

Market Research of the Egg Food Market

Maslova G.M.*

Voronezh State Agricultural University Named After the
Emperor Peter the Great
Voronezh, Russia

Kashirina N.A.

Voronezh State Agricultural University Named After the
Emperor Peter the Great
Voronezh, Russia

Glinkina I.M.

Voronezh State Agricultural University Named After the
Emperor Peter the Great
Voronezh, Russia

Bailova N.V.

Voronezh State Agricultural University Named After the
Emperor Peter the Great
Voronezh, Russia

E-mail: glinkina@srd.vsau.ru, iriska-gli@rambler.ru

Abstract — In Russia, the demand for egg products is traditionally determined by the needs of the population, since eggs are included in the consumer basket. The article presents research on the dynamics of the Russian egg market, explores the volumes of eggs produced, and the share of imported products. The dynamics of consumption volumes is determined by food industries which use eggs. The volumes of consumption and production of food eggs for 2014–2020 were determined. The main driver of competitiveness of Russian egg products is the state support whose main directions are discussed in the article. The most promising areas for increasing production profitability and stabilizing the price situation in the domestic market are identified. The data on the largest manufacturers are presented. For a more complete analysis of the food egg market, as well as identification of competitors, a survey of egg consumers was conducted. Based on the results of the study, the strategy for selling food eggs was developed. The current state and development trends of egg production, channels for their implementation are examined, the market conditions for eggs and egg products are analyzed, and proposals for its development are substantiated.

Keywords — food eggs, quail food eggs, consumer preferences, analysis, market, demand, supply.

I. INTRODUCTION

Food eggs are eggs produced by hens for direct human consumption and processing. Food eggs are obtained from birds of different species. But mainly poultry eggs are considered as food [1].

Dietary chicken eggs – eggs whose shelf life does not exceed 7 days.

Table eggs are eggs whose shelf life at 0–20 °C is not more than 25 days, and eggs whose shelf life at –2–0 °C is not more than 90 days.

For food purposes, chicken eggs are mainly used. They contain almost all the substances required for human nutrition: proteins, fats, minerals (calcium, phosphorus, magnesium, potassium, sodium, iron, etc.), vitamins (A, E, B1, B2, B3, B6, B12, D, H, etc.). Egg nutrients are almost completely absorbed. The caloric content of 100 g is about 160 kJ [3, 12].

Therefore, food eggs are a high-grade food product. The egg market is mainly represented by chicken and quail eggs. But turkey, caesar and ostrich eggs can also be found.

Depending on the shelf life, quail eggs are divided into diet and canteen classes. Diet eggs include quail eggs whose shelf life does not exceed 11 days. Table eggs include quail eggs whose shelf life does not exceed 30 days. Unlike chicken eggs, quail eggs are not divided into categories depending on their weight. According to the requirements, the egg mass should be at least 10 g [5].

The demand for egg products is determined primarily by the needs of the population, since eggs are included in the consumer baskets. The main consumers of egg products are food industry enterprises, mainly confectionery, bakery, meat processing and oil and fat industries, and the HoReCa segment.

II. RESULTS AND DISCUSSION

In the dynamics of the Russian egg market, relative stability is observed. It is due to the saturation level: in 2014–2019, the average annual growth rate did not exceed 1 %. According to the results obtained in 2019, the egg market volume amounted to about 44552 million pieces, which is 1 % lower than the level of 2018 (Fig. 1). According to preliminary estimates, in 2020, the indicator may grow by 0.5 %, up to 44776 million units.

Moreover, the share of imported products is insignificant and does not exceed 3 % of total consumption.

At the same time, the domestic supply of poultry eggs is different in different regions. For example, only 35 regions of Russia are self-sufficient in eggs. Moreover, in 23 regions, mainly in Eastern Siberia and the Far East, the level of self-sufficiency is below 50 %. But these tasks are solved within the regional and industry programs by subsidizing, as well as by the producers themselves which optimize and improve logistics schemes. An increase in egg production is observed in Belgorod Region, Yaroslavl Region, and Krasnodar region.

