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Чоботарь Д.В.  
Саламатіна О.О.

**BIOTECHNOLOGICAL METHODS OF REGULATING REPRODUCTIVE  
FUNCTIONS OF COWS  
(БІОТЕХНОЛОГІЧНІ МЕТОДИ РЕГУЛЯЦІЇ ВІДТВОРЮВАЛЬНОЇ ФУНКЦІЇ У  
КОРІВ)**

*У публікації проведено огляд методів регуляції відтворювальної функції корів. Було проаналізовано дослідження вчених про стимуляцію відтворювальної функції у сільськогосподарських тварин шляхом використання гормональних препаратів.*

*Ключові слова: біотехнології, відтворювальна функція, корови, стимуляція, гормональні препарати, синхронізація, простагландини, статевая охота, статевий цикл, гонадотропін.*

*The publication provides a review of methods for regulating the reproductive function of cows. It analyzes research by scientists on stimulating the reproductive function of farm animals through the use of hormonal drugs.*

*Keywords: biotechnology, reproductive function, cows, stimulation, hormonal drugs, synchronization, prostaglandins, estrus, sexual cycle, gonadotropin.*

Scientific research related to methods of regulating reproductive functions of farm animals dates back to the 1950s, when it was first proven that hormones could be used to increase the fertility of animals. However, at that time, the understanding of the mechanisms of neurohumoral interactions was quite incomplete, and the practical possibilities for using hormonal drugs of various actions were extremely limited [1].

In modern times, numerous studies on stimulating reproductive functions of farm animals through the use of biologically active substances are being conducted in many countries around the world. As real practice shows, hormonal drugs are the most effective, as they allow for proper normalization of sexual processes and increase fertility. Such drugs include gestagens (megestrol acetate, progesterone, etc.) used in combination with gonadotropic drugs [2].

However, according to scientists [3], after synchronization with progestagens, fertility may decrease, and synchronization may be incomplete for inseminating groups of animals at a specifically defined time. Therefore, nowadays, more researchers are focusing on the use of prostaglandins to study the stimulation of sexual function of cows and heifers [4].

One of the most widespread classes of prostaglandins includes: A, B, E, D, C, and F. Prostaglandins in living organisms are synthesized from polyunsaturated fatty acids through a special enzyme system (prostaglandin synthase), which is located in the myxomal membranes [5].

Prostaglandins can be found in a very large number of systems in the bodies of various animal species and humans, namely: in the mucous membranes of the stomach and intestines, in the kidneys, liver, spleen, brain tissue, iris, and other tissues and organs. However, the highest concentration is found in seminal fluid [6].

Prostaglandins exert a powerful physiological effect on a number of body systems: cardiovascular, endocrine, reproductive, nervous, respiratory, digestive, and excretory. Of particular interest to scientists is the luteolytic action of prostaglandin F<sub>2</sub>-α in the ovarian artery, where it causes the regression of the corpus luteum, accompanied by a decrease in the content and production of progesterone [6].

The results of research by scientists [7] clearly showed that estradiol plays an extremely important role in the synthesis or realization of PGF2- $\alpha$ . 18-24 hours before the onset of labor, under the influence of estrogens, the content of PGF2- $\alpha$  in the blood of animals begins to increase sharply. PGF2- $\alpha$  of placental origin enhances the effect of oxytocin on the uterus, and at this time, the level of progesterone drops [7].

In conducted studies [6], prostaglandin, which was administered intrauterinely, caused synchronous estrus in 72.2% of animals within 70-84 hours after treatment, with a fertility rate of 84% after the first insemination. A significant advantage of this insemination is the coverage of animals characterized by "silent heat" and their subsequent successful artificial insemination.

The effectiveness of using PGF2- $\alpha$  estrumate in heifers was studied [8]. The drug was injected intramuscularly into the animals in a dose of 500 mcg twice with an interval of 11 days. As a result of this treatment, 100% of the heifers came into estrus within 48-72 hours. In the blood of the heifers, the concentration of progesterone decreased to minimal levels 36 hours after the administration of estrumate.

Scientists investigated [9] prostaglandin F2- $\alpha$  of domestic production and lutalyse of American origin. No radical difference in the luteolytic action of the drugs compared in a series of studies was found. The effective dose for the use of domestically produced prostaglandin was 10 mg when administered intrauterinely and 25 mg when administered intramuscularly.

One of the practical recommendations of scientists [6] to increase the effectiveness of using prostaglandins F2- $\alpha$  for animals with ovarian hypofunction is to administer them gonadotropin PMSG at a dose of 1500-2000 IU per head, and after 48 hours – prostaglandin F2- $\alpha$ . When using this treatment scheme, estrus is observed in 41.7% of heifers with a fertility rate of 60%.

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Швець С.А.,  
Ганніченко Т.А.

## IMPLEMENTATION OF LEAN MANAGEMENT IN AGRICULTURAL ENTERPRISES

*The article comprehensively explores the theoretical, methodological, and practical aspects of implementing lean management in the activities of Ukrainian agricultural enterprises. The essence of the lean production concept is revealed, and its potential for improving management efficiency in the agricultural sector is analyzed. The main methodological approaches, advantages, and barriers to implementing lean technologies in agricultural enterprises are identified. The strategic expediency of applying lean production principles in the context of a transformational economy is substantiated.*

**Keywords:** lean management, agricultural enterprises, lean production, process optimization, management efficiency, business processes, competitiveness.

*У статті комплексно досліджено теоретичні, методологічні та практичні аспекти впровадження lean-менеджменту в діяльність аграрних підприємств України. Розкрито сутність концепції ощадливого виробництва, проаналізовано її потенціал для підвищення ефективності управління в аграрному секторі. Визначено основні методологічні підходи, переваги та бар'єри імплементації lean-технологій у сільськогосподарських підприємствах. Обґрунтовано стратегічну доцільність застосування принципів бережливого виробництва в умовах трансформаційної економіки.*

**Ключові слова:** lean-менеджмент, аграрні підприємства, ощадливе виробництво, оптимізація процесів, ефективність управління, бізнес-процеси, конкурентоспроможність.

In the context of contemporary global economic transformations, Ukraine's agricultural sector finds itself in a state of permanent necessity to enhance its competitiveness and adapt to dynamic market challenges. Innovative management technologies capable of ensuring significant improvement in operational efficiency and optimization of internal economic processes have become particularly crucial. Among such technologies, the concept of lean management, or lean production, which originated in the production system of the Japanese corporation Toyota and has been successfully adapted to various industrial contexts, occupies a prominent position [1].

The theoretical and methodological foundations of lean management are based on fundamental principles of continuous improvement of production systems, maximum minimization of all types of losses, and orientation towards creating value for the end consumer. According to Voitko's research on international enterprise competitiveness, these principles require strategic transformations that go beyond traditional management approaches [4].

Scientific research by leading domestic and foreign scholars convincingly proves the high potential of lean technologies in the agricultural sector. In particular, studies by the Institute of Agrarian Economics, as highlighted by Lupenko, demonstrate that consistent implementation of lean production principles enables domestic agricultural enterprises to achieve impressive economic results: reducing operational costs by 15-25%, increasing labor productivity by 20-30%, shortening production cycle duration by 35-40%, and improving overall product quality [1].

The methodology of lean management in agricultural production involves a comprehensive systemic approach to transforming business processes. Its key components include consistent identification and elimination of unproductive expenses, formation of a corporate culture of continuous improvement, maximum involvement of personnel in optimization processes, and