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**Evaluation of Actual Nutrition, Quality and Safety of Food Raw Materials and Food Products
in the Republic Sakha (Yakutia)**

ABSTRACT

The evaluation of actual nutrition of the population in various medical and economic areas of the republic (industrial, agricultural, Arctic) by frequency analysis of food consumption, in accordance with a standardized questionnaire developed by FGBNU «Nutrition Research Institute» employees and the State Research Center for Preventive Medicine, Ministry of Health of the Russian Federation and supplemented by the Nutrition Center of Research Health Institute NEFU named after M.K. Ammosov is carried out. The analysis of compliance of the quality control and food safety in the Republic Sakha (Yakutia), the requirements of the legislation of the Russian Federation, legislation of the Customs Union is made. The parameters of the consumption of certain food groups by people living in a variety of medical and economic areas of the Republic, including products of local food staples and national dishes are established. Also the researchers identified problems, causes of biosafety of food in the Republic.

Keywords: actual nutrition, frequency method of studying, food, local food raw materials, the national dish, the doctrine of the food security of the Russian Federation, monitoring, supervision, quality food production and food safety, sanitary-chemical, microbiological, parasitological parameters.

INTRODUCTION

The actual nutrition of the population depends on many factors, among which are the main, it is the socio-economic, climatic and geographic conditions of residence and national-cultural. At present, social and economic reforms in the Republic of Sakha (Yakutia) are associated with the exacerbation of many negative phenomena, including poor maintenance of various groups of the population balanced diet according to physiological norms, reducing the quality and safety of food products, provoke the development of disease and reduced quality of life population. Given the characteristics of the region of residence, the country has a difficult situation with food security quality and safety of food, especially in remote areas. This is largely due to the high proportion of transport costs and complex multistep commercial security system, which significantly increases the cost of food and essential commodities related to the population of the republic as a whole.

The staff of the Center for Food Research Institute of Health NEFU named M.K. Ammosov monitoring the actual power of the adult population of the republic by the daily food recall revealed an unsatisfactory response power dynamics for 10 years (2001-2012). The parameters inadequate intake certain food groups such as dairy, dairy, meat and fish products, and excessive consumption of bakery, confectionery, sugar and sweets. [4]

In the study of food energy value and chemical composition of rations in accordance with the approved rules of physiological consumption, low levels of most necessary nutrient reserves are revealed [3]. The greatest contribution of simple carbohydrates and saturated fats are found in the dietary energy. In assessing the availability of individual rations macronutrient and micronutrient deficiency we revealed combined deficiency of nutrients,

including essential vitamins and minerals. The close connection with different malnutrition deficiency states, anemia, osteopenia, pathology of pregnancy, childbirth and fetal overweight and obesity is found [5].

The Republic of Sakha (Yakutia) is the largest region of the Russian Federation with a population of less than one million people, therefore referring to one of the lowest population density in Russia (with Chukotsky and Nenets Autonomous Districts). Yakutia is a region with high levels of natural resource economic potential. The republic has a complicated transportation scheme, the region's infrastructure is underdeveloped in many remote areas, with the exception of only large industrial and administrative centers. Today, the function of state control and supervision over the quality and food safety, and prevention of infectious, mass non-infectious and occupational diseases in the country assigned to the Department of Federal Service in the field of Consumer Protection and Human Welfare in the Republic of Sakha (Yakutia).

The lack of positive trends in morbidity and mortality from chronic diseases, the development of which is largely due to the nutritional factor, determines the goals and objectives of our study.

The aim is a comprehensive assessment of actual nutrition by frequency of certain food consumption, quality and safety of food raw materials and food products in the Republic of Sakha (Yakutia).

MATERIALS OF THE RESEARCH

The assessment of actual nutrition by frequency of food consumption was carried out in a group of 51 products, including 12 national dishes. The study involved adults aged 18 to 75 years old living in the three medical and economic areas of the republic (agricultural, industrial, and Arctic). The sample consisted of 2118 people [4].

