

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Perspectives of Use of Bread and Bread Products as Functional Food as Part of Governmental Policy for Disease Prevention and Increase of Population Life Quality.

Matraeva Lilya Valerievna*, Bashina Olga Emilevna, Tsaregorodcev Yuri Nikolayevich, and Kalinin Nikolai Nikolaevich.

Dr. econ. sciences, professor, Russia, Moscow, Russian State Social University Russia, 129226, Moscow, st. Wilhelm Picka 4, building 1.

ABSTRACT

The article is devoted to the problem of increasing population life quality. Authors position bread as a universal product supporting national security in terms of food supply. Bread is relatively cheap, widespread within the population. Our ancestors consumed the bread made only of rough grinded flour on a daily basis. Purified white flour was used to make "holiday bake" that was considered as delicacy and never was a common part of daily meals. Increase in population life quality is one of priority goals of Russian government while providing them with safe, healthy and quality rations is one of the main ways to achieve this goal. Bread is emasculated during its production nowadays. Authors perform multidimensional grouping of Russian regions. This allows to identify main directions in stimulating bread and bakery production depending on peculiarities of each region. For this authors did grouping of regions based on specific diseases and after it helps develop targeted incentive measures for bread industry stimulating the production of special and diet bread that will replenish micronutrient and vitamin deficits in each specific region and eventually increase population life quality. Identified 5 regional clusters, which are characterized by a specific high level of certain classes of diseases associated with the specifics of their territorial location or specialization of employment. Further, based on the above-proven thesis that in Russia traditionally high level of bread consumption has developed, on the basis of this classification the most popular types of bread are offered from the point of view of the prevention of the aforementioned diseases, the production support of which is expedient for the state and regional authorities.

Keywords: bread and bakery, population life quality, human nutrition, bread in preventive healthcare, statistical methods.

**Corresponding author*

INTRODUCTION

The problem of preserving and improving the health of the population of Russia is a priority of the state. In recent years, there has been a steady trend in the use of nutrition for prevention and treatment. In this regard, scientists, physicians and food processors have joined their efforts to create a new group of specialized products.

One of the main factors contributing to the development of the production of functional foods is the lifestyle of modern man, characterized by a sharp decrease in physical activity, which leads to higher requirements for food quality. Our ancestors spent a lot of energy during the day and along with a lot of food they received enough vitamins and trace elements, and today the population of the planet Earth is completely in other "energy-consuming" conditions. Reducing the volume of consumed products makes it necessary to enrich them (Dzakhmischeva, 2013).

The problem is that some curative functional foods are expensive, for example, seafood, and they are too expensive for most people. That is why it is necessary to apply additional measures within the framework of the state policy on providing the population with products that contribute to the prevention of diseases caused by the territory of their residence and the specialization of employment in these areas.

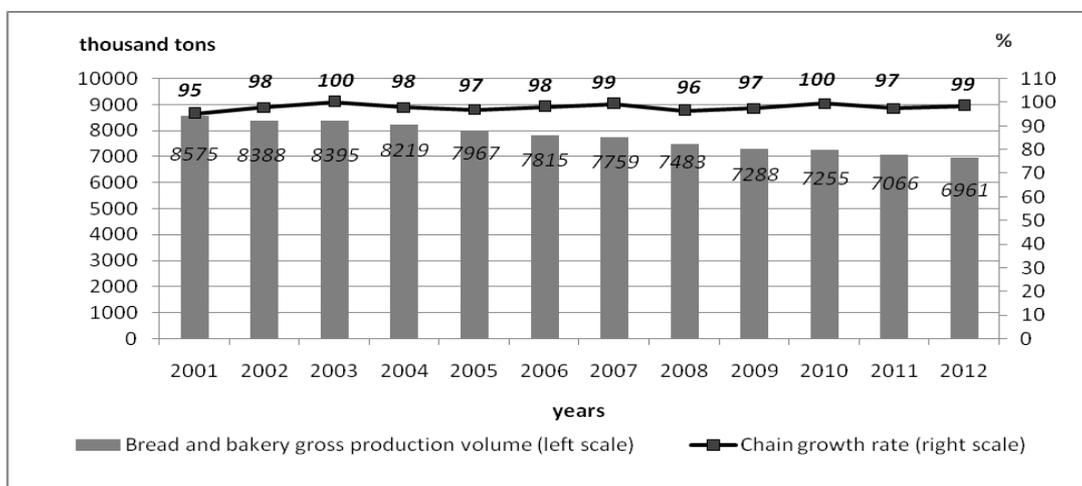
Bread is a unique product in this system due to its three unique qualities.

