

The results of previous studies indicate that nutrition has a great influence on the reproductive function of the Simmental cow. The lack of a balanced nutrition system has led to the loss of the body weight and deterioration of the cow's condition, delays the onset of puberty, increases the postpartum interval before conception, prevents normal ovarian cycling by reducing the secretion of gonadotropins, increases infertility and reduces the frequency of conception [2]. In this regard, some researchers pointed out that the improvement of the reproductive function of Simmental cows is mainly related to providing the necessary conditions for keeping and ensuring a balanced nutrition of cows, improving insemination methods and introducing new methods of biotechnology. These improvements will increase the reproductive ability of cows, which in its turn will ensure maximum use of the genetic structure of cows [4, 1].

**Conclusion.** On the basis of the previous information we can conclude that the reproductive functions of Simmental cattle in Russia are unsatisfactory and the efforts should be made to improve them by improving the breeding systems of Simmental cattle, especially the management and nutrition ones.

### References

1. Гостева Е.Р. и Улимбашев М.Б. Воспроизводительные особенности симменталов Поволжья как маркеры их адаптации к факторам среды // Животноводство и кормопроизводств. – 2018. – Том 101. – № 4. – С. 50-56.
2. Ионова, Л. В. Влияние интенсивности роста телок на их воспроизводительную способность и молочную продуктивность [Текст]: дис. Кан. Сел. наук: 06.02.07 / Л. В. Ионова. – Балашиха, 2016. – 126 с.
3. Левина Г.Н. Продуктивные качества коров симментальской породы молочного типа при разной упитанности в период раздоя. Молочное и мясное скотоводство. – 2017. – № 5. – С. 14-16.
4. Овсянникова Г. В. Использование мирового генофонда молочного скота в создании сырьевой базы молочной промышленности Черноземья: вестник мах. – 2017. – № 1. – С. 8-12.
5. Шуварин М. В. и Савруков Н.Т. Некоторые экономические аспекты повышения продуктивности и срока использования молочных коров // Azimuth of Scientific Research: Economics and Administration. – 2019. – Т. 8. – № 1(26). – С. 406-409.

УДК 811.11:579.64-027.32/.33

## PROBLEMS OF WASTE MANAGEMENT IN RUSSIA FROM THE PERSPECTIVE OF INDUSTRIAL MICROBIOLOGY

*Hatem Amjad, Ph.D. student of the department microbiology and immunology, RSAU – MTAA, amjadhatem82@gmail.com.*

*Gotovtseva Irina Petrovna, associate professor, Department of Foreign and Russian Languages, RSAU – MTAA, lingva@rgau-msha.ru*

**Abstract:** We can define biotechnology as a process in which raw materials are converted into new products using microorganisms, which in this case are called

*industrial microorganisms. Industrial microorganisms play an important role in facilitating and improving human life. One area where microorganisms are used is waste management. This article discusses the problems of waste management in Russia from the perspective of industrial microbiology and the various applications of microorganisms in municipal waste management.*

**Keywords:** *biotechnology, industrial microorganisms, waste management, Municipal solid waste, biogas.*

**Industrial microbiology in waste management solution.** The constant increase in the amount of waste makes scientists look for new and optimize the already known methods of their disposal. Currently, they are widely used: firing, pressing, aerobic fermentation, etc. Each specific method has its advantages and disadvantages and can be applied depending on local conditions that determine the appropriateness of its application. One of the most common methods for the disposal of organic waste is their decomposition using microorganisms. The essence of this method is that certain types of waste under specially selected conditions (temperature, pressure, pH of the medium) undergo degradation using strains of microorganisms. This method has several advantages: it is economical, efficient, as evidenced by its successful application in several countries. This method of waste disposal is environmentally friendly, which is especially important for Russia as a whole and its industrial cities in particular. Organic waste, as well as some artificial materials and pesticides, can undergo microbial degradation.

Municipal solid waste (MSW) and sewage sludge (WWS) are the main waste of large cities. The total volume of solid waste accumulation in cities and towns of Russia is about 150 million m<sup>3</sup>, or 30 million tons per year, WWS - 20 million tons per year. Urban solid waste is characterized by a high content of organic components - up to 50-60% of the total waste mass. About half of them are biodegradable food waste. In Russia at least 97% of solid waste is disposed in the form of unsorted waste at special landfills, the area of which in the country exceeds 40 thousand hectares. In addition to solid waste, compacted WWS are also disposed at landfills. Anaerobic microbial decomposition of organic substances contained in solid waste and WWS in the landfill occurs within 30-50 years with the formation of biogas, which contains a large number of toxic impurities in addition to the main components (greenhouse gases - methane and carbon dioxide).