Analysis of the quality and safety of food raw materials and food products was carried out using indicators of the industry's annual statistical reporting form №18 «Data on the health status of a subject of the Russian Federation" for 2007-2014 years, State reports "On the state sanitary and epidemiological welfare of the population in the Russian Federation in 2013 "state Report" On the state sanitary and epidemiological welfare of the population in the Republic of Sakha (Yakutia) for 2001-2014 years ".

RESULTS

The evaluation of food consumption by a frequency questionnaire method included the following questions: Do you often eat some food "every day", "once a week", "1-2 times a week" and "rarely or never".

In general, the consumption of certain food, prevailing in the diet showed the following parameters in% of the total number examined presented in Figure 1.

Fig. 1 Basic food groups prevailing in "daily" diet surveyed

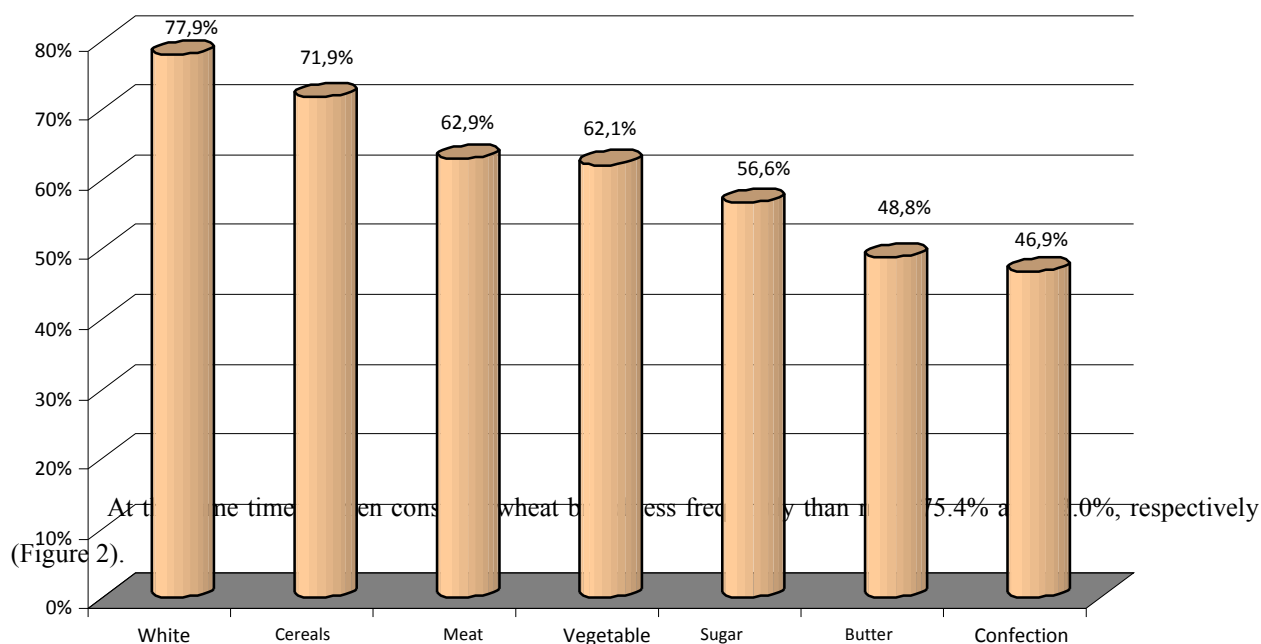
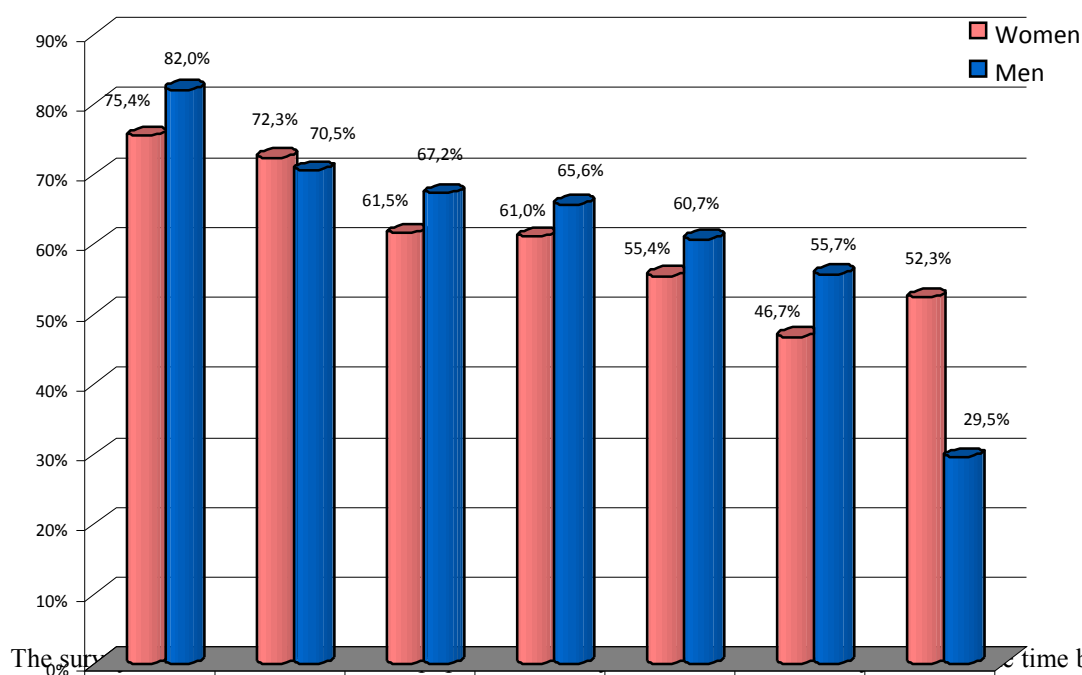