Firstly, it is a basis to human nutrition since it lays the foundation of food pyramid – a model of rational diet recommended by World Health Organization. In Russia bread and bakery provide about 40% of calories for the daily diet of an average member of the population. Secondly, bread belongs to a special consumer goods group because it is one of the products that has no adequate substitutes that cover basic nutritional demands of a person in a similarly fulfilling way. Thirdly, bread and bakery are vital for the diet of socially unprotected layers of the society due to breads relative cheapness.

The abovementioned factors place baking industry in one row with strategic national industries since it strongly influences not only food security but also national security of a country. Therefore, bread consumption index, its quality and price became important economic and political indicators that demonstrate the life quality of ordinary population and the effectiveness of government authorities.

In Soviet Russia bakery was one of the most important sectors of food industry. Main productive capacities were concentrated at large national-level mills. In the beginning of years 1990 90% of bread and accompanying goods were produced at 990 mills. Productive funds equaled more than 3 bln. Rubles net value. Over 565 thousand people were occupied in that sphere (Chubenko 2004).

1991, however, was the year when bread production started to decrease (pic. 1) and steadily, yearly bread consumption dropped to 118 kilograms per year per person in 2014.



Picture1: Bread and bakery production dynamics in Russia within years 2001-2012.

Source: calculated by author based on freely available statistical information published by Rosstat (Russian statistical database)

<http://cbsd.gks.ru> (dated 09 Jun 2017)

Main reasons of decrease in bread consumption are as follows:

Firstly, the shift in Russian nourishment culture Strive for a healthy lifestyle lead to a drop in bread and bakery consumption, especially among young people. “Healthy” bread, however, has a rather high price and is unavailable for the general population which makes it a niche product up to now.

Secondly, there was a general growth in bread price combined with a drop in spending power of the population.

Bread price increase usually is believed to have a gently sloping dynamics that correlates with inflation rate and price growth for other foodstuff. However, if we compare the price growth rate for bread and bakery made of superior quality flour with the Consumer Price Index for foodstuff within 2000 and 2014 we can notice that during several years of this period the bread price growth rate strongly exceeded the comparative CPI. Thus, in 2003 CPI equaled 110% while bread price growth rate was 130%. In 2008 the corresponding figures were 116% and 128% in spite of the national policy intended to limit bread price growth held at that time (pic. 2).



Picture 2: Foodstuff CPI and bakery (made of superior quality flour) price index in Russia in years 2000–2015 (%)

Source: calculated by author based on freely available statistical information published by Rosstat (Russian statistical database) <http://cbsd.gks.ru> (dated 09 Jun 2017)

Thus, average consumer prices for bread and bakery made of superior quality flour grew five times by the year 2014 comparing to 2000 while real cash income of the population dropped steadily which lead to a decrease in bread consumption due to its high cost.

It should be noted that provisions price increase (including bread) is not something specific just for Russia. Global economy experiences that trend as well so analysts are attracted to the problem of balanced ration quality and consumption structure of households across the globe. Results of these researches are highly demanded since they influence both national alimentary security and life quality of the entire population. They may also affect the prospects of inner bread and bakery markets in different regions. These researches are also important for correcting the development strategy of Russian baking industry as well as for developing regional targeted protectionism policy – it requires reliable quantitative researches for its proper

functioning. Each region within the country has its own bread consumption culture hence factors influencing consumer preferences do vary.

