ATLANTIS PRESS

Advances in Biological Sciences Research, volume 7

1st International Symposium Innovations in Life Sciences (ISILS 2019)

Effect of Antibiotics and Vitamin-Mineral Supplements on the Saccharomyces Cerevisiae Strains of Feed Additives for Poultry and Cattle

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***Abstract*—The effect of antibiotics and vitamin-mineral supplements on Saccharomyces cerevisiae strains CNCM I-1077 (feed additive Lewisel SC Titan Plus for cattle, horses, goats, and sheep) and CNCM I-1079 (feed additive Lewisel SB Titan Plus for poultry, pigs) studied. The yeast contained in the feed additive sown on nutrient medium No. 2 (Saburo agar) with the addition of chloramphenicol. The number of yeast colonies grown with the addition of antibiotics Enroflon, Florfenicol, Intecol, Klindaspectin, Komplicid, Kvinocyclinum, Macradox 200, Pulmokit, Soladoxy 500, Solamox, Spelink-44, Spelink-660, Sulteprim, Tilmipul, Tilmozin and vitamin-mineral complexes Ciprogen, Floram, Lybecrim, Productive Acid, Productive Forte, Rumisol was recorded VitAmMin. The control happened medium without the addition of veterinary drugs. Veterinary drug solutions added to the nutrient medium at concentrations recommended by the manufacturer for use. It found that the number of colonies of S. cerevisiae in the Petri dishes did not change Klindaspectin, Soladoxy 500, Solamox, Spelink-44, Sulteprim, Tilmipul and the acidifier Komplicid; Florfenicol and Kvinocyclinum increased the number of yeast colonies by 14%, and Tilmipul and Lybecrim - by 27%.**

Keywords—yeast, Saccharomyces cerevisiae, antibiotics, vitamin-mineral supplements, feed additive, effect of supplements on yeast strains

I. INTRODUCTION

Feed is the basis for the formation of farm animal productivity. We can assume that about 40% of the productivity of most animal species depends on the level and quality of feeding. In the feed ration for each species, all components should be represented: energy, digestible protein, minerals, and vitamins in a certain ratio. In accordance with the norm of feeding. One of the important properties of feed is its digestibility, which depends, inter alia, on the type of animal [1].

Sources of feed protein are plant foods, which make up to 70% of the diet of animals. The deficiency replenished with high protein supplements, including biotechnological products - fodder yeast.

In the cost of livestock products, more than half of the cost spent on feed, and there is still a problem of feed protein deficiency [1-3]. As protein additives, feed yeast used as a product of microbiological synthesis. Digestibility of fodder yeast protein reaches 95%. Their constituent elements participate in the synthesis and assimilation of amino acids, contribute to the normal development of the bone skeleton; B vitamins are regulators of fat metabolism and, as is known to date, have no contraindications to use. In fodder yeast the proportion of protein can be up to 2/3 of dry weight and of which 10% are essential amino acids, while, for example, about 6% is contained in soy protein of lysine [2,3]. Fodder yeast is a valuable protein-vitamin feed for all types of farm animals, which in its biological value approaches proteins of animal origin. Data on contraindications to the use of fodder yeast and the consequences of an overdose of fodder yeast in the literature have not yet been identified [4, 5].

Active yeast Saccharomyces cerevisiae does not belong to the normal microflora of the gastrointestinal tract of ruminants. They stimulate the development of bacteria that utilize excess lactic acid in the rumen, optimizing the pH of the rumen and preventing the development of acidosis, accelerate the enzymatic cellulolytic activity in the rumen, reducing the likelihood of acidosis and increasing energy extraction from bulky diet feed [5]. The yeast in the composition of feed additives is not sensitive to antibiotics and used simultaneously with them preventing dysbiosis. The feed additive Lewisel Titan Plus for poultry helps to improve intestinal health, optimizes the immune system and helps to increase the safety and productivity of poultry. A study of the effect of antibiotics and vitamin-mineral supplements on Saccharomyces cerevisiae may indirectly indicate the availability of nutrients in the gastrointestinal tract of the most important agricultural animals (pigs, poultry, cattle, horses, goats and sheep)

The research aim was to study the effect of antibiotics and vitamin-mineral supplements on Saccharomyces cerevisiae strains CNCM I-1077 (for cattle, horses, goats, sheep) and CNCM I-1079 (for poultry, pigs) of feed additive Lewisel Titan Plus.