Fig. 2 The frequency of certain food consumption among women and men



The survey results show that at the same time when consumption of wheat bread is less frequent than meat, 75.4% and 82.0%, respectively (Figure 2). At the same time when consumption of wheat bread is less frequent than meat, 75.4% and 82.0%, respectively (Figure 2).

With regard to the consumption of fish and fish products we found the following parameters as of the total number surveyed only 18.0% of men and women consume fish "every day", despite the fact that men consume fish more often than women, 24.6% and 15.9% respectively. Liver is a valuable source of organic iron and protein necessary for blood formation and in general for the normal functioning of the human body. However, during the

week it is included in the diet only at 29% and 30.5% of the population, depending on the health and economic zone of residence, including daily use of 1.7%, several times a week - 6.2% and 1-2 times a week - 21.3% of the surveyed population. From sausage cooked sausage daily use - 8.6% and smoked sausages - 4.3%, respectively. At the same time, men consume sausage more often than women, 24.0% and 44.7% respectively. Milk and dairy products (whole milk and milk products, cheese, cottage cheese) have a number of very valuable nutritional properties that can not be replaced by other products. Milk is consumed daily only by 11.3% of respondents. It should be noted more half of the respondents 62.5% consume dairy products (yogurt, butter milk) and prefer consumption of local products. It was revealed that 58.5% of women 34.7% of men consume cottage cheese and sour cream are rarely or not at all to eat. Such foods as potatoes and fresh vegetables, herbs consume "several times a week" 43.1% and 39.1% of the male and female population respectively. Fresh fruits in your diet includes 1-2 times a week, 36.7% of respondents. With regard to the consumption of dried fruits, nuts, found that these types of products are used "rarely or never" 77.4% women and 70.2% men respectively. According to the recommendations on nutrition, the basis of a healthy diet is the regular consumption of a variety of cereals. According to information received daily rump consumes 71.9% of respondents, while men consume the product more often than women, 56.1% and 33.6%, respectively.

The study found that 48.8% of the surveyed population consume butter "daily", while between women and men clear differences in the consumption of these products have been identified.

With respect to such food as vegetable oil, an indispensable source of vitamin E and polyunsaturated fatty acids, the proportion of people consuming the product 3-6 times a week amounted 62.1%. Thus, often consume oil men than women, 65.0% and 36.8% respectively.

The study showed that overall 56.6% of the respondents consume sugar "on a daily basis." The proportion of people who use sugar "rarely or never", is 30.5%, with women more likely to consume sugar, than men, 86.2% and 68.0%, respectively.