METHODS

In the process of research, the following general scientific methods were used: a content analysis technique aimed at analyzing the semantic contents of textual arrays and products of communicative correspondence on the subject of research, as well as tools for inductive and deductive analysis, which allowed to unite the author's separate conclusions on this problem and formulate the author's vision of the problem. In the process of research, special methods were also used: absolute and relative statistical indicators, dynamics indicators, statistical methods of multidimensional grouping, and methods for visualizing the results of the study. The information base of the research was made up of official statistical and analytical materials of the Federal State Statistics Service of Russia, the World Health Organization, normative and legislative acts, as well as materials of scientific publications in periodicals and on official Internet sites.

RESULTS AND DISCUSSION

Overall decrease in bread consumption is not an alarming factor by itself as it is frequently described in a range of articles on this subject. Comparing recommended and factual consumption rates is a different case. This indicator traditionally reflects the life quality of the population.

Periodic literature shows a certain level of confusion in terms of bread recommended consumption rates (RCR). Accurate, official RCR for various foodstuff fall into the following categories:

- Recommended by World Health Organization
- Compliant with modern requirements to healthy nutrition developed by Nutrition Institute
- Stated in Russian Federal Law on consumer basket for various categories of the population.

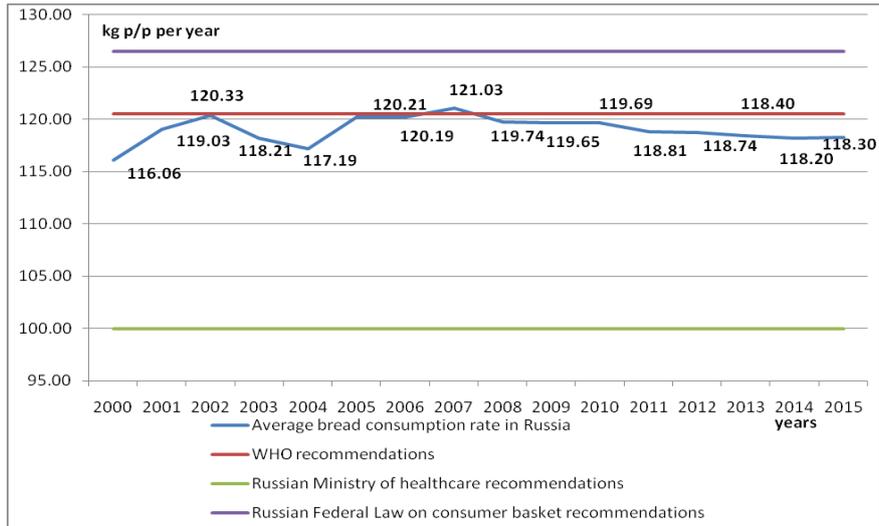
RCR for bread and bakery as of 2014 are stated in the Table 1.

Table 1: RCR for bread and bakery recalculated to flour (kg per average person per year)

Source of recommendations	Recommended amount	Comments
WHO(Regional publications of WHO, 2017)	120,5	–
Russian Ministry of healthcare (Recommendations of Russian health ministry, 2010)	107	Before 2010
	95–105	After 2010
Russian Federal Law on consumer basket (Federal law on consumer basket, 2012)	126,5	Working-age population
	98,2	Retired
	77,6	Children

As Table 1 states, RCR vary significantly. Consumption rates recommended by Russian healthcare institutions are lower than those recommended by WHO. It should also be mentioned that Russia is now in the trend of decreasing the rate of bakery consumption. Before 2010 Russian Ministry of healthcare recommended to consume 107 kg per person per year. That amount dropped to 100 kg after 2010. The RCR for working age population that is stated in the Federal Law changed respectively – it went down from 133,7 kg to 126.5 kg since 03 December 2012. This trend is supposed to make for an improvement in national well-being thanks to optimizing the nourishment structure.