About 10 % of the total volume of eggs produced is sent for processing, which is a low indicator.

During storage, transportation, and for other reasons, egg defects may appear. Depending on the type of defects and their degree, eggs with defects belong to food defective or technologically defective.

Defective eggs are suitable for consumption, but they have defects that reduce their nutritional value. These eggs are not sold, but are used in the baking and confectionery industries. The defective eggs can be broken, dried, emptied, with small spots. [5, 6, 9].

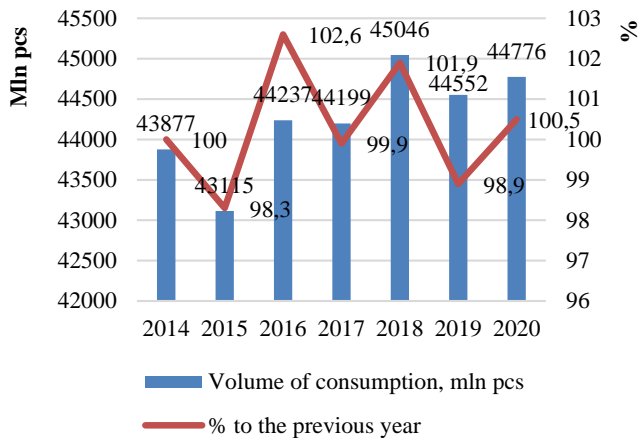


Fig. 1. The volume of consumption of food eggs in 2014–2020, million units

Most eggs are consumed in Russia. According to the results of 2019, the share of imported products amounted to about 2 %, while a gradual decrease in supplies was observed. 2.7 % of products produced by Russian enterprises are exported.

The dynamics of consumption volumes is determined by the food industry, where egg products are used. The egg products market is more dependent on imports (the share of imported products is about 20 %), which is largely due to the pricing policy of foreign suppliers. In particular, this applies to dry egg yolk, whose share is about 60 %, since the vast majority of imported products from India is mixtures with salt and fillers of maltodextrin and silicon dioxide which reduces the cost of production [14, 15].

The main driver of competitiveness is the state support which includes compensation for transportation costs to expand the export potential of producers and limits the import of egg products.

In recent years, egg production has shown a steady positive trend, which is associated with the implementation of investment projects to expand and modernize the production capacities of large enterprises.

In 2019, the volume of egg production amounted to 44891 million pieces, which is 0.1 % higher than the level of the previous year (Fig. 2). Despite the stable demand, Russian producers do not plan to reduce production volumes, since the most promising direction for increasing production profitability and stabilizing the price situation is expanding the export potential to export eggs.

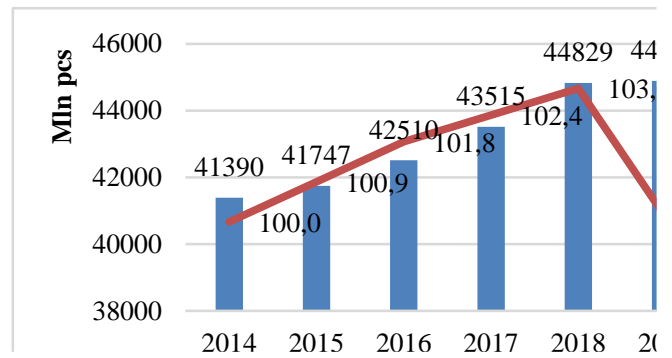


Fig. 2. The volume of production of food eggs in 2014–2020, million units

Overproduction of eggs is a factor stimulating the development of the egg processing segment, where output growth has been observed since 2018; in 2019, it amounted to about 18.2 thousand tons (+ 7.9 % compared to the previous year) (Fig. 3).

