2007.

10. Lakshin A.M. Kataeva V.A. General hygiene with the basics of human ecology. - M.: Medicine, 2004

11. MU 1-40/3805-91 “Methodological guidelines for laboratory quality control of public catering products” (dated 11.11.1991);

12. MR 4237-86 “Methodological recommendations for hygienic control of nutrition in organized groups”;

13.NationalstandardGOST R 50764-2009"Public catering services. General requirements";

14.Norms of physiological needs for energy and nutrientsfor different groupspopulation of the Russian Federation - MR 2.3.1.2432-08 of 12/18/2008

15. General hygiene. A, A. Minkh.-M.: Medicine.-1984.

16. General hygiene. G.I. Rumyantsev, E.P. Vishnevskaya, T.A. Kozlova. - M.: Medicine.-1985.

17. Fundamentals of the state policy of the Russian Federation in the field of healthy nutrition of the population for the period up to 2020(approved by the order of the Government of the Russian Federation dated 25.10.2010 No. 1873-r) andaction planon the implementation of the principles of the state policy of the Russian Federation in the field of healthy nutrition of the population for the period up to 2020 (approved by the order of the Government of the Russian Federation dated 30.06.2012 No. 1134-r);

18. Pivovarov Yu.P., Korolik V.V. Guide to laboratory classes on hygiene and the basics of human ecology. Moscow: Publishing center "Academy". - 2010.

19. Recommendations on rational food consumption standards that meet modern requirements for healthy nutrition(approved by order of the Ministry of Health and Social Development of the Russian Federation dated 02.08.2010 No. 593n);

20. Guide to laboratory classes on general hygiene. Part 1. Food hygiene. - M.: RUDN University Press, 1999.

21. SanPiN 2.3.2.1078-01"Hygienic requirements for the safety and nutritional value of food products. Sanitary and Epidemiological Rules and Regulations" *with additions and amendments as amended by SanPiN 2.3.2.1280-03 (No. 2), SanPiN 2.3.2.2227-07 (No. 5), SanPiN 2.3.2.2340-08 (No. 6), SanPiN 2.3.2.2351-08 (No. 7), SanPiN 2.3.2.2354-08 (No. 8), SanPiN 2.3.2.2362-08 (No. 9), SanPiN 2.3.2.2401-08 (No. 10), SanPiN 2.3.2.2421-08 (No. 11), SanPiN 2.3.2.2422-08 (No. 12), SanPiN 2.3.2.2430-08 (No. 13), SanPiN 2.3.2.2509-08 (No. 14), SanPiN 2.3.2.2567-09 (No. 15), SanPiN 2.3.2.2575-10 (No. 16), SanPiN 2.3.2.2603-10 (No. 17), SanPiN 2.3.2.2650-10 (No. 18), SanPiN 2.3.2.2722-10 (No. 19), SanPiN 2.3.2.2757-10 (No. 21),SanPiN 2.3.2.2804-10 (No. 22), SanPiN 2.3.2.2868-11 (No. 23), SanPiN 2.3.2.2871-11 (No. 24), SanPiN 2.3.2.2888-11 (No. 25).

22. SanPiN 2.3.2.1293-03"Hygienic requirements for the use of food additives" with additions and amendments No. 1, 2, 3 (as amended by SanPiN 2.3.2.2364-08, SanPiN 2.3.2.2508-09, SanPiN SanPiN 2.3.2.2795-10).

23. SanPiN 2.3.2.1290-03 "Hygienic requirements for the organization of production and circulation of biologically active food additives (BAA)".

24. SanPiN 2.3.4.545-96 "Production of bread, bakery and confectionery products. Sanitary rules and regulations" (applied in the production of bakery and flour confectionery products in the food service area of an educational institution).

25. SP 2.3.6.1066-01"Sanitary and epidemiological requirements for trade organizations and the circulation of food raw materials and food products in them."

26. Sanitary rules and regulations "Production of milk and dairy products" State Sanitary and Epidemiological Surveillance Committee of Russia 2.3.4.551-96

27. Sanitary norms and rules "Production of bread, bakery and confectionery products" of the Russian Sanitary and Epidemiological Surveillance Committee 2.3.4.545-96

28. Speyers G. Possibilities of safety assessment of new food products//Questions of nutrition. - 2002. - No. 1. - p.35-42

29. Tutelyan V. A.The concept of optimal nutrition: scientific substantiation // Population health and habitat. Information bulletin. - M.: ZniSO, 2009. November. - No. 11. P. 6.

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FOOD HYGIENE

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