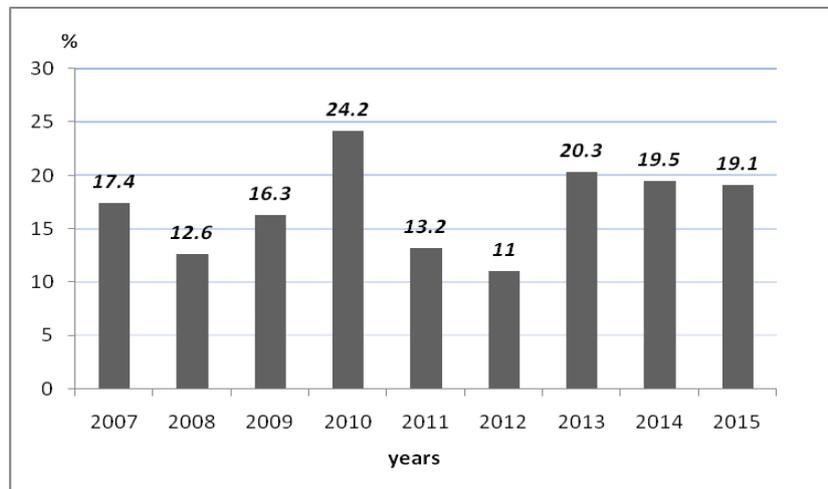
The graph below allows to compare factual average yearly bread consumption rate with recommended consumption rate from 2000 through to 2014.



Picture3: Recommended and average bread consumption rates in Russia from 2000 to 2015.

The graph above allows to make the following conclusions. At first, average amount of bread consumption in Russia is rather stable, the variation rate is form -2.6% to +1.6% of average rate. Secondly, Russian population averagely consumes more bakery than Ministry of Healthcare recommends yet this amount is close to the recommendations of who. Thirdly, the factual consumption rate is less than the one recommended by the Law on consumer basket – this law was created for “poor” layers of the society that traditionally tend to consume more bread than the “wealthy” ones. The graph is unable to show it since it disregards income stratification.

Comparison of factual and recommended consumption rates reveals population well-being in general. The quality of consumed bakery in its turn casts light on life quality. The situation is rather alarming here since bread and bakery are invariably at the head of low-quality products chart throughout last decade as shown at Picture 4.



Picture4: Low quality bread and bakery products, percent of analyzed samples in the period from 2007 to 2015.

Source: created by author using Russian statistics database Rosstat available at <http://csd.gks.ru>, data collected on 09 Jun 2017.

Principal reproaches of regulating authorities are as follows: at first, lack of certificates that prove product quality and security (86% of violations in 2015), secondly, improper labeling (6,2 % in 2015), thirdly, breach of shelf life (3,6% in 2015), violation of storage conditions (2% in the same year).

According to specialists, main reasons for these to happen are:

Firstly, the present-day downsizing of the industry. Small business is usually unable to set up diligent management procedures that ensure sustainable product quality. According to Russian union of grain and flour processing mills, “40% of flour in Russia is produced at non-certified mills that do not monitor neither the quality of the grain nor the safety of end product... proper technologies of grain preparation and treatment are often reduced in duration or neglected completely, grain is not separated from harmful vegetal impurities due to lack of necessary equipment. Bread baked of this flour may be harmful for health since it contains unallowable quantities of chemical residue used for plant protection including mercury, organic pesticides, microbiological contaminants and other harmful additives that can accumulate in human body and lead to severe diseases” (Order of the Government of the Russian Federation, 2012)

Secondly, the lack of strict quality standards for bread and bakery products. This happens despite the fact that this product not only reflects life quality of the population, but is also tightly bonded with national food security. Prevailing mass of bread is produced according to technical conditions and they are significantly less strict than State Standards. Moreover, numerous mills produce bread that does not comply with either. This problem is very severe with small bakeries.

Another important indicator of nutrition quality and, consequently, life quality in Russia is the fact that the majority (80%) of produced bread is mass grade bread with low added value.

Grain “emasculatation”

When top grade flour is produced today all the most valuable parts of the grain are removed before grinding at the mill – such as the seed coat, also known as bran, aleurone cells and the germ. All that remains is the endosperm – central part of the grain rich in starch and easily digested fast carbohydrates, low in its biological value.

