Comprehensive assessment of consumer properties on bakery products with functional additives sold in Murmansk

O A Sokolova¹, K V Alloyarov¹ and T A Baranova²

¹ Murmansk State Technical University, Murmansk, Russia
² Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia

sokolova.oa@mail.ru

Abstract. Due to the economic recession resulting from low labor efficiency, a reduction in the number of the employable population and sanctions, constantly sending shock waves throughout the world community, Russian consumers have enhanced their consumption of staple foods, bakery products included. Overall production of bakery goods with a three-day shelf life has decreased, since neither minimum income consumers, that is, most of the population, nor retirement-age people can afford them. Conversely, production of shelf-stable low-moisture bakery goods has been increasing. (Crumb moistness is a regulated physicochemical parameter.) Bakery products are everyday goods. Being critical to the food sovereignty and security of the country, they are considered strategic goods. In view of this, the marketing activities of bakery goods manufacturers must accommodate state interests and be consistent with welfare policies. It is of particular importance today as the socio-economic and demographic conditions in Russia remain dire. According to the State Committee on Statistics of the Russian Federation (Goskomstat), about 40% of the country’s population have income that is less than the minimum subsistence level, while the annual natural population decline amounted to 218,000 people. The current situation requires that the population be provided with affordable, high-quality bakery products and the interests of manufacturers (i.e., profit-making) and society at large be factored in and balanced out. These challenges are met both abroad and somewhat in Russia by applying a concept of enlightened, socially responsible and ethical marketing on a large scale.

1. Materials and methods
To further substantiate this concept, market research was conducted in Murmansk from March to April 2018, aiming to explore the merchandizing and competitive prices of bakery products. The research involved customer interviews in various points of sales in Murmansk. The output of the interviews was then supplemented by the observations of the interviewers, i.e., the authors of this paper. In every single case, the interviews to gather information were carried out with the approval and on behalf of the management of the point of sale.

The characteristics of mixed-flour breads competing in the market of Murmansk have been investigated. The range of breads available has been determined. There have been identified the primary bread manufacturers — OOO Khlebopek (Khlebopek LLC) and OOO Viktoria (Viktoria LLC), their product assortments, baking procedures, and marketing schemes [1].
Bread is a staple food and a source of B vitamins which are of critical importance to the people living in the polar (Arctic) regions since they exert a normalizing effect on the nervous and cardiovascular systems, increase intestinal activity, boost immunity, contribute to energy exchange [2].

2. Research methods and objects
The objects of the study were samples of mixed-flour breads sold in Murmansk. The samples were acquired in Yabloko, Evroros, Moya Semya and Dixy retail outlets. The product assortment was determined over the research period, the obtained data was then systematically analyzed from March to April 2018 [3].

The output from the given research was to be used in devising a method to produce bakery products with functional additives competitive in the Murmansk market.

Table 1. Items of mixed-flour breads with additives sold in the Murmansk market

| Bread item            | Category | Weight, g | Types of flour used | Functional additives | Energy content, kcal | Price, RUB | Use of bread molds | Packaging |
|-----------------------|----------|-----------|---------------------|----------------------|----------------------|------------|-------------------|-----------|
| OOO VIKTORIA          |          |           |                     |                      |                      |            |                   |           |
| ‘Darnitskiy’          | rye      | 700       | 2                   | -                    | 206                  | 29.99      | yes               | yes       |
| ‘Orlovskiy’           | rye      | 500       | 2                   | -                    | 207                  | 28.99      | yes               | yes       |
| ‘Mariinskiy’          | rye      | 500       | 2                   | +                    | 245                  | 34.99      | no                | yes       |
| ‘Borodinskiy Zavarnoy’| rye      | 400       | 2                   | -                    | 208                  | 28.99      | yes               | yes       |
| ‘Sovital’             | multigrain| 300      | 1                   | +                    | 251                  | 33.99      | yes               | yes       |
| ‘Grechishniy’         | top      | 300       | 1                   | +                    | 239                  | 37.99      | yes               | yes       |
| ‘Zolotoye Zyornysko’  |           |           |                     |                      |                      |            |                   |           |
| ‘Viktoria’            | rye      | 250       | 2                   | +                    | 231                  | 29.99      | no                | yes       |
| ‘S Otrubyami’         | first    | 400       | 1                   | +                    | 245                  | 29.99      | no                | yes       |
| ‘Stolichniy’          | rye      | 350       | 2                   | -                    | 210                  | 26.99      | yes               | yes       |
| ‘Bogorodskiıy’reye    | 500      | 2         | +                   |                      | 217                  | 25.99      | yes               | yes       |
| OOO KHLEBOPEK         |          |           |                     |                      |                      |            |                   |           |
| ‘Mariinskiy’          | rye      | 500       | 2                   | -                    | 245                  | 34.99      | no                | yes       |
| ‘Appetitniy’          | rye      | 500       | 2                   | -                    | 245                  | 34.99      | no                | yes       |
| ‘Borodinskiy’         | rye      | 400       | 2                   | -                    | 208                  | 27.99      | yes               | yes       |
| ‘Darnitskiy’          | rye      | 700       | 2                   | -                    | 206                  | 36.99      | yes               | yes       |
| ‘Imandra’             | rye      | 400       | 2                   | -                    | 206                  | 49.99      | yes               | yes       |
| ‘Sergeevskiyy sourdough’|         | 300      | 2                   | +                    | 251                  | 33.99      | no                | yes       |
| ‘Solodoviy’           | first    | 300       | 2                   | +                    | 251                  | 34.00      | yes               | yes       |
The criteria used to evaluate the product assortments are the following: ingredients, use of additives, energy content, manufacturer, unit price. The samples acquired from the first three manufacturers have a shelf life of 72 hours, those obtained from TekilaJaz have a shelf life of three days. Table 1 presents the assortments of bakery products under study. All the samples are sold sliced and packaged [4].

