

USE OF OLEOPROTEAGINOUS SEEDS AS PROTEIN SOURCES TO MODULATE THE BROILERS' INTESTINAL MICROBIOME

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Abstract: This study evaluates the effect of inclusion the oleoproteaginous seeds (flax, camelina and hemp) as protein alternative to soybean meal substitution in broiler diet enriched in polyunsaturated fatty acids (PUFA) on the intestinal microbial populations and health status of broiler, for 42-day feeding trial (192, day-old Ross 308 chicks; 4 groups; 8 chick/replicate). For ten days, all groups received the same basal diet, and that, the experimental diet formulations were included: 6% flaxseed (E1), 10% camelina seeds (E2) and 15% hemp seeds (E3) compared to C diet. Prior to slaughter (42 days old of bird), the blood samples were aseptically collected to determine the biochemical analysis and caecal and intestinal content were collected for microbiological examination. The *Lactobacillus* population in the ileum was significantly higher ($p = 0.008$) in group E1 compared to group C. The serum protein profile was significantly lower ($p = 0.008$) for urea concentration in E2 compared to the C group. The AST concentrations for E1 was significantly higher compared to E3 group. Conversely, for alkaline phosphatase values, significantly lower results were observed for E1 compared to C group while the value for alanine transaminase (ALT) was significant higher ($p < 0.005$) for E3 group compared to C group. The addition of dietary oleoproteaginous seeds had a positive effect in limiting the development of the pathogenic bacteria only in the small intestine, thus, improving the microbial balance as flaxseed which increased the content of lactobacillus in the ileum, and camelina and hemp show distinct effects on biochemical profiles, indicating potential implications for broiler health.

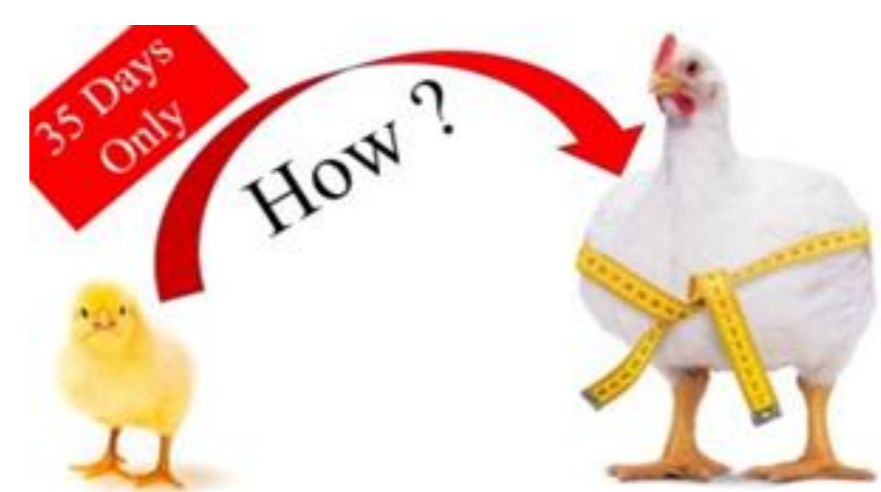
• Introduction

In recent years, an increasing number of consumers have favored chicken meat for its high-quality protein content and its suitability as a foundation for developing functional foods, while the complex gut microbiota of chickens continues to play a critical role in processes such as nutrient digestion, absorption, immune system development, and defense against pathogens.