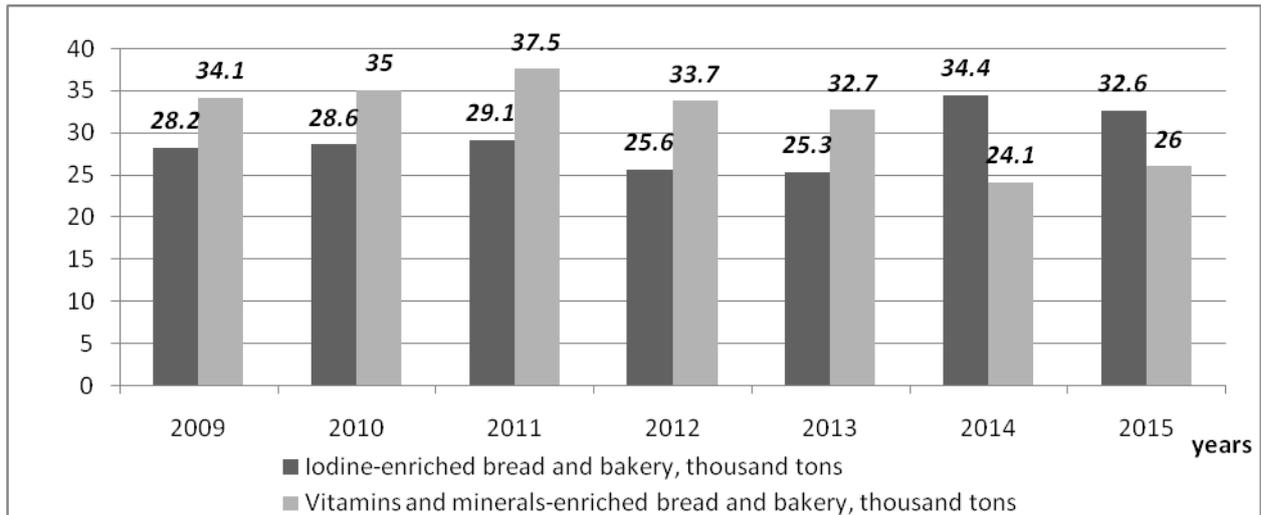
Cellulose is removed from the grain during this process. Cellulose is a fiber tissue that is used to cleanse human digestive system and remove waste products and toxic residue. Cellulose and complex carbohydrates are also the main nutrition source for intestinal bacteria (micro flora) that directly influence our health and immune system performance.

Removing the seed coat and the germ, parts that have fantastic healing abilities, we remove “B” group vitamins and the most powerful antioxidant and “youth vitamin” – “E” and unsaturated fat acids – key nutrition source for our brain and central nervous system. Lack of “E” vitamin in our body leaks to serious metabolic problems and infertility. All children are born with low level of liposoluble vitamins – “A”, “D”, “E”, “K”. Lack of “E” vitamin during pregnancy is one of the main reasons of premature birth. When future mother consumes insufficient amounts of “E” vitamin it may also lead to the destruction of red blood cells and jaundice.

Iron and zinc deficit cause various severe irreversible illnesses – anaemia, infertility, vision and memory degradation, malignant tumors, etc. At the same time, we throw away the main sources of iron and zinc – the bran, calling it “ballast material”. Bran removes organic impurity – excessive ferments of gastric juice, bile acid, bilirubin, cholesterol. It also helps normalize intestinal flora, adsorbs pathogenic microorganisms, colon bacillus and stabilizes intestinal peristalsis.

Aleurone cells are a thin layer of living cells rich in amino acids necessary for protein and hormone synthesis.

Production of medical grade bread, prophylactic grade bread and iodine-enriched bakery equals to 65 thousand tons yearly which represents about 1% of short shelf-life bakery produced in Russia. In developed countries bakery of these types has about 30% of gross market share (consequently, it leaks to increase in average bread price). This is, incidentally, the main origin of Russian stereotype that bread is significantly more expensive abroad, especially in developed countries. The statement does not include any reference to consumer characteristics and quality of the product.