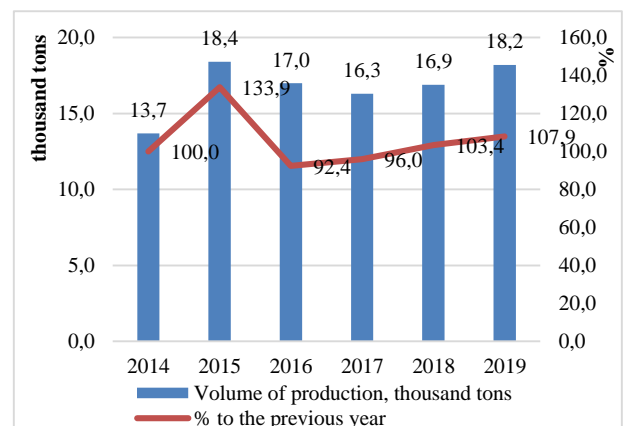


Fig. 3. Volumes of egg products production in 2014–2019, thousand tons

Many large poultry farms are involved in egg processing. As a result, frozen and dry egg products are produced. Frozen egg products include egg melange, yolk and protein. Egg melange is a natural-free mixture of egg whites and yolks, filtered, mixed and frozen in special containers. Sometimes 0.8 % of table salt or 5 % sugar is added to the melange. Frozen egg yolk is a yolk filtered, freed from shell and protein, mixed and frozen in a special container. Frozen egg white is freed from shell and yolk protein and frozen in a special container. Dry egg products include egg powder, dried without separation, dry protein and dry yolk. Deep processing of eggs increases the shelf life, facilitates transportation and eliminates losses from broken eggs [2, 17].

The Russian egg and egg products market is characterized by a high level of competition. The leading players are Sinyavinskaya JSC (Leningrad Region), Volzhanin, Roskar, Borovskaya (Tyumen Region) and Sverdlovskaya Farm. Another major market participant is JSC "Ruzovo" engaged in the processing of eggs: raw materials for further processing are purchased from third-party enterprises.

The profitability of egg production is influenced by the size of enterprises. The optimal enterprises are those that achieved a certain level of production mechanization and possess labor resources to ensure the effective combination and use of all factors of production and maximum production from 1 m² of usable area at the lowest labor and resources costs. Thus, an analysis of the work of poultry enterprises with different levels of production concentration shows that the largest indicators are reached by large poultry farms with an annual production number of food eggs of at least 20 million pieces.

Given the relatively stable level of egg consumption, Russian enterprises do not plan to increase production capacities in the medium term, the growth rate will not exceed 1–2 %.

The most promising area for increasing profitability is the sectors of egg products.

Since 2017, the Russian egg market has seen a decrease in imports with an average annual rate of 24 %, which was due to the expansion of production capacities of Russian enterprises as a result of the implementation of investment projects. In 2019, the volume of eggs imported into the Russian market amounted to about 883.3 million pieces, which is 28.4 % lower than the level of the previous year.

The products are imported from Belarus and Kazakhstan – these countries account for 56 and 44 % of the total imports.

Imports of egg products are characterized by the unstable dynamics. In 2019, there was a decrease in the supply of egg products by 28.8 % to the level of the previous year (2.1 thousand tons). This was due to the continued development of the egg processing segment, which resulted in a decrease in the demand for imported egg products. Imported products are mainly supplied from India and Argentina – these countries account for 53 and 26 % of the total supply.

The dynamics of egg exports is characterized by a positive trend: in conditions of the market saturation and a stably high level of production, Russian enterprises are increasing the volume of exports. Since 2016, there has been a steady increase in supply volumes. In 2019, the volume of eggs exported amounted to about 1222.6 million pieces, which is 20.3 % higher than the level of 2017.

According to forecasts, the export potential will amount to 538.78 million pieces, or 1,506.44 million rubles. An increase in the export potential of food eggs in 2017-2020 will be 31.8 % or 129.99 million units (Table 1).