Table 1 - Frequency of certain food consumption among the population of Arctic, agricultural and industrial areas of the Republic of Sakha (Yakutia)

The study population was studied consumption of beverages such as tea, cocoa drink coffee cereals, carbonated beverages and fruit and vegetable juices, vitamin drinks.

The majority, 93.8% of respondents drink tea "every day", no sex-related differences in the consumption of tea are revealed. 23.8% of respondents answered that they consume cereal drink coffee "every day" and 76.2% said that they never drink coffee. At the same time men consume coffee more frequently than women, 55.3% and 38.4% respectively. With regard to the consumption of carbonated drinks, more than half of the surveyed population, 86.3% prefer to drink these beverages. Fruit and vegetable juices and vitamin drinks are daily consumed by 15.2% of respondents, while 29.3% drink rarely.

We would like to highlight the frequency of food consumption of local raw food or national dishes, which can be divided into 3 groups of products: meat (elk meat, venison, hare, black pudding, giblets; lactic fermented milk products (kuercheh, suorat, byyppah, mare's milk), flour (pancakes, waffles, salamat). The food consumption frequency is very low, only 40.2% of respondents said that pancakes are consumed 1-2 times a week.

The main criteria that characterize the quality and safety of food raw materials and food, is it potentially dangerous contamination by toxic and microbiological agents. The monitoring of food raw materials and food products, indicates that, over the past two decades (18 years), the proportion of production that does not meet quality standards for microbiological indicators ranges from 12-11% [2]. The Republic of Sakha (Yakutia) refers to the

subjects of the Russian Federation, with the great number of testing food raw materials and food products, exceeding hygienic standards for microbiological indicators [1]. In 2014 the figure was 9.5%, which exceeds the average 2-fold (RF in 2013- 4.6%) [1,3]. Nevertheless, the republic continues the downward trend of testing not requiring hygienic standards for microbiological indicators as compared in 1997- 11.7%, in 2000- 12.5%, 14.7% in 2005, in 2007 - 12.9%, 12.1% in 2010, in 2012- 11.8%. It should be noted that the aggregate share of imported products that do not meet the requirements in terms of microbial contamination leveled from 7.2% to 2.1% (3.4 times). [2].

According to the parameters of chemical safety in the republic a tendency to low specific gravity of food product samples was established that do not meet the requirements of sanitary legislation, from 5.8% in 1997 to 0.5% in 2014. [2]. In 2014, the proportion of samples of food raw materials and food products that exceed hygienic standards on the content of chemical contaminants was 0.5%, which is at the national average (the Russian Federation in 2013- 0.6%) [1,4]. At the same time, the proportion of samples of imported products do not comply with sanitary and epidemiological requirements for this indicator on average ranges from 4 to 2% [2, 5].

Ensuring the safety of food for parasitological indicators remains relevant in the country. According to the accounting data for the past 8 years, there is a decrease the proportion of samples of food raw materials and food products that do not meet sanitary and epidemiological requirements for parasitological indices by 0.5% (from 1.6% in 2007 to 1.1% in 2014). In 2014 the number of samples studied by parasitological parameters exceeds the number of samples in 2013 1.6 times (2014- 1248, 2013.- 770). According to the research, the proportion of samples that do not meet hygienic standards is 1.1% (in 2013 - 1.7%), which exceeds the figure in Russia is 1.8 times (RF in 2013.- 0.6%) [1,4]. The largest share of non-standard set of samples in a group of food products "fish and non-fish species and products produced from them" - 10 of the 308 samples (3.2%) did not comply with standards. [4]

When considering meaningful review issues of quality and safety of food raw materials and food products, it should be noted that the most critical indicators of the sample proportion of products not meeting the requirements for microbiological parameters in the basic food groups are as follows: "milk and dairy products", "meat and meat products", "bird and poultry products", "fish and fish products", "bakery", "vegetables, herbs dining room". However, the dynamics of the past 10 years shows a steady downward trend in the sample proportion of products not meeting the requirements of the following categories: "Milk and dairy products" - in 2.1 times (2000- 20.2%, in 2014 - 9.5%); "Meat and meat products" - 1.7 times (11.6% in 2000, in 2014g.- 6.5%), "bakery" - in 1.5 times (2000- 10.5% , 2014- to 6.7%) (Table 2) [2,4].