Picture 5: Production of bread enriched in bioactive components

Source: created by author based on data from Common interdepartmental statistical system, available at <https://fedstats.ru> (information collected on 09Jun2017)

World Health Organization states that population is to get sufficient quantities of vital agents e.g. micronutrients and iodine from specially enriched mass market foodstuff, first of all, bread. Thus, in Western Europe about 75% of salt consumed is added to products during fabrication phase and only 25% of salt is added by household final consumers while cooking or eating. Researches indicate that roughly a quarter of all consumed salt comes from bread and bakery. In United Kingdom between 1998 and 2001 mine salt consumption was reduced by 21%. This was achieved by pushing bread manufacturers to switch from mine salt to iodized salt. European practice of enriching bread with dietary fibers and micronutrient has revealed itself to be quite efficient as well.

In Russia the market share of this bakery segment stays unfairly low.

Authorities realize that status quo should be changed so a recent National Policy on healthy alimentation that covers the period up to year 2020 states “producing more vitamin-enriched and mineral-enriched mass-market bakery and dairy products (up to 40-50% of gross production quantities)” as measures to maintain and improve national health, pursue preventive healthcare goals and fight unbalanced and deficient food habits (Russian federal policy on healthy nutrition up to year 2020, 2012).

Fulfilling these goals, however, might be a challenging task – machinery tear and wear reaches striking 60% while corresponding equipment capacity factor levels 39-41% only – equipment wears out and remains mostly unused.

This is exactly the reason why governmental support and financing is needed to stimulate the development of bread making enterprises. At the same time, stimulation should be targeted, rational and differentiated. Incentive measures should take into account demographic profile and peculiarities of regional consumers, whereas simplified stimulation system based only on average national characteristics may not only fail at solving the problem but also induce complications of different kind. For instance, in 1962 when Europe still suffered from food deficit after World War II the policy of providing financial support for farmers was adopted all across Europe. According to its regulations farmers were granted with economic stimuli to hold them at their farmland. “... As a result, Europe encountered a severe overproduction problem and measures were taken to moderate the supply that included extermination of healthy quality crops” (Sokolova 2010).

Regional stimulation plan is to be financially effective, result-oriented and must lead to minimizing the disproportions of regional bakery markets. This quality of planning may only be achieved if the

Government applies effective approaches based on statistical analysis of regional consumer profile. The plan should sort out

- regions that require financing and subventions most
- population categories or social groups that require “bread subsidies” in each region
- within each region, prioritizing medium and small-sized bakery plants eligible for national financial grants.

Taking into account the goals mentioned above, we have performed a multi-dimensional clusterization of Russian regions based on main disease types that can be prevented with special sorts of bread and bakery:

- digestive system diseases
- skin and cellular tissue diseases
- blood circulation malfunctions
- endocrine system malfunctions
- neoplasms and tumors.

The clusterization is based on Ward method and Euclid’s distance metrics. 80 regions were grouped based on statistical data on diseases collected in 2015. Results are aggregated in Table 2.

Table 2: Clusterization results for Russian regions based on main disease types as of 2015

Population sickness rate for main disease classes, illnesses per 1000 person,		Neoplasms	Endocrine	Blood circulation	Digestive system	Skin and cellular tissue
1	Average	11,7	9,2	29,0	30,7	52,3
	Number of regions	34	34	34	34	34
2	Average	13,8	16,1	34,5	47,1	57,1
	Number of regions	17	17	17	17	17
3	Average	8,1	10,1	29,7	33,1	34,4
	Number of regions	15	15	15	15	15
4	Average	12,9	11,2	30,3	30,8	40,1
	Number of regions	12	12	12	12	12
	Average	7,8	6,2	74,1	145,1	64,5
	Number of regions	2	2	2	2	2
total	Average	11,6	11,1	31,6	37,5	48,4
	Number of regions	80	80	80	80	80

Source: created by author using Russian statistics database Rosstat available at <http://cbds.gks.ru>, data collected on 09 Jun 2017.

Regions in **cluster 1** (34 regions) tend to show an average sickness rate for all disease groups analyzed (with slightly higher levels for skin and cellular tissue problems). The group includes the following regions: Belgorod, Vladimir, Ivanovo, Kaluga, Lipetsk, Moscow, Tver, Tula, Vologda, Kaliningrad, Volgograd, Kirov, Nizhni Novgorod, Saratov, Kurgan, Sverdlov, Tyumen, Cheliabinsk, Magadan and Sakhalin. It also includes the cities of Moscow and St. Petersburg, Perm, Altai, Zabaikalskiy, Kamchatskiy, Primorskiy, Khabarovskiy territories, republics of Adigeya, Kalmykia, Bashkortostan, Udmurtia, and Jewish autonomous region.

