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EFFECT OF ANTIBIOTICS AND VITAMIN-MINERAL SUPPLEMENTS ON THE STRAIN SACCHAROMYCES CEREVISIAE CNCM I-1077

Discovery Note

Abstract

The article presents the data of studying the effect of adding antibiotics and vitamin-mineral supplements to the nutrient medium on the number of colonies of the Saccharomyces cerevisiae strain of cattle feed additive for Livicell SC Titan Plus. The studies were carried out at the Department of Biotechnology and Microbiology of the National Research University "BelSU" in 2019. Yeast contained in the feed additive was sown on Saburo agar with the addition of chloramphenicol. A phosphate buffer solution was used to dissolve the samples. Preparing a series of subsequent dilutions of 1: 100; 1: 1000 ... 1: 109. Crops with crops were incubated for 72 hours at a temperature of 30 ºC. Antibiotics and vitamin-mineral supplements were added to the nutrient medium in the concentrations recommended by the manufacturer for use. Control served as agar Saburo. The growth of colonies of S. cerevisiae was inhibited by the antibiotics Enroflon, Pulmokit, Solamox, Sulteprim, Tilmozin (by 22%, 7%, 9%, 4% and 36%, respectively) and the vitamin-mineral supplement VitAmMin by 28%. An increase in CFU values of S. cerevisiae by more than 2 times with the addition of Productive Forte was noted. The antibiotics Soladoxy 500, Solamox, Sulteprim did not affect the number of colonies of S. cerevisiae. In the diet with a feed additive for cattle, Lewisel SC Titan Plus is recommended to appoint (if necessary) tetracyclines or Tilmipul macrolide, or amphenicol Florfenicol, or fluoroquinolone Kvinocyclinum.

Keywords: *Saccharomyces cerevisiae*, feed additive, yeast, antibiotics.

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ВЛИЯНИЕ АНТИБИОТИКОВ И ВИТАМИНО-МИНЕРАЛЬНЫХ ДОБАВОК НА ШТАММ STRAIN SACCHAROMYCES CEREVISIAE CNCM I-1077

Примечание об открытии

Аннотация

В статье приводятся данные изучения влияния добавления в питательную среду антибиотиков и витамино-минеральных добавок на число колоний штамма Saccharomyces cerevisiae кормовой добавки для крупного рогатого скота Левисел SC Титан Плюс. Исследования проводили на базе кафедры биотехнологии и микробиологии НИУ «БелГУ» в 2019 г. Содержащиеся в кормовой добавке дрожжи высевали на агар Сабуро с добавлением хлорамфеникола. Для растворения образцов использовали фосфатно-буферный раствор. Готовили серию последующих разведений 1:100; 1:1000… 1:109. Чашки с посевами инкубировали 72 часа при температуре 30 ºС. Антибиотики и витамино-минеральные добавки добавляли в питательную среду в рекомендуемых производителем концентрациях для применения. Контролем служил агар Сабуро. Рост колоний S. cerevisiae ингибировали антибиотики Enroflon, Pulmokit, Solamox, Sulteprim, Tilmozin (соответственно на 22%, 7%, 9%, 4% и 36%) и витамино-минеральная добавка VitAmMin – на 28%. Отмечено увеличение значений КОЕ S. cerevisiae более, чем в 2 раза при добавлении Productive Forte. Не влияли на численность колоний S. cerevisiae антибиотики Soladoxy 500, Solamox, Sulteprim. В рационе с кормовой добавкой для крупного рогатого скота Левисел SC Титан Плюс рекомендовано назначать (при необходимости) тетрациклины или макролид Tilmipul, или амфеникол Florfenicol, или фторхинолон Kvinocyclinum.

Ключевые слова: *Saccharomyces cerevisiae*, кормовые добавки, дрожжи, антибиотики

1. Introduction

In the cost of livestock products, 65-70% of the cost goes to feed, and there is still a problem of feed protein deficiency [1], [2]. As protein additives, feed yeast is used, the proportion of protein in the cells of which can be up to 2/3 of the dry weight, of which 10% are essential amino acids, while, for example, soy protein contains about lysine 6% [3], [4]. Fodder yeast is a product of microbiological synthesis, a valuable protein-vitamin feed for all types of farm animals, which in its biological value approaches proteins of animal origin. 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. There are no contraindications to the use of fodder yeast and the consequences of an overdose of fodder yeast [5].

Active yeast Saccharomyces cerevisiae does not belong to the normal microflora of the gastrointestinal tract of ruminants, but 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 [6]. And it is believed that the yeast in the composition of feed additives is not sensitive to antibiotics and can be used simultaneously with them, preventing dysbiosis. The aim of the study was to study the effect of antibiotics on S. cerevisiae strain CNCM I – 1077 feed supplement for cattle Levisel SC Titanium Plus.

2. Material and methods

The Levisel SC Titan Plus cattle feed additive consists of dried live yeast cells of S. cerevisiae strain CNCM I-1077 (at least 1x109 CFU / g) encapsulated with fatty acids and a limestone filler. The yeast contained in the feed additive was sown on nutrient medium No. 2 (Saburo agar) with the addition of chloramphenicol. A phosphate buffer solution was used to dissolve the samples. The vial with the primary suspension was 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 was thoroughly mixed with a pipette and the pipette was 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 was carried out immediately after preparing suspension No. 8, preventing it from settling. Cups with crops were 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, Kvinocyclinum, Pulmokit, Soladoxy 500, Solamox, Sulteprim, Tilmipul, Tilmozin and vitamin-mineral complexes Lybecrim, Productive Forte, Rumisol was recorded VitAmMin. The control happened medium without the addition of veterinary drugs.