In Russia the primitive organization of solid waste landfills is used in comparison with developed countries, where measures are initially taken to minimize the environmental impact of the landfill. Although Russia signed relevant international agreements about reducing biodegradable organic materials in landfills about 20 years ago, separate collection and/or sorting of solid waste is not established, and solid waste landfills in Russia are environmentally hazardous objects that pollute the environment. Ground air and atmosphere are polluted by gases (methane, carbon dioxide, and impurities), soils, soils surface and ground waters - by toxic compounds. The contribution of solid waste landfills to global methane emissions is estimated at 12–15%, while it is almost the only source of atmospheric methane that is subject to control, regulation and can be reduced.

The main disadvantages of the method of waste disposal at solid waste landfills are:

- a long-term negative local impact on the environment ecology and public health;
- globally significant emissions of greenhouse gases - carbon dioxide and especially the most dangerous greenhouse gas - methane, which can be used as raw material for energy production;
- the alienation of large areas for landfills, which due to lack of isolation spread pollution to much wider areas;
- loss of organic matter that can be used to improve soil quality.

Each large city in Russia is surrounded by a ring of landfills. In the Moscow Region alone, more than 250 old landfills are registered. There are practically no territories left for organizing new solid waste landfills.

An alternative to the disposal of solid waste at landfills is the microbial treatment of organic waste in anaerobic bioreactors that are isolated from the environment and therefore do not harm it. In Russia, the technology of anaerobic processing of the organic solid waste fraction (OF-MSW) in bioreactors is not used and there are no analogs [1].

The recent environmental situation almost everywhere paves the way for the intensive long-term development of biotechnology and expects a solution of a number of urgent problems. Waste, especially organic waste released into the environment, have a diverse negative impact on the environment. A special group of organic waste comprises food and leather waste and processing industry waste: meat processing waste, cheese production waste and slaughterhouse waste, the disposal of which is environmentally friendly. These wastes are a cheap raw material for biotechnological processing.

Currently, in a number of regions of Russia, there is a problem of waste processing, both in meat and dairy industries. Valuable protein-containing raw materials of animal origin, such as slaughter blood of animals and birds, tissues of internal organs, meat processing waste, collagen-containing raw materials (protein coatings, veins, waste, pork skin, cartilage), milk and cheese whey are mainly emitted or, used in very small amounts for the preparation of blood, meat and bone meal, the use of which is not particularly effective and does not always justify itself.

#### **Various applications of microorganisms in municipal waste management.**

Microorganisms are ubiquitous where they perform many important functions. Microbes play an important role in the natural processing of living materials. All naturally occurring substances are biodegradable, meaning they can be destroyed by living organisms, such as bacteria or fungi.

Microorganisms were invaluable in finding solutions to several problems that mankind faced in maintaining the quality of the environment. They, for example, were used to affect positively human and animal health, genetic engineering, environmental protection, and the processing of household and industrial waste. These microorganisms or their products are integrated into substrates that provide the desired industrial products, such as bio-purification (biomimicry), bio-purifiers, cellulose bio-purification, bio-purification of waste (bioremediation), biofiltration,

aquaculture processing, bioprocessing of textiles, biocatalysts, biomass, and biomass fuel production.

In addition, microorganisms are vital for humans and the environment, as they participate in carbon and nitrogen cycles, and also perform other vital functions, such as the disposal of dead remains and waste from other organisms by decomposition.

**Energy production:** microorganisms are used in the fermentation process for the production of ethanol and the production of methane in biogas reactors [2].

In Russia, the accumulation of organic waste is a serious environmental problem. Organic waste is a valuable source of raw materials that can be used for the production of biogas and biofertilizers. Biogas production is possible from sewage sludge generated at urban wastewater treatment plants, livestock waste at agricultural enterprises, and organic food fractions from municipal solid waste. According to our estimates, the total amount of organic waste in Russia suitable for the formation of biogas and biofertilizers is about 167.8 million tons per year. The main part of this waste is livestock waste (90%), 6% - a fermented fraction of municipal solid waste, and 4% - from sewage sludge. The Central and Volga Federal Districts have the greatest potential for organic waste (54 and 43 million tons, respectively). Currently, the actual use of organic waste, that can be potentially used as raw material for biogas production, is 2-3 orders of magnitude lower than the existing potential of organic waste [3].