Residents of the regions that form **cluster 2** suffer from digestive and skin diseases almost twice as more often than the total population. This cluster includes the following 17 administrative areas: Bryansk, Orel, Murmansk, Novgorod, Orenburg, Samara, Ulianovsk Irkutsk, Kemerovo, Amur regions, Altai territory, Karelia, Komi, Chuvash, Khakasia, Saha republics and Chukotsk autonomous region.

Regions included in **cluster 3** are characterized by lower than average sickness rate in all disease groups. 15 areas form this cluster – Voronezh, Kostroma, Kutzk, Tambov, Leningrag, Pskov, Tomsk regions, Dagestan, Kabardino-Balkaria, Karachaevo-Cherkess, Osetia, Chechen, Buriatia, Tyva republics, Stavropol territory.

The problem that characterizes the **cluster 4** is neoplasms and tumors. 12 areas are included in this group – Riazan, Smolensk, Yaroslavl, Arkhangelsk, Astrakhan, Rostov, Penza, Novosibirsk regions, Mariy-El and Mordovia republics, Krasnodar and Krasnoyarsk territories.

Cluster 5 is the most problematic in terms of sickness rate. It includes Omsk region and Ingushetia republic. Residents of these regions generally suffer from blood circulation, digestive and skin diseases significantly more often than elsewhere in Russia.

CONCLUSION

Authorities should stimulate the production of different types of bread to facilitate disease prevention policy.

Bread **enriched in lactulose concentrate** is beneficial for digestive system. Lactulose stimulates the development of healthy intestinal microflora.

Wholegrain bread baked without yeast is considered to be healthy for the skin since it preserves all the qualities of the grain and contains vitamins of A, B, D, E groups as well as amino acids and microelements.

Bread with bran contains comparatively more of cereal cellulose. Cellulose has no nutrition value but it is an outstanding natural sorbent agent. High consumption of cellulose decreases the risk of neoplasm and tumor formation, especially the risk of intestinal cancer. Sorbent capacities of cellulose make it efficient for blood cholesterol level reduction which makes it helpful for cardiovascular diseases prevention.

Iodine-enriched non-yeast bread helps prevent endocrine system malfunctions (especially for patients suffering from diabetes). This method of prevention, along with iodized salt, has solved the problem of iodine deficiency in many countries of the world. Usually the enrichment of bread and milk with iodine is carried out by the addition of iodinated proteins in them (Dzakhmischeva, 2013). Studying the effect of these additives on the human body, scientists do not come to an unambiguous conclusion. Some scientists believe that the use of these supplements helps to solve the problem of iodine deficiency. But many scientists categorically reject these nutritional supplements as a panacea, and even consider it harmful to human health (Shansharova, 2014; Preedy, 2011; Betoret, 2011). This disagreement is due to the fact that with the help of special additives the product is enriched with iodinated protein, resistant to high temperatures, and, on the other hand, this iodine practically does not split off from the protein at a temperature of up to 600 ° C. In case of thyroid gland diseases chemically pure potassium iodide or sea laminaria extract should be included in patient's ration and consequently in bread composition. In order to achieve it, bread dough is based on gluten and a certain amount of bran is added.

Thus, the above described multi-dimensional clustering of Russian regions allows to identify which type of bread should be produced in each region of Russia according to prevailing disease type. It helps develop targeted incentive measures for bread industry stimulating the production of special and diet bread that will replenish micronutrient and vitamin deficits in each specific region and eventually increase population life quality.

ACKNOWLEDGMENTS

The research was carried out with the financial support of the Russian Foundation for Basic Research in the framework of the research project "Development of approaches to the creation of a system for assessing the state and determining promising areas for the development of the scientific sphere", project No. 16-02-00407 and in the framework of the research project " Import substitution in the consumer market using Big Data technologies ", project No. 17-02-00718.