The present market research identified two primary bread manufactures in Murmansk: OOO Khlebopek and OOO Viktoria.

![Figure 1. Assortment of breads made from mixes (rye flour, wheat flour of different categories, etc.) in Murmansk according to the manufacturer](image-url)
OOO Khlebopek offers 15 items for sale: ‘Mariinskiy,’ ‘Appetitniy,’ ‘Borodisnkiy,’ ‘Darnitskiy,’ ‘Sergeevskiy,’ ‘Solodoviy,’ ‘Kumuzhinskiy,’ ‘Prostoy,’ ‘Pomorskiy,’ ‘Murmanskiy,’ ‘Imandra,’ ‘Darnitskiy,’ ‘Mnogozernovoy,’ ‘Vityaz,’ ‘Vosem Zlakov,’ accounting for 40% of the total amount of products [5].

OOO Viktoria offers 11 mixed-bread items for sale: ‘Darnitskiy,’ ‘Orlovskiy,’ ‘Mariinskiy,’ ‘Borodinskiy Zavarnoy,’ ‘Sovital,’ ‘Grechishniy,’ ‘Zoloteye Zyornyshko,’ ‘Viktoria,’ ‘S Otrubyami,’ ‘Stolichniy,’ ‘Bogorodskiy,’ which makes up 20%. OOO Belaya Vezha and OOO TekilaJaz rank third and fourth, respectively: Belaya Vezha offers 7 items for sale, TekilaJaz — 5.

Analysis of the sample assortments reveals that the majority of breads are baked in traditional rectangular-shaped baking pans, or molds (Fig. 2): 74% of breads are molded-baked and only 26% of them are “free-shaped” [6].
Analysis of the data presented in Fig. 3 shows that bakery products weighing 300 g and 400 g (making up 29% and 26% of the examined samples, respectively) are produced in larger quantities, presumably due to being in greater demand among consumers. Breads weighing 700 g and 500 g (16% and 13% of all the samples, respectively) rank second. Breads weighing 250 g and 350 g are in the least demand [7].

Analysis of the data presented in Fig. 4 shows that nearly 50% of the sample items contain two types of flour, various mixtures and supplements, 34.21%— only two types of flour and no supplements, and 15.79% — one type of flour, various mixtures and supplements. A very limited amount (2.63%) is made from three types of flour and no supplements [8].
Analysis of the energy content of the examined samples (Fig. 5) concludes that Fitness Bread (OOO Belaya Vezha) has the highest energy content while Shveytsarskiy Bread (OOO Belaya Vezha) has the lowest. The energy content of the majority of the samples varies from 205 to 210 kcal, so their composition will be used to create a new bakery product with functional additives [9].

The average market price varies depending on the net weight of the item, there are more or less affordable bakery products. Analysis of the prices of the examined samples (Fig. 6) concludes that Vityaz Bread (OOO Khlebopek) has the highest price per item — 57.99 rub., while Derevenskiy Bread (OOO Belaya Vezha) has the lowest — 22.99 rub. Vosem Zlakov Bread (OOO Khlebopek) has the highest price per 100 g — 19.00 rub., whereas Darnitskiy Bread (OOO Viktoria) has the lowest [10]. Fitness Bread (OOO Belaya Vezha) has the highest energy content and the highest price per item and per 100 g: 56.99 rub., and 18.40 rub., respectively. Shveytsarskiy Bread has the lowest energy content and is sold at a price of 43.99 rub. per item, or 11.00 rub. per 100 g.

3. Conclusion
Data derived from this market research is to be used to create a bakery product with functional additives tailored to meet consumers’ demands. To be economically viable, it should comprise two types of flour and functional additives, weigh 300 grams, and cost up to 11.00 rub. per 100 grams.

References
[1] Skripnuk D and Samylovskaya E 2018 Human Activity and the Global Temperature of the Planet IOP Conference Series: Earth and Environmental Science 180(1) 012021
[2] Gutman S and Teslya A 2018 Environmental safety as an element of single-industry towns'
sustainable development in the Arctic region *IOP Conference Series: Earth and Environmental Science* **180**(1) 012010

[3] Skripnuk D and Samylovskaya E 2018 Human Activity and the Global Temperature of the Planet *IOP Conference Series: Earth and Environmental Science* **180**(1) 012021

[4] Shokina Yu and Kirilyuk O 2008 Optimizations of the Conditions and Terms for the Storage of Soft-Smoked Fish Products *Fish industry* **4** pp 77-80

[5] Konakhina N 2018 Evaluation of Russian Arctic Foreign Trade Activity *IOP Conference Series: Earth and Environmental Science* **180**(1) 012018

[6] Sokolova O 2018 Market Research on Demand for Functional Dietetic Food Products in Murmansk *Vestnik Kerchenskogo Gosudarstvennogo Morskogo Universiteta* **2** pp 101-106

[7] Afonichkina E and Afonichkin A 2018 Synergies of the Economic Development of the Arctic Cluster System *IOP Conference Series: Earth and Environmental Science* **180**(1) 012011

[8] Borisov V and Pochukaeva O 2016 Relationships between development factors of the Arctic Zone of the Russian Federation *Studies on Russian Economic Development* **27**(2) pp 159-165

[9] Grinëv A 2017 The dynamics of barter between the Russians and Alaska Natives 1741–1867 *Folk Life* **55**(2) pp 67-87

[10] Efremova I Didenko N Rudenko D and Skripnuk D 2017 Disparities in rural development of the Russian Arctic zone regions *Research for Rural Developmen* **2** pp 189-194