II. EXPERIMENTAL

The feed supplement Lewisel Titan Plus consists of dried live yeast cells of S. cerevisiae strain CNCM I-1077 or strain CNCM I-1079 (at least 1 x 109 CFU / g) encapsulated with fatty acids and a limestone filler. The yeast contained in the feed additive sown on nutrient medium No. 2 (Saburo agar) with the addition of chloramphenicol. A phosphate buffer solution used to dissolve the samples. The vial with the primary suspension as kept for 15-20 minutes in a water bath at a temperature of 37 ° C. The sample was homogenized. Before taking the next portion of the sample, both for further dilution and for inoculation, the suspension thoroughly mixed with a pipette and the pipette washed with a suspension at least 5 times. From the resulting suspension No. 1, a series of subsequent dilutions was prepared (1: 100; 1: 1000, etc., to obtain a suspension of No. 8 1: 109). Sowing carried out immediately after preparing suspension No. 8, preventing it from settling. Petri dishes with crops placed in a thermostat for 72 hours at a temperature of 30 ºC.

The number of yeast colonies grown with the addition of antibiotics Enroflon, Florfenicol, Intecol, Klindaspectin, Komplicid, Kvinocyclinum, Macradox 200, Pulmokit, Soladoxy 500, Solamox, Spelink-44, Spelink-660, Sulteprim, Tilmipul, Tilmozin and vitamin-mineral complexes Ciprogen, Floram, Lybecrim, Productive Acid, Productive Forte, Rumisol was recorded VitAmMin. The control happened medium without the addition of veterinary drugs.

III. RESULTS AND DISCUSSION

Data on the effect of drugs on the number of yeast colonies CNCM I-1077 (as a percentage of control) are presented in the diagram (Fig. 1). It can be seen that the antibiotics Enroflon, Pulmokit, Solamox, Sulteprim, Tilmozin and vitamin-amino-mineral supplement VitAmMin inhibited the growth of yeast colonies.

Moreover, Enroflon, Tilmozin and VitAmMin reduced the number of colonies of S. cerevisiae by 22 and 36% respectively (Fig. 1 and Fig. 2).

Therefore, Florfenicol and Kvinocyclinum increased the number of yeast colonies by 14%, and Tilmipul and Lybecrim - by 27%. Therefore, with the ineffectiveness of the tetracycline antibiotics Soladoxy 500, Solamox, Sulteprim relatively neutral to yeast, it is possible to use Tilmipul Macrolide or Florfenicol Amphenicol, or Kvinocyclinum fluoroquinolone.

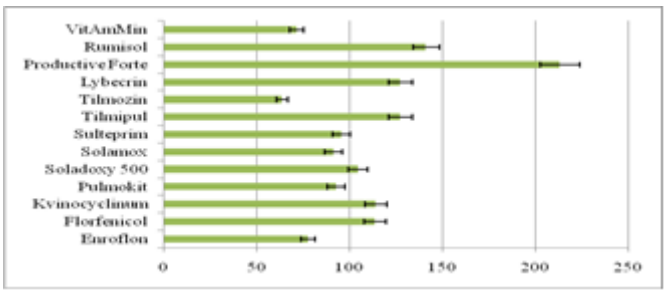


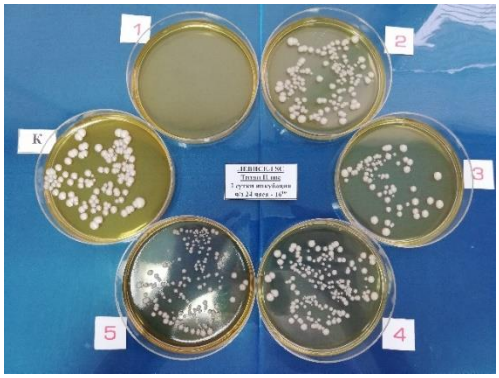
Fig. 1. The number (in % of the control) of colonies of S. cerevisiae CNCM I-1077 (Lewisel SC Titan Plus) in Petri dishes with the addition of veterinary additives to the environment.

Thus, when veterinary drug solutions added to the nutrient medium at concentrations recommended by the manufacturer for use, it found that the number of colonies of *S. cerevisiae* (strain CNCM I-1077 Lewisel SC Titan Plus) in the plates did not change the tetracycline antibiotics Pulmokit and Soladoxy.

An ambiguous effect on the growth of yeast colonies also shown by solutions of vitamin-mineral supplements. Consideration given not only to the possibility of reducing the number of yeast colonies when used together with VitAmMin. Also increasing the CFU values by more than 2 times with the addition of Productive Forte. The use of Lybecrim (see fig. 1) considered the most neutral with respect to the number of colonies of S. cerevisiae (strain CNCM I-1077).

The data on the effect of drugs on the number of yeast colonies strain CNCM I-1079 (the feed additive for poultry Lewisel SB Titan Plus) as a percentage of control presented in the diagram (fig. 3).

Of the 11 studied antibiotics, the majority inhibited the growth of yeast colonies, and the drug Macrodox 200, as well as the mixture of acids Productive Acid, reduced the number of colonies of S. cerevisiae by 38 and 36%, respectively, which, however, cannot serve as a reason for refusing these drugs when prescribed by a specialist.



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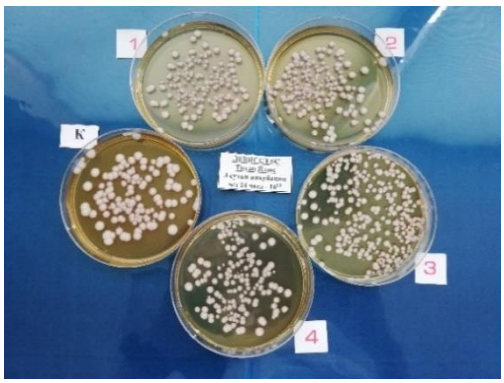

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Fig. 2. Colonies of S. cerevisiae CNCM I-1077 (Lewisel SC Titan Plus) in cups with the addition of antibiotics (A): 1 Kolimiksol, 2 – Kvinocyclinum, 3 – Enroflon, 4 – Pulmokit, 5 – Soladoxy 500 and vitamin and mineral supplements (B): 1 – VitAmMin, 2 – Lybecrim, 3 – Productive Forte, 4 – Rumisol,; K – control.

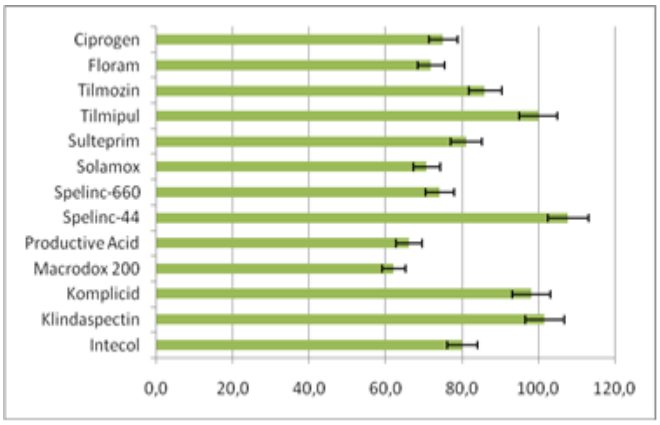

Fig. 3. The number (in % of the control) of colonies of S. cerevisiae CNCM I-1079 (Lewisel SB Titan Plus) in Petri dishes with the addition of veterinary additives to the environment.

Antibiotics Intekol, Macrodox 200, Spelink-660, Solamox, Sulteprim, Tilmozin, Floram and Cyprogen, as well as Productive Acid reduced the number of colonies grown by 30-10%. The antibiotics Klindaspectin, Spelink-44 and Tilmipul, as well as the acidifier Komplicid, did not have a statistically significant effect on the number of colonies of *S. cerevisiae* (CNCM I-1079 Lewisel SB Titan Plus) and considered neutral to yeast feed additives.

Thus, it found that the number of colonies of *S.* cerevisiae (strain CNCM I-1077 Lewisel SC Titan Plus) in the dishes did not change the tetracycline antibiotics Pulmokit and Soladoxy, and increased the value of CFU by 25% Lybecrim Vitamin and Mineral Feed Supplement. It is possible to recommend the use of drugs of choice lincosamines Klindaspectin and Spelink-44, instead of an antibiotic of the same group Spelink-600; Tilmipul macrolide instead of Tilmosin and Macrodox 200, acidifier Komplicid instead of Produktive Acid. Solamox and Sulteprim tetracyclines, Intecol polypeptide antibiotic, Cyprogen fluoroquinolone and Floram chloramphenicol antibiotic avoided in conjunction with yeast (strain CNCM I-1079) feed additives Lewisel SB Titan Plus.

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