TABLE I. FORECAST OF FOOD EGG EXPORT BY REGIONS OF THE RUSSIAN FEDERATION

Region	2020 to 2017, %
Yaroslavl region	92052,9
Leningrad region	308,4
Rostov region	119,0
Chelyabinsk region	148,2
Kemerovo region	758,2
the Russian Federation	131,8

A significant event of the last year was export deliveries by one of the largest Russian producers – JSC Sinyavinskaya

Poultry Farm to the UAE (44.2 %). Russian eggs are also exported to Mongolia (26 %), Ukraine (14 %), Abkhazia (3 %), Qatar (3 %) and other countries.

The dynamics of exports of egg products has shown positive growth rates since 2017, which indicates the gradual development of this segment. In 2019, about one thousand tons of products were exported, which is 46 % more than in the previous year. The egg products are exported to Belarus and Ukraine (56 and 19 %, respectively).

The intensification of poultry farming is the main direction of its development [8, 18].

Egg production is based on the use of a hybrid bird, obtained by crossing specialized combined lines. For the production of eggs, crosses of the white leggorn breed are mainly used. To date, more than 10 crosses of egg hens are used in poultry farms. "Brown" cross-hen egg "Rodonit-2" is characterized by high productivity and quality. The birds have a low weight and their feed is cheap. They are superior to other crosses by incubation properties and safety of the livestock. The use of these crosses makes it possible to increase the volume of egg production [13].

Specialized poultry enterprises adopted the principle of labor organization. As a rule, these enterprises use a complete production cycle [16].

Further development of the Russian egg market in conditions of saturation and relatively stable demand involves the expansion of the export potential and development of the egg processing industry (increasing the share of egg processing and improving the quality of products). Market dynamics will be influenced by consumer demand, government support and dynamics of development of consuming industries in the egg products market.

In the medium term, according to the basic development scenario, the volume of the egg market will grow by 1–1.5 % annually.

The volume of consumption of egg products will increase by 2 %.

To ensure the rational functioning of the market, the minimum share of processed eggs should be 20 %. This level allows you to regulate supply and demand in case of changes in the market situation [4, 7, 10, 11].

To analyze the food egg market and identify competitors, a survey of egg consumers was conducted. Marketing research on consumer demand and the food egg market was conducted. The direct and indirect method of data collection involved both male and female persons. The number of participants aged 18-50 was 5,000.

The survey involved buyers, with an income level below the average – 53 % and with an average income – 39 %. Most of the respondents were working people – 70 %. 77 % of respondents were women purchasing eggs about 1–2 times a week.

All the respondents consumed food eggs. Of these, 45 % consumed only chicken eggs, the rest consumed both chicken

and quail eggs. None of the respondents bought turkey, caesar and ostrich eggs, due to the fact that in the Russian market, there are no these eggs.

All the respondents purchase food eggs in supermarkets – 42 %, and in hypermarkets – 29 %; 17 % purchase eggs in near stores on the way from work.

More than 80 % buy first category food eggs, since they consider them to be optimal in terms of price and quality.

When answering the question: “What do you pay attention to when choosing food eggs?”, 28 % pay attention to the appearance, 23 % – to the category, 19 % – to the production term, 17 % – to the trademark, the rest – to color (Fig. 4).

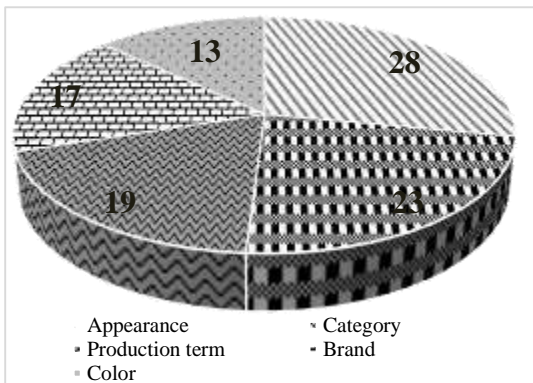


Fig. 4. Consumer preferences when answering the question: “What do you pay attention to when choosing food eggs?”

