Economic assessment of the need for processing of raw materials of animal origin

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Abstract. The search for new effective methods of processing of secondary raw materials in the food industry is a very urgent problem. The biological waste of the food and processing industry is considered to include veterinary confiscates, nonfood waste and little value food products, waste products of food, technical and special products, the corpses of livestock and poultry. This waste has been and remains a valuable secondary raw material. The reasons are our Russian mentality, which allows us to neglect the environment, certain economic reasons and the inefficiency of the supervisory bodies. In Soviet times, large processing plants had workshops for production of feed, fish, feather, horn and hoof and other flour. Waste of smaller enterprises was brought to special plants, where they were either burned or used for production of the same flour. Most of these plants had not been working for a long time, and the rest ones did not cope with the supplied volume of waste. The other side of the problem is that both these plants and the vast majority of enterprises that have their own production of feed and other animal flour use obsolete old technologies and old equipment. The result is a product with low consumer qualities. The variety of nonfood waste of the food industry and the diversity of their application imply the use of different technologies of utilization. And the more advanced these technologies, the higher the profitability of processing and the quality of the products.

1. Introduction
Modern economic conditions and toughening environmental legislation urgently require the introduction of low-waste and non-waste energy-saving technologies. The problem of bringing production to an "environmentally friendly" level is one of the most acute at present. The need to develop environmentally sound technologies and equipment for waste disposal and recycling is becoming increasingly evident. According to the Federal legislation [1] the basic principles in the field of waste management should be:
- use of the latest scientific and technical achievements in order to implement low-waste and non-waste technologies;
- complex processing of raw material resources in order to reduce the amount of waste.
According to the average data, the total mass of waste from slaughter and evisceration of poultry is 24-26 % of the live weight of the bird. The mass of waste includes feather, blood, goiters, esophagus, trachea, spleen, infundibulum, testes, gallbladder, cuticle, gut contents and feces. The protein content of these wastes is from 14-15 % (in pulp) to 80 % (in feather). With modern production volumes, waste amounts to hundreds of thousands tons per year. Using them for feed purposes significantly increases the profitability of production.

2. Purpose of research
Large, medium and small farms of the Lipetsk region and adjacent regions are considered suppliers of raw materials for processing in this project. At the moment, a number of agreements on cooperation in the field of utilization of biowaste created by them have been concluded.

3. Material and methods of research
The study showed that at the moment the need for the service is estimated at about 150-170 tons per day. In the region there are no similar processing plants, so it can be argued that the company will be provided with raw materials in quantities sufficient for smooth operation.

Currently, the agricultural producer, even with all the desire is not able to get rid of waste properly. The capacity of existing enterprises is not enough. Inspection bodies often turn a blind eye to the execution of formally concluded contracts for waste disposal, because in the actual absence of recycling facilities, the company will have to either stop or prohibit their activities, which is unacceptable for the economy of the region.

But in the future, with the entry into force of the Federal law of 29.12.2014 No. 458-FZ "on production and consumption waste" (The entry into force of many provisions is postponed until January 1, 2016, certain provisions — until 2017 and even until 2019) [1] control over the recycling process will be tightened, which will create the need for the transition of small and medium-sized farms to plant services. At the same time, the financial aspect of the transition will be entirely mandatory for agricultural producers.

In 2016, the Russian Federation produced 20 thousand tons of fat. The Orenburg region accounted for 1.7 %, or 139 tons of these products. Among the regions under consideration, only the Voronezh region produced more (210 tons). In other neighboring regions, the production of fats was minimal or absent. It should be said that these statistics may not take into account small businesses, as well as production for their own needs, so it not quite accurately assesses the overall development of the industry.

However, even these data show that the development of the production of fat and feed additives in these areas is still very weak. According to average estimates, up to 10 % of fat can be produced from one ton of animal food waste. Thus, the potential output of these products only in the Lipetsk region could be more than 7 thousand tons, that is, a third of the current Russian production [1-3].