**Nuclear pollution.** The use of microbiological methods makes it possible to reduce the volume of liquid radioactive waste by decomposing nitrates, which are the main macro component of liquid radioactive waste, into a non-radioactive gaseous product using economical biodegradation. A preliminary reduction in the volume of liquid radioactive waste before inclusion in the solid matrix will reduce the consumption of matrix material and reduce the volume of the final cured product, which is subjected to long-term controlled storage or disposal. In addition, the removal of nitrate ions from liquid radioactive waste will prevent the unwanted decomposition of the matrix material of the cement compound due to biodegradation of nitrates that occur during long-term storage and increase the reliability of localization of radionuclides in an inorganic matrix [4].

**Conclusion and recommendation.** The application of biotechnology in various fields, such as industry, agriculture and waste management is critical, given the economic and environmental benefits. Using microbiology makes product processing cheaper, and improves its quality. The critical points of waste processing are its overall direct and indirect costs and calculation of the profitability ratio. Wastes belonging to the municipality and industry (liquid, solid and gaseous) constitute environmental pollution and threaten public health. The urgent problem of waste management must be solved. When these types of contaminants are removed, the cost of the project will be less critical.

## References

1. Биотехнология и микробиология анаэробной переработки органических коммунальных отходов: коллективная монография / общая ред. и

составл. А.Н. Ножевниковой, А.Ю. Каллистова, Ю.В. Литти, М.В. Кевбрина – М.: Университетская книга, 2016. – 320 с., ил.

2. Adebayo, F. Microorganisms in Waste Management / F. Adebayo, S. Obiekezie // Research Journal of Science and Technology. – 2018. – 10. 10.5958/2349-2988.2018.00005.0.

3. Analysis of the resource potential of biogas production in the Russian Federation / Z B Namsaraev [et al.] // J. Phys.: Conf. Ser. 1111 012012. – 2018.

4. Treatment of liquid radioactive waste using microorganisms / V.E Tregubova [et al.] // *Theor Found Chem Eng.* – 2016. – No. 50. – P. 562–567.

УДК 811.11:636.32/.38:577.112.386.5

## INFLUENCE OF THE “PROTECTED” FORM OF METHIONINE IN DIETS ON THE DIGESTIVE AND EXCHANGE PROCESSES IN THE SHEEP ORGANISM

*Ali Khrbeck, 1st year postgraduate student, Faculty of Animal Science and Biology, RSAU – MTAA, kherbeikali@gmail.com*

**Abstract:** *The relevance of work In conditions of intensification of sheep husbandry, the requirements for obtaining the greatest amount of high-quality wool, sheepskin and meat are substantially increasing. The most complete realization of the potential for sheep productivity is possible only under conditions of optimal feeding, balanced in all nutrients, including amino acids. When feeding sheep, methionine is the most important essential amino acid. It was found that amino acids undergo partial degradation under the influence of rumen microorganisms. [Aliev A.A. 1997, Dvalishvili V.G. 1989, Zlydnev N.Z. 1993, Kryazheva V.L. 2002, Sevastyanova N.A. 1974, Tkachenko M.A. 1985]. This problem can be solved by feeding methionine to ruminants in a “protected form in order to prevent splitting.*

**Keywords:** *Methionine, Protected methionine, cicatricial digestion, Amino acids.*

The Research objective To determine the effect of the “protected” form of methionine on the processes of cicatricial digestion, digestibility, and use of feed nutrients, and metabolism in the body of sheep whereas Methionine is an essential amino acid. As the substrate for other amino acids such as cysteine and taurine, versatile compounds such as, and the important antioxidant glutathione, methionine plays a critical role in the metabolism and health of many species. Methionine is also an important part of angiogenesis, the growth of new blood vessels. Methionine is an essential nutrient and generally [1-5]. Meeting methionine requirements results in higher production, better metabolic health, and improved reproduction performance. Because the methionine content of feedstuffs is generally low, supplemental methionine should be fed to meet the nutritional requirements. This allows the proper