75 % of the respondents buy chicken eggs worth of more than 55 rubles for a dozen, and food quail eggs – worth of more than 70 rubles for 20 pieces. Consumers pay attention to promotions, but buy promotional products of known brands.

When answering the question: "Do you pay attention to the color when choosing food chicken eggs?", 55 % of respondents prefer brown eggshells, because they think that their yolk is more yellow, 38 % do not pay attention to the color, other respondents choose eggs with white shells.

Almost all the respondents consume food eggs after heat treatment (fried or boiled), 3 % consume raw eggs, 9 % use them for preparing various dishes (salads, pastries, sandwiches).

To the question: “What brands of food eggs do you prefer?”, the answers were as follows (Fig. 5):

- “Lipetsk eggs” – 22 %,
 - “Eco-Poultry Factory” – 20 %,
 - “Healthy farm” – 20 %,
 - "Bobrovsky" – 19 %,
 - “Village land” – 12 %.
- 59 % of respondents are fully satisfied with quality of food eggs.

- 36 % of respondents do not like when eggs are stained.
- Other respondents complain of egg defects (blood inclusions).

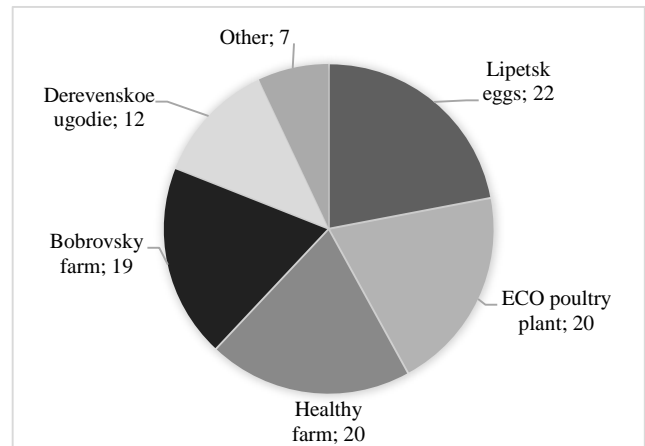


Fig. 5. Consumer preferences when answering the question: “What brands of food eggs do you prefer?”

III. CONCLUSION

The egg market is one of the few ones in Russia, which sells only domestic products.

The distribution of egg production is uneven in Russia. The main production is concentrated in the Volga Federal District and the Central Federal District.

Another distinctive feature is promotion of three innovative areas (biological, technological and organizational).

For the successful development of poultry farming, it is necessary to improve the production technology. The technological schedules should be based on rational schemes for rearing and keeping adult birds.

An important direction is product processing. Egg processing is carried out by special enterprises and poultry farms. Many poultry farms process eggs to produce melange and egg powder.

An important condition for the functioning of the egg and egg products market is its state regulation. All measures of state regulation should be aimed at the comprehensive modernization of poultry farms, increasing the competitiveness of their products and exporting them.

The main success factors for egg products are quality and supply stability. Therefore, products characterized by a higher technical level will gradually replace cheap and less quality ones.

References

[1] M. Aghabeygi, F. Antonioli, F. Arfini, Assessing symmetric price transmission by using threshold cointegration in Iranian egg market. British Food Journal, 2019.

- [2] J. Arthur, K. Wiseman, K.M. Cheng, "Salted and preserved duck eggs: A consumer market segmentation analysis", *Poultry Science*, vol. 94, iss. 8, pp. 1942–1956, 2015.
- [3] Y.A. Attia, M.A. Al-Harathi, M.A. Korish, M.H. Shiboob, "Protein and amino acid content in four brands of commercial table eggs in retail markets in relation to human requirements", *Animals*, vol. 10, iss. 3, p. 406, 2020.
- [4] L.A. Craig, M.T. Holt, "The impact of mechanical refrigeration on market integration: The U.S. egg market 1890–1911", *Explorat. in Econ. Hist.*, vol. 66, pp. 85–105, 2017.
- [5] I.M. Glinkina, "Study of the quality indicators of quail dietary eggs, Veterinary and sanitary aspects of the quality and safety of agricultural products", pp. 189–192, 2015 [Mater. of the I Int. Conf. on veter. and sanitary examination]. Voronezh.
- [6] I.M. Glinkina, "Comparative assessment of quality indicators of eggs quail different evaluation", *Biotechnology: state and development prospects. Proceedings of the IX International Congress, 2017, Moscow: LLC "Red Group"*, pp. 179–180.
- [7] A.N. Hebbar, N. Patted, D.H. Mitrannavar, "Dynamics of egg prices in major markets of India: An econometric analysis", *Int. J. of Agricult. and Statist. Sci.*, vol. 12, pp. 151–157, 2016.
- [8] K. Jackowicz, Ł. Kozłowski, "Which came first, the chicken or the egg? Banks and firms on local banking markets", *Finance a Uver – Czech J. of Econ. and Finance*, vol. 66, iss. 3, pp. 182–206, 2016.
- [9] Z. Kralik, M. Grčević, G. Kralik, D. Hanžek, A. Zelić, "Quality of table eggs on the Croatian market", *Poljoprivreda*, vol. 23, iss. 1, pp. 63–68, 2017.
- [10] K.D. Krawiec, "Lessons from Law About Incomplete Commodification in the Egg Market", *J. of Appl. Philos.*, vol. 33, iss. 2, pp. 160–177, 2016.
- [11] N. Longworth, R.A. Jongeneel, H.W. Saatkamp, "A vertically linked dynamic partial equilibrium model to analyze market shocks caused by HPAI control in the Dutch egg production chain", *NJAS – Wageningen J. of Life Sci.*, vol. 88, pp. 112–128, 2019.
- [12] S. Mi, K. Shang, C.-H. Zhang, Y.-Q. Fan, "Characterization and discrimination of selected chicken eggs in China's retail market based on multi-element and lipidomics analysis", *Food Res. Int.*, vol. 126, 108668, 2019.
- [13] I. Minakov, R. Smykov, "Formation and development of the market of eggs and egg products", *Bull. of Michurinsk State Agrar. Univer.*, no. 2, pp. 93–97, 2014.
- [14] W.A. Momani, S. Janakat, M. Khatatbeh, "Bacterial contamination of table eggs sold in Jordanian markets", *Pakistan J. of Nutrit.*, vol. 17, iss. 1, pp. 15–20, 2017.
- [15] A. Pawlewicz, "Change of price premiums trend for organic food products: The example of the polish egg market", *Agricult., Switzerland* vol. 10, iss. 2, p. 35, 2020
- [16] G. Scrinis, C. Parker, R. Carey, "The Caged Chicken or the Free-Range Egg? The Regulatory and Market Dynamics of Layer-Hen Welfare in the UK, Australia and the USA", *J. of Agricult. and Environmental Ethics*, vol. 30, iss. 6, pp. 783–808, 2017.
- [17] W. Sumekar, A.N. Al-Baarri, E. Kurnianto, "Prospect for the development of salted egg agro industry: an analysis on marketing distribution aspect", *2nd Int. Symp. on Food and Agro-biodiversity (ISFA), Semarang, Indonesia*, vol. 102, UNSP 012005, sept. 26–27, 2017.
- [18] J. Wanner, C. Bauer, C. Janiesch, "Two-sided digital markets: Disruptive chance meets chicken or egg causality dilemma", vol. 1, pp. 335–344, 2019 [Proceedings 21st IEEE Conf. on Busin. Inform., CBI 8808087].