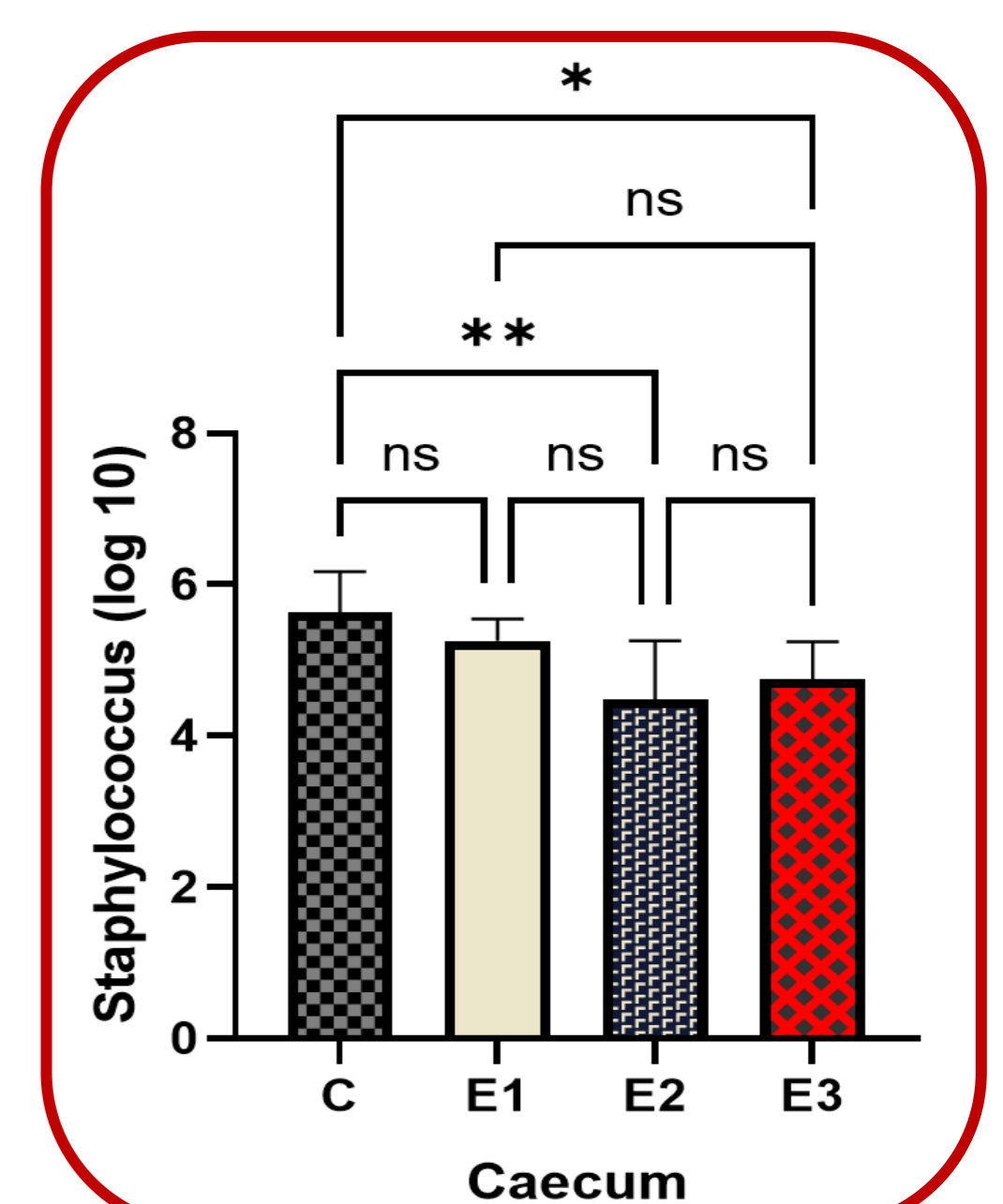
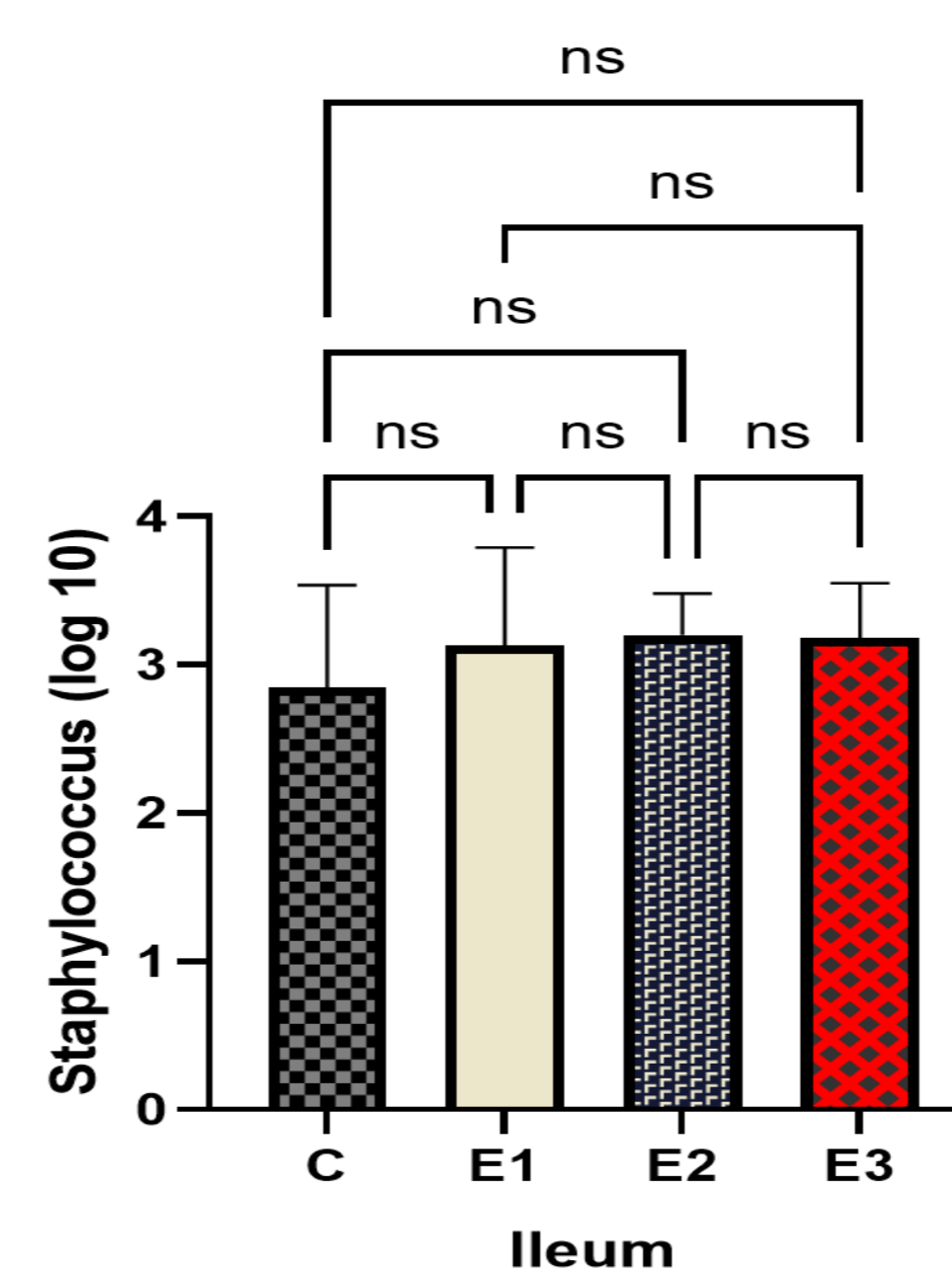
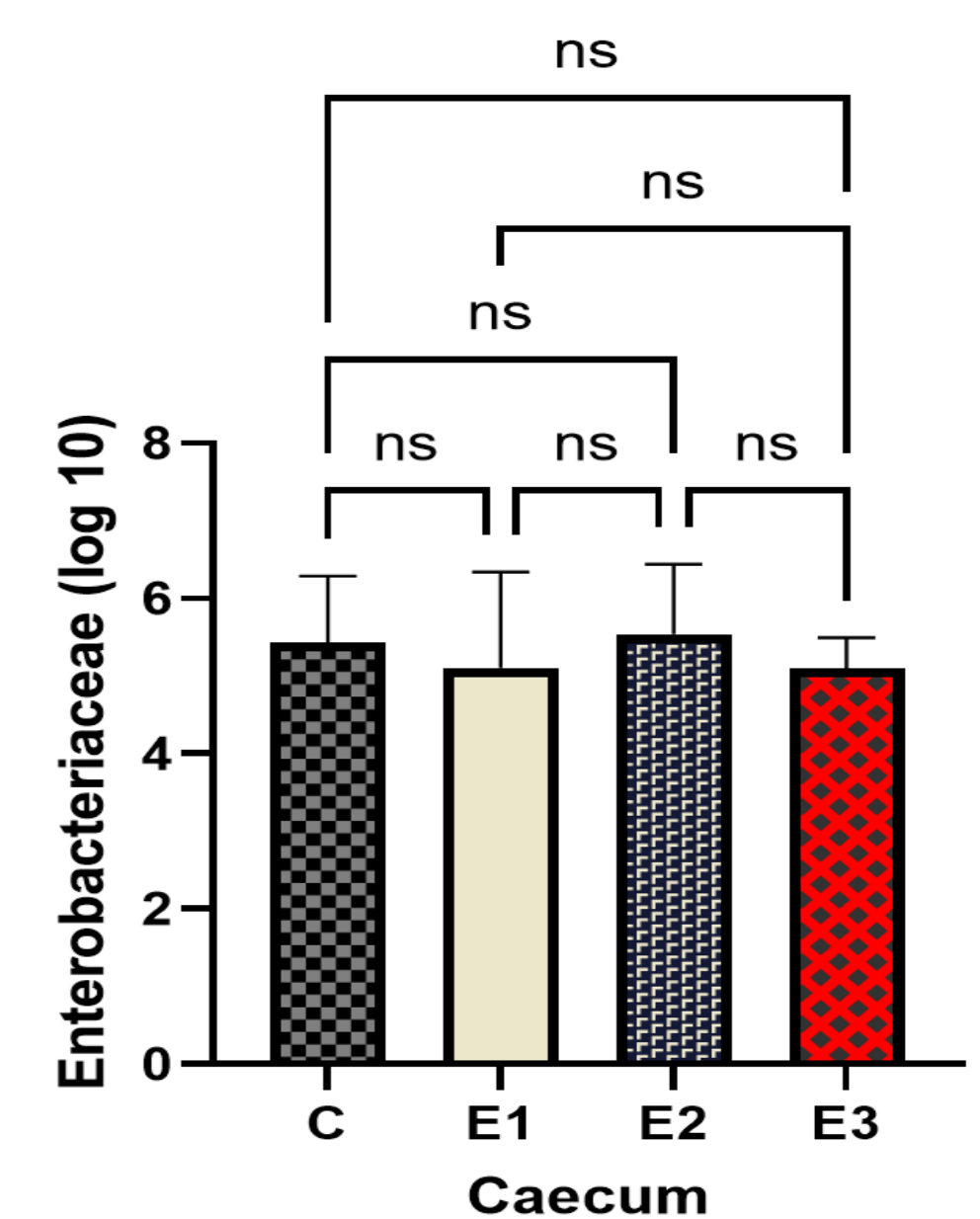
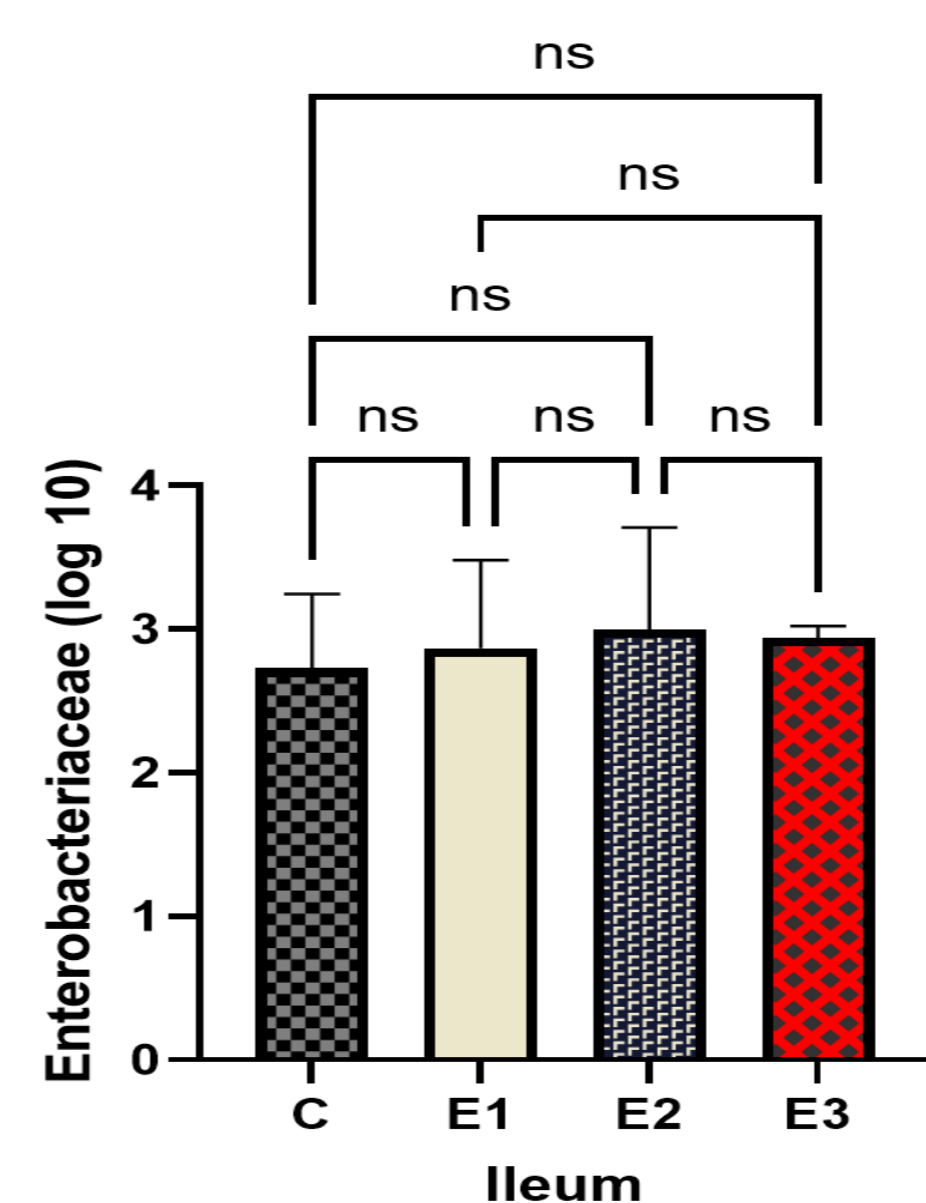
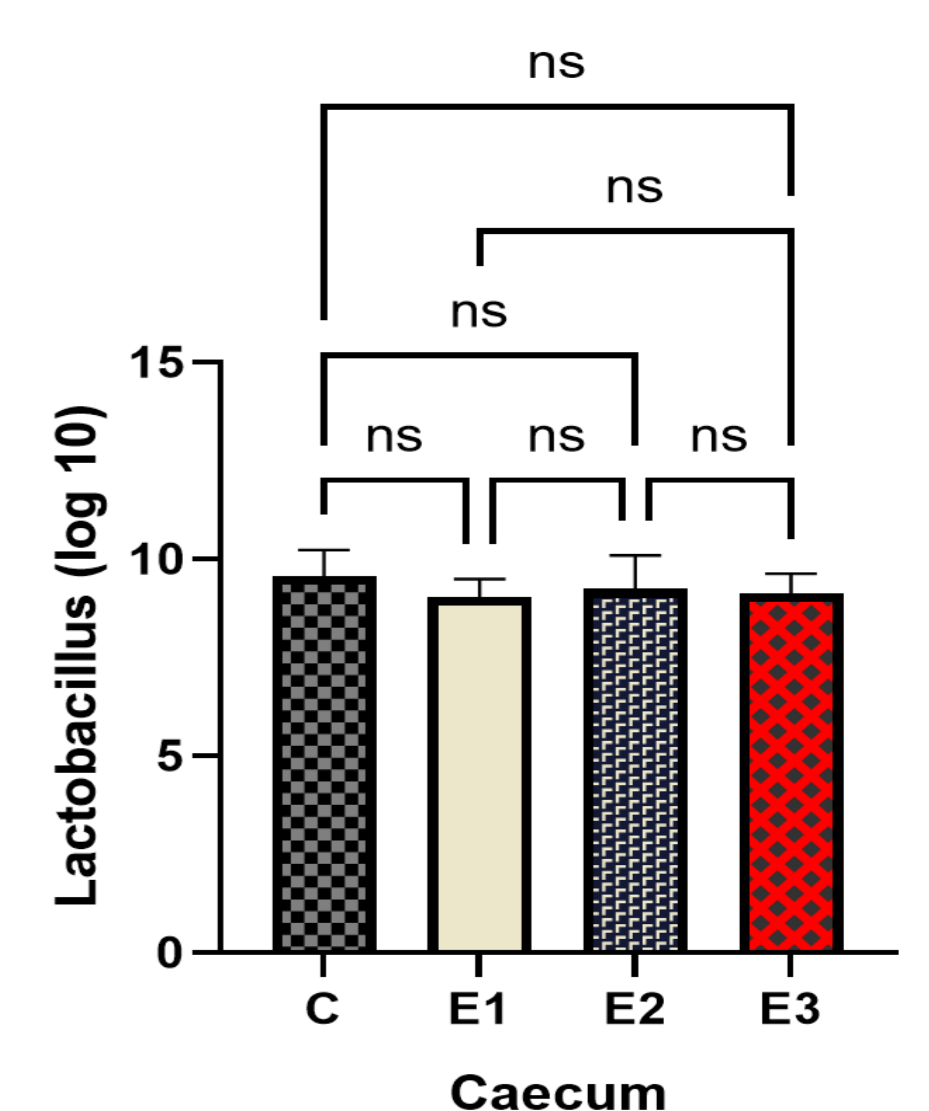
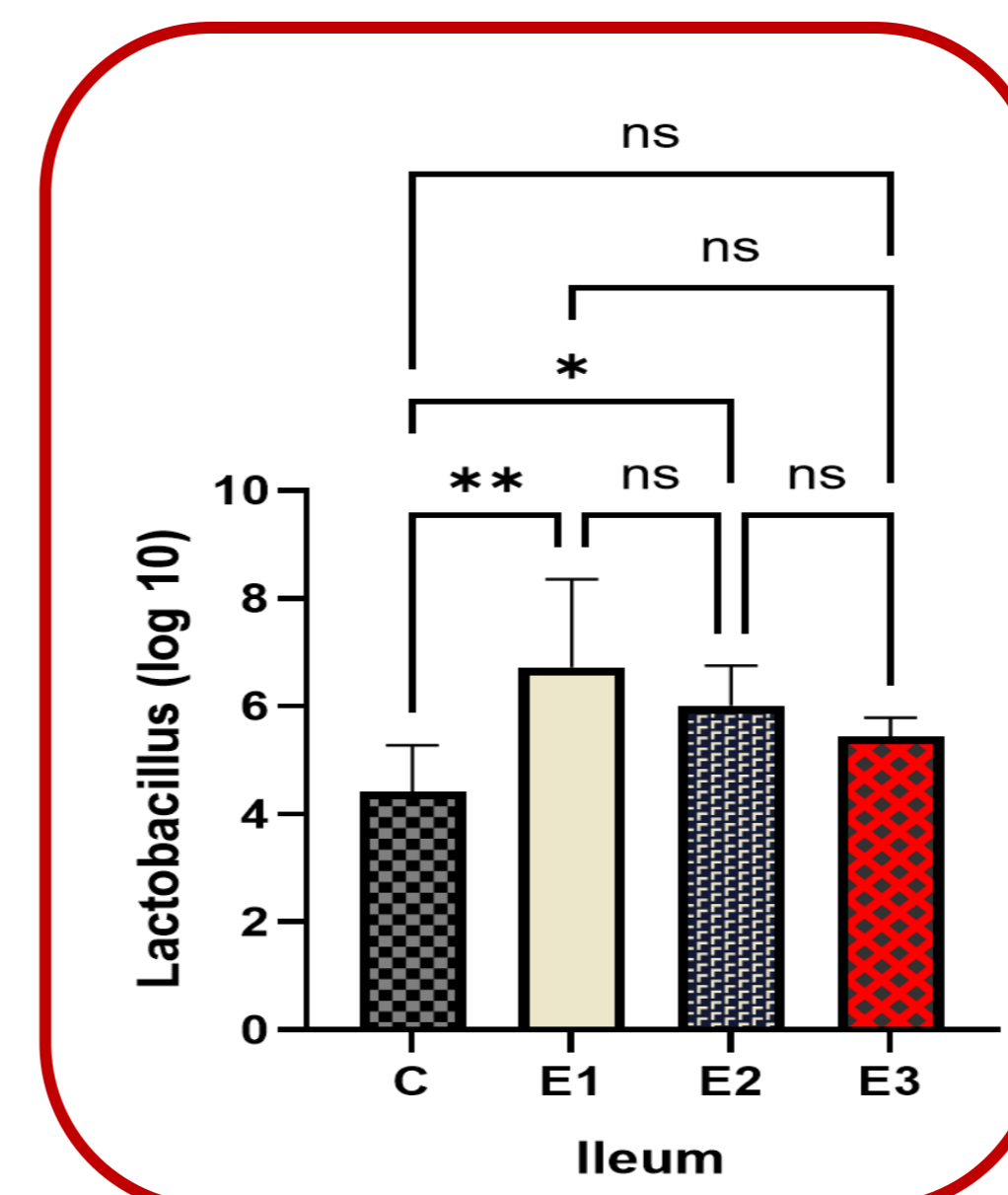
Aim of this study was to investigate the effect of inclusion the oleoproteaginous seeds (flax, camelina and hemp) as protein alternative to soybean meal substitution in broiler diet enriched in polyunsaturated fatty acids (PUFA) on the intestinal microbial populations and health status of broiler.

• Material and method

- 4 groups x 6-week
- 192, day-old Ross 308, kept in an experimental hall on permanent wood shaves litter
- 4 treatments:
 - ✓ Control
 - ✓ E1 (with 6% flaxseed);
 - ✓ E2 (with 10% camelina seeds);
 - ✓ E3 (with 5% hemp seeds);
- performance monitoring entire experimental period
- 8 blood samples were aseptically collected from the main brachial vein of birds to determine the biochemical analysis
- 8 chicks from each group were slaughtered and caecal and intestinal content were collected for microbiological examination



• Results and discussions



Conclusions: The *Lactobacillus* population in the ileum was significantly higher in group E1 and E2 compared to group C, with no notable differences observed among the other experimental groups, while the *Staphylococcus* population significantly decreased in the caecum for E2 and E3. The addition of dietary oleoproteaginous seeds had a positive effect in limiting the development of the pathogenic bacteria, , improving the microbial balance.