REFERENCES

- [1] Betoret, E., Betoret, N., Vidal, D., Fito, P. Functional foods development: Trends and technologies. *Trends in Food Science and Technology*, 2011, 22(9), 498-508.
- [2] Chubenko N. T. Russian bread industry within years 1980-1990. *Food industry*, 2004, № 4, 48-49.
- [3] Common interdepartmental statistical system <https://fedstats.ru> (retrieved on 30 Jun 2017)
- [4] Dzakhmischeva I. Prevention of iodine deficiency by functional foodstuffs, *Basic Research*, 2013, 10-11, 2418-2421.
- [5] Federal law on consumer basket in Russia № 227-FZ of 03 December 2012, available at <http://www.consultant.ru> (retrieved on 09 Jun 2017).
- [6] Food and health in Europe. New basis for action//Regional publications of WHO, European series/ №96, available at <http://www.who.int> (retrieved on 09 Jun 2017).
- [7] Gil, A., Ortega, R.M., Maldonado, J. Wholegrain cereals and bread: a duet of the Mediterranean diet for the prevention of chronic diseases, *Public health nutrition*, 2011, 14 (12 A), 2316-2322.
- [8] Han, W., Ma, S., Li, L., Wang, X.-X., Zheng, X.-L. Application and Development Prospects of Dietary Fibers in Flour Products, *Journal of Chemistry*, 2017, Volume 2017, Article number 2163218.
- [9] Kosovan A.P. Russian bread industry as national food market stabilizing factor, *Food industry*, 2002, 10, 32-33.
- [10] Mironenko N.S. Introduction to the geography of world economy. Global labor division. Workbook. Moscow: Aspect-press publishing; 2006, 239.
- [11] On the approval of the plan of measures to implement the Fundamentals of the state policy of the Russian Federation in the field of healthy nutrition of the population for the period until 2020: Order of the Government of the Russian Federation of June 30, 2012 No. 1134-r available at URL: <http://www.consultant.ru> (retrieved on 09 Jun 2017).
- [12] Preedy, V., Watson, R., Patel, V. Flour And Breads And Their Fortification In Health And Disease Prevention. 2011, 524.
- [13] Recommendations on rational and healthy food products consumption rates, order of Russian health ministry № 593n of 02 August 2010, available at <http://base.consultant.ru> (retrieved on 09 Jun 2017).
- [14] Ross, A.B., van der Kamp, J.-W., King, R., Lê, K.-A., Mejbörn, H., Seal, C.J., Thielecke, F. Perspective: A definition for whole-grain food products - Recommendations from the Healthgrain Forum, *Advances in Nutrition*, 2017, 8(4), 525-531.
- [15] Russian regions, statistical reference book, 2004-2014, available at Russian federal statistics webpage <http://www.gks.ru> (retrieved on 09 Jun 2017).
- [16] Russian statistical database, available at <http://cbds.gks.ru> (accessed on 09 Jun 2017).
- [17] Sectoral targeted policy statement "Development of bread industry in Russia for years 2014-2016", order of Russian agriculture ministry №83 of 19 March 2014, available at <http://www.garant.ru> (retrieved on 09 Jun 2017).
- [18] Shansharova, D., Hrivna, L., Sotnikova, V., Abdraimova, D., Khakimzhanov, A., Menkov, N. Wheat bread functional purpose for prevention of cardiovascular diseases, *Bulgarian Journal of Agricultural Science*, 2014, 20(5), 1094-1097.
- [19] Skopinceva E. Flour mill owners are worried about the quality of Russian bread, *Economics and life*, 2014 № 26 (9542) available at <http://www.eg-online.ru/article/251239/> (retrieved on 09 Jun 2017).
- [20] Sokolova I.A. Food products demand and national agriculture policy, *Problems of modern economics*, 2010, 4, 341-345.
- [21] Vanamala, J. Food systems approach to cancer prevention. *Critical Reviews in Food Science and Nutrition*, 2017, 57(12), 2573-2588.
- [22] Zavodchikov N.D., T.N.Larina, A.S. Zemliankina The efficiency of Russian bakery industry, *Social and economic development of Russia in WTO environment. Conference material. Orenburg*, 2014, 36-41.