Table 2 – The sample proportion of food raw materials and food products that do not meet hygienic standards for microbiological parameters

Significant improvement in product quality can not be achieved because of unfavorable sanitary condition of facilities, lack of centralized water supply, sanitation, lack of water treatment systems. The state policy in the field of equipment of enterprises, agricultural cooperatives, modern technological equipment, as well as the allocation of funds for the reconstruction of facilities makes a significant contribution to solving the problems of providing the population with food products of assured quality. However, the weakening of intra-industrial inspection at manufacturing enterprises, improving food quality indicators is not possible. In addition, the notorious that workers and food processing businesses are "decreed contingent" in general, the quality of products depends on the health status and the general level of professional training.

Control over the safety of food raw materials and foodstuffs from genetically modified sources is conducted in the framework of the Resolution of the Chief State Sanitary Doctor of the Russian Federation from 31

December, 2004. N 13 "On strengthening the supervision of food derived from GMO". Since 2008 on the basis of the virology laboratory conducted research on the identification of genetically modified sources. In 2014. studied 138 samples of meat, milk, flour, cereal, fruit and vegetable products, canned food, cereals, the content of genetically modified sources above the permissible requirements were found (in 2013y.- 77 samples, 80 samples 2012y., in 2011y. - 133 samples) the presence of GMOs in the period 2008-2014 not established [2,6].

CONCLUSION

The evaluation of dietary intake using the frequency method of studying food consumption has revealed insufficient intake of useful basic foodstuff such as milk, fish, meat products, on average, the proportion of daily consumption of such food is between 11.3% and milk dairy products to 37.1% of fish products or 1-2 times a week. Depending on a place of residence, the frequency of food consumption changes as well. In the Arctic zone the population generally rarely sees milk and dairy products, vegetables, fruits and herbs, however their local products are common, 6.3% - 62.9% and fish - venison respectively. Meanwhile, the population of the Arctic zone consume higher consumption of sugar and confectionery products, 56.6% and 35.5%, respectively. At the same time, women are more likely to consume sugar-containing products than men, 86.2% and 68%, respectively.

The above results suggest a certain degree of possible deficiency or excess of nutrients, vitamins, minerals, originating from food for functioning. For example, rare or insufficient consumption of meat and meat products gives grounds to make an assumption about the insufficient consumption of protein (essential amino acids), unsaturated fatty acids, the iron in the diet, causing the body's protein-energy malnutrition, iron deficiency and anemia and other disorders. Insufficient frequency of consumption of milk and dairy products, fish and fishery products allows you to think about possible shortage of calcium and phosphorus for proper bone mineralization and osteoporosis, fermented milk products - about lack of lactic acid bacteria, contributing to the development of normal microflora.

According to the monitoring of the state of food raw materials and food products, carried out by the Office of Rospotrebnadzor for the Republic of Sakha (Yakutia), over the past two decades (18 years), the proportion of production not meeting quality standards for microbiological indicators has ranged from 12-11%. In 2014 figure was 9.5%, which exceeded the average 2-fold (RF in 2013 - 4.6%).

The republic has established the downward trend of low specific gravity of testing food products that do not meet the requirements of sanitary legislation, from 5.8% in 1997 to 0.5% in 2014. In 2014, the proportion of food raw materials and food products that exceed hygienic standards on the content of chemical contaminants was 0.5%, which is at the national average (the Russian Federation in 2013 - 0.6%).

In the dynamics of the last 10 years in the major food groups: "milk and dairy products", "meat and meat products", "poultry and poultry products", "fish and fish products", "bakery", "vegetables and dining greens" retained the largest share of product samples not meeting the requirements for microbiological parameters.

Control over the safety of food raw materials and foodstuffs from genetically modified sources is carried out since 2008, the presence of GMOs in the period 2008-2014 not installed.

Thus, conducting such monitoring studies assessing the actual nutrition to study the frequency of consumption of specific products and analysis of the quality and safety of food raw materials and food products will enable a comprehensive approach to solving the problem of epidemiological and sanitary-hygienic state power and find ways to optimize the structure of nutrition and prevention alimentary-related diseases in the Republic of Sakha (Yakutia).

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