If we consider the demand for feed additives, it is directly dependent on the demand for animal products. In turn, the consumption of livestock products depends on the number and welfare of the population. The world's population continues to grow rapidly, reaching 7.2 billion in 2013 and reaching 8.1 billion by 2025.

Given that in a decade the world's population will increase by almost 1 billion people, it is necessary to increase agricultural production in order to meet consumer demand in the medium term. If we consider the retrospective dynamics, only in the last five years the volume of world meat consumption increased by 18 % and amounted to 252 million tons. The structure of consumption is dominated by pork, the share of which in 2017 was 42 %, the third part accounted for poultry meat, and a quarter of the meat consumed — beef [4, 5].

Despite the dominant position of pork in the structure of consumer demand, most of all feed additives are consumed in poultry industry. It is determined by distribution of livestock of agricultural animals.

In Russia in 2017 a part of poultry in the structure of livestock exceeded 88 % (figure 1) [4, 5].
The market of animal products and the market of feed additives are characterized by unidirectional dynamics. In the period 2014-2017 there was an increase of 7-10% due to the active development of poultry and pig farming in Russia. However, in 2016, the same factor played a negative role in the dynamics of the feed market: there was a decrease in the number of cattle, competition with imported pork products increased in the WTO, stagnation in the number of poultry established, as a result, the feed market also showed a slowdown.

Production of the largest category of feed additives – protein and vitamin-decreased by 22.7% compared to 2015, with a fall to the level of 211.48 thousand tons. In the general structure of the Russian production of feed additives, it formed more than 40%. Premixes accounted for 31.7% (188.8 thousand tons), feed protein – 21.4% (109 thousand tons) (figure 2) [4, 5].

On the market of feed protein there was a drop in demand and production. During this period, the share of protein feeds of microbial origin in the structure of production of feed additives decreased from 36% to 13%. The fall in the market was due to the increased demand for its substitutes. The main competitors of feed microbiological synthesis are cheaper soybean and sunflower meal, as well as fish, feather and feed flour. However, in 2016, soybean meal (most of which is imported) had risen significantly, forcing farmers to look for a replacement. In this regard, in 2017 in the production of protein flour there was a positive trend.

In the structure of feed additives by types of animals, their bulk is intended for birds. In 2017, 115.1 thousand tons of 188.8 thousand tons of premixes were produced for the poultry industry. In protein-vitamin supplements, birds accounted for 85.4 thousand tons, or 40.4%, cattle — 75.9 thousand tons, or 35.9% [6, 7].

High dependence on imported suppliers leads to price fluctuations. And the cost of feed and feed additives today is the largest item of expenditure in animal husbandry. On average, they cost from 50% to 70% of the cost of livestock products [6, 7].
At the beginning of 2017, there was a sharp increase in prices for premixes. If in 2016 their average cost for the year was 34.3 thousand rubles per ton, in the first two months of this year it increased more than twice – to 79.5 thousand rubles per ton. Before that, the highest number was recorded in April 2016 – 44.1 thousand rubles per ton. Curiously, at the end of 2016, Russian production of premixes also reached a record high rate in the last few years, 20 thousand tons of premixes were produced in December [6, 7].

The situation in Ukraine (especially in the part of the soybean market and protein feed) has an indirect impact on the growth of prices for premixes. For the production of premixes, it is necessary to buy ingredients abroad, and against the background of the weakening of the ruble against foreign currencies and sanctions imposed against Russia, the cost of raw materials is constantly increasing. In turn, this leads to a jump in prices for the final product – premixes. Prices for protein and vitamin supplements are still growing at a moderate pace, but in the long term and in their dynamics, sharp changes are possible.

Protein and vitamin supplements in Russia in April 2016 cost an average of 34.5 thousand rubles per ton, it is 5.5 % less than a month earlier, although 12.4 % more than in April 2015. Since the beginning of the year, the average price of protein and vitamin supplement in Russia decreased by 0.4 % [6, 7].

Over the period from January, 2014 the minimum price of protein and vitamin supplements in Russia was the one fixed in October, 2014 - 23.6 thousand rubles per ton, reminds SoyaNews. The highest price was in October, 2015 - 45.8 thousand rubles per ton [6, 7].

Statistical analysis allows one to identify trends of the markets of production and cost of fat, feed additives, premixes, protein and vitamin supplements.

But if you go back to the biological waste disposal by recycling, including into feed flour, at veterinary-sanitary disposal plants (workshops), here are the disinfection in biothermal holes, the destruction by burning in disposal boilers (crematoria) or in exceptional cases, the disposal in designated areas (burial grounds for cattle).

However, almost everywhere the requirements concerning the equipment of cattle burial grounds are violated. The sizes of sanitary protection zones from burial grounds for cattle to residential buildings and livestock farms are often not observed, the territory of many of them is not fenced, there are no trenches, shafts of soil, bridges, facilities are open for free access, both for people and animals. Biological waste is not disinfected. It poses a significant threat to public health.
In the Lipetsk region there are a number of civil cases on the termination of operation of the cattle burial grounds in connection with their unfitness and non-compliance with the Rules. But they often continue to be used, due to the lack of opportunities for waste disposal. Agricultural producers, even if they wish, are not able to dispose the waste properly. According to the veterinary service, two burial grounds for cattle with veterinary-sanitary passports are considered in the region; there are 205 places of burial of the dead animals, including one that meets the requirements of veterinary and sanitary rules of collection, disposal and destruction of biological waste.

During the inspection in the Voronezh and Volgograd regions, conducted by the Office of Federal Service for Veterinary and Phitosanitary Surveillance (Rosselkhoznadzor), gross violations of the disposal of biological waste were revealed. Particularly serious violations were found in the Khokholsky district of the Voronezh region. The inspection found that there were the bodies of pigs and chickens in one of the ravines near State Unitary Enterprise of Voronezh Region “Veterinary, Sanitary and Disposal Plant” (GUP VO "Vetsanutilzavod"). The plant, which violates the rules of disposal, has repeatedly been subject to administrative penalties in the form of fines, while not all the shortcomings were eliminated by it completely. Fines for such violations are not so great and amount to 10-20 thousand rubles, other punishment is also possible – suspension of activity of the enterprise for a period of up to 90 days. At present activity of plant is stopped.

The risk of epidemics of dangerous diseases should also be taken into account. There are 625 stationary unfavorable settlements in case of anthrax in the region, 1367 lesions have been considered since 1923. Anthrax diseases in the region were registered among people in 1996 – 9 cases, among animals – in 1996, 2001, 2003. Specially equipped motor transport is required for transportation of corpses of the infected animals on disposal, this vehicle is absent as well [7].

As a result, there are uncontrolled burials everywhere or they simply throw animal corpses and other biological waste into garbage containers, into a solid waste landfill. This situation with the so-called disposal of biological waste can not be passed unnoticed, because it leads to a real threat of occurrence and spread of various diseases, total pollution of the environment, deterioration of an environmental, epizootological and epidemiological situation.

4. Conclusion
The current situation with the facilities aimed at the disposal of biological waste is aggravated by the lack of cost-effective legal and organizational conditions in the country in the field of waste management.

Lipetsk region is a dynamically developing region with an ever-increasing number of industrial and agricultural industries. In the region there are large complexes for the production of poultry, pork, cattle. They are also faced with the problem of disposal of biowaste.

To solve this problem is possible through the activities of the complex for the processing of biological waste. A number of other enterprises of the region have already expressed interest in cooperation. Thus, it is possible to draw a conclusion about the importance of this project, which combines the interests of meat processors, feed meal consumers, livestock breeders, and also solves an important environmental problem.

References:
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