3. Results and discussion

Data on the effect of drugs on the number of yeast colonies (as a percentage of control) are presented in the diagram. It can be seen that the antibiotics Enroflon, Pulmokit, Solamox, Sulteprim, Tilmozin inhibited the growth of yeast colonies; moreover, Enroflon and Tilmozin reduced the number of colonies of S. cerevisiae by 22 and 36%, respectively, and the vitamin-amino-mineral supplement VitAmMin - by 28% (fig. 1 and 2)

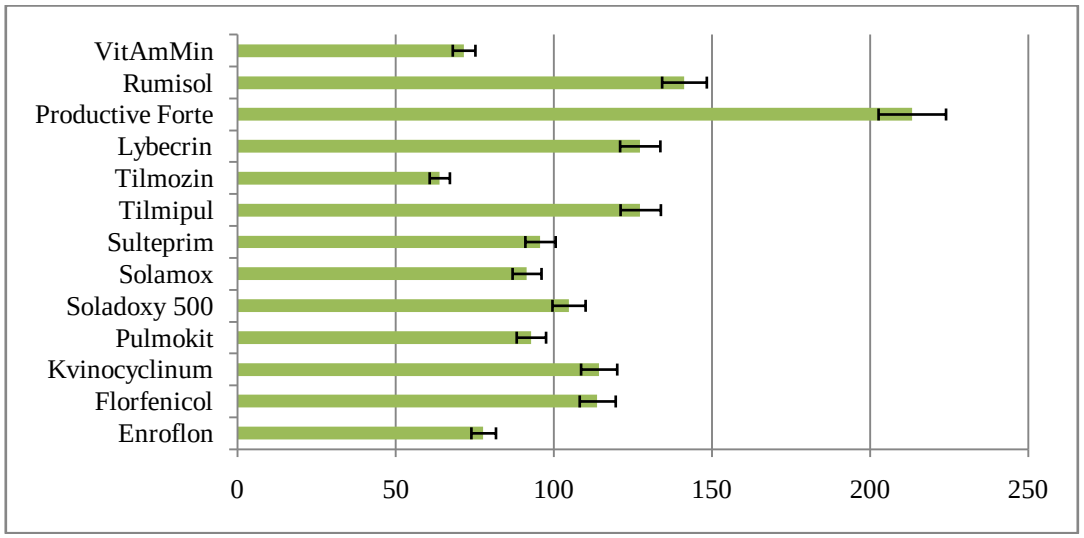
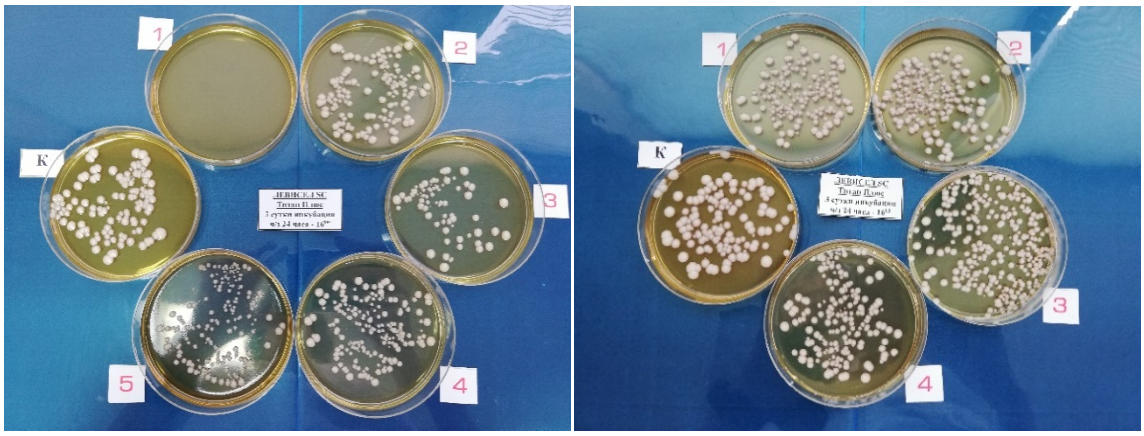


Figure 1 – The number (in % of the control) of colonies of Saccharomyces cerevisiae in Petri dishes with the addition of veterinary additives to the environment



A B

Figure 2 – Colonies of Saccharomyces cerevisiae in cups with the addition of antibiotics (*A*): 1 Kolimiksol, 2 – Kvinocyclinum, 3 – Enroflon, 4 – Pulmokit, 5 – Soladoxy 500 and vitamin and mineral supplements VitAmMin (*B*): 1 – VitAmMin, 2 – Lybecrim, 3 – Productive Forte, 4 – Rumisol,; K - control

Interestingly, Florfenicol and Kvinocyclinum increased the number of yeast colonies by 14%, and Tilmipul - by 27%. Therefore, with the ineffectiveness of the tetracycline antibiotics Soladoxy 500, Solamox, Sulteprim relatively neutral to yeast, Tilmipul Macrolide or Florfenicol Amphenicol or Kvinocyclinum fluoroquinolone can be recommended. Thus, when veterinary drug solutions were added to the nutrient medium at concentrations recommended by the manufacturer for use, it was found that the number of colonies of S. cerevisiae (strain CNCM I – 1077) in the plates did not change the tetracycline antibiotics Pulmokit and Soladoxy.

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

4. Conclusion

Thus, when veterinary drug solutions were added to the nutrient medium in concentrations recommended by the manufacturer for use, it was found that the number of colonies of S. cerevisiae (strain CNCM I – 1077) in the dishes did not change the tetracycline antibiotics Pulmokit and Soladoxy, and increased the value of CFU by 25% Vitamin and Mineral Feed Supplement Lybecrim.

Conflict of Interest

None declared.

Конфликт интересов

Не указан.

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