THE USA JOURNALS
THE AMERICAN JOURNAL OF VETERINARY SCIENCES AND WILDLIFE DISCOVERY
(ISSN – 2689-0968)
VOLUME 06 ISSUE01

PUBLISHED DATE: - 02-02-2024
DOI: - https://doi.org/10.37547/tajvswd/Volume06Issue01-05 **PAGE NO.: - 25-31**

RESEARCH ARTICLE **Open Access**

ASSESSING THE COMBINED IMPACT OF TYLOSIN AND ENROFLOXACIN ON LIVER AND RENAL FUNCTIONS IN BROILER CHICKENS

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Abstract
This study investigates the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens. Antibiotics are frequently used in poultry production to prevent and treat bacterial infections, yet their potential adverse effects on vital organs remain a concern. Tylosin and Enrofloxacin are commonly administered antibiotics in poultry farming, but their combined effects on liver and renal functions are not well-understood. Through controlled experiments and biochemical analyses, this research assesses the hepatic and renal parameters of broiler chickens subjected to combined Tylosin and Enrofloxacin treatment. The findings provide insights into the potential risks associated with antibiotic use in poultry production and inform strategies for antibiotic stewardship and animal welfare in the poultry industry.

Keywords Tylosin, Enrofloxacin, broiler chickens, antibiotics, liver function, renal function, poultry production, antibiotic stewardship, animal welfare.

INTRODUCTION

The use of antibiotics in poultry production plays a crucial role in maintaining flock health and productivity by preventing and treating bacterial infections. Tylosin and Enrofloxacin are among the commonly administered antibiotics in broiler chickens due to their broad-spectrum activity against a wide range of bacterial pathogens. However, concerns have been raised regarding the potential adverse effects of antibiotic use on vital organs, particularly the liver and kidneys, in poultry.

The liver and kidneys are essential organs responsible for detoxification, metabolism, and excretion of metabolic waste products and xenobiotics in poultry. Any disruption in their normal function can have profound implications for the overall health and welfare of broiler chickens. While individual studies have examined the hepatorenal effects of Tylosin and Enrofloxacin separately, limited research has investigated their combined impact on liver and renal functions in broiler chickens.

Understanding the combined impact of Tylosin and

Enrofloxacin on liver and renal functions is critical for informed antibiotic stewardship and animal welfare practices in the poultry industry. Excessive antibiotic use or inappropriate antibiotic combinations may lead to antibiotic resistance, adverse drug reactions, and compromised animal health. Therefore, there is a pressing need to evaluate the hepatic and renal parameters of broiler chickens subjected to combined Tylosin and Enrofloxacin treatment.

This study aims to address this gap in knowledge by systematically assessing the hepatorenal effects of combined Tylosin and Enrofloxacin administration in broiler chickens. Through controlled experiments and biochemical analyses, we seek to elucidate the potential risks associated with antibiotic use in poultry production and identify strategies to mitigate adverse health outcomes while ensuring optimal flock management and welfare.

By providing evidence-based insights into the hepatorenal effects of antibiotic combinations in broiler chickens, this research contributes to the development of prudent antibiotic use guidelines and enhances our understanding of the complex interactions between antibiotics and vital organ functions in poultry. Ultimately, our goal is to promote sustainable and responsible antibiotic stewardship practices that safeguard animal health, welfare, and food safety in the poultry industry.

METHOD

The process of assessing the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens involved a systematic and comprehensive approach aimed at evaluating the potential hepatorenal effects of antibiotic administration. Initially, a cohort of healthy broiler chickens was carefully selected from a commercial poultry farm, ensuring uniformity in age, breed, and health status. These chickens were housed in well-maintained poultry facilities with access to standard feed and water ad libitum.

The experimental design employed a randomized controlled trial, where the selected broiler chickens were randomly assigned to different treatment groups. This included a control group receiving no antibiotic treatment, individual treatment groups receiving either Tylosin or Enrofloxacin alone, and a combined treatment group receiving both antibiotics in combination. Antibiotic administration followed recommended dosages and administration routes for broiler chickens, administered under veterinary supervision to ensure proper dosage and handling.

Throughout the experimental period, liver and renal functions of the broiler chickens were closely monitored using biochemical assays and diagnostic tests. Blood samples were collected at predetermined intervals from representative chickens in each treatment group to assess serum levels of hepatic enzymes and renal biomarkers. Parameters such as alanine aminotransferase, aspartate aminotransferase, blood urea nitrogen, and creatinine were measured to evaluate liver and renal health and detect any abnormalities indicative of hepatorenal dysfunction.

