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Laptev, Georgi Yu., Turina, Darya G., Yildirim, Elena A., Ilina, Larisa A., Gorfunkel, Elena P., Filippova, Valentina A., Dubrovin, Andrei V., Melikidi, Veronika Kh., Novikova, Natalia I., Kalitkina, Kseniya A. and others (2023) *[Analysis of changes in broiler microbiome biodiversity parameters due to intake of glyphosate and probiotic Bacillus sp. GL-8 using next-generation sequencing]* Анализ изменений параметров биоразнообразия микробиома бройлеров в результате приема глифосата и пробиотика Bacillus Sp. GL-8 с использованием секвенирования следующего поколения. [Conference item]
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Papers

Effect of a probiotic strain administration in different feeding phases on α - and β -diversity and gene expression of the rumen microbiome in lactating cows

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Abstract

. The normal functioning of the microbiome plays an important role in maintaining the basic functions of the body. In recent years, there have been more data that the nonselective herbicide glyphosate (GLY) can negatively impact gut bacterial communities. The aim of our study was to investigate the composition of broiler caecal microbiome under chronic exposure to GLY and the introduction of a probiotic microorganism strain into the diet. One hundred twenty broilers of the Ross 308 cross were divided into three groups: Group 1 of control birds fed the basic diet (BD); Group 2 of experimental birds fed BD supplemented with GLY at 20 ppm; and Group 3 of experimental birds fed BD supplemented with GLY and a probiotic strain of the microorganism *Bacillus* sp. GL-8. Using the next generation sequencing (NGS) technique, we showed that GLY contained in the contaminated bird feed, even at minimal concentrations, can adversely affect gut microbial communities under chronic exposure. Under

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Section

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Due to GLY administration, there was a trend of lowering the biodiversity of normal microflora representatives, along with the intestinal colonization by undesirable forms of microorganisms. In particular, when adding GLY (Group 2), we observed a decreased number of *Tepidimicrobium* representatives ($0.001 \pm 0.00006\%$) that ferment indigestible polysaccharides, while in Group 1 their content was greater ($0.3 \pm 0.02\%$; $P \leq 0.05$). In the GLY presence in the feed, the probiotic introduction into the diet in Group 3 had a positive effect on biodiversity and the number of microorganisms. Addition of *Bacillus* sp. GL-8 in this group was associated with a decline in OTU values and the Shannon, Simpson and Chao1 α -biodiversity indices ($P \leq 0.05$). In Group 3, there was also a lower number of Firmicutes (by 16.7%) and a rise in the number of Bacteroidetes (by 19.1%) as compared to Group 2 ($P \leq 0.05$). Given the widespread use of GLY and its negative impact on the microbiome, an ecological strategy to restore microbial balance with the help of probiotic microorganisms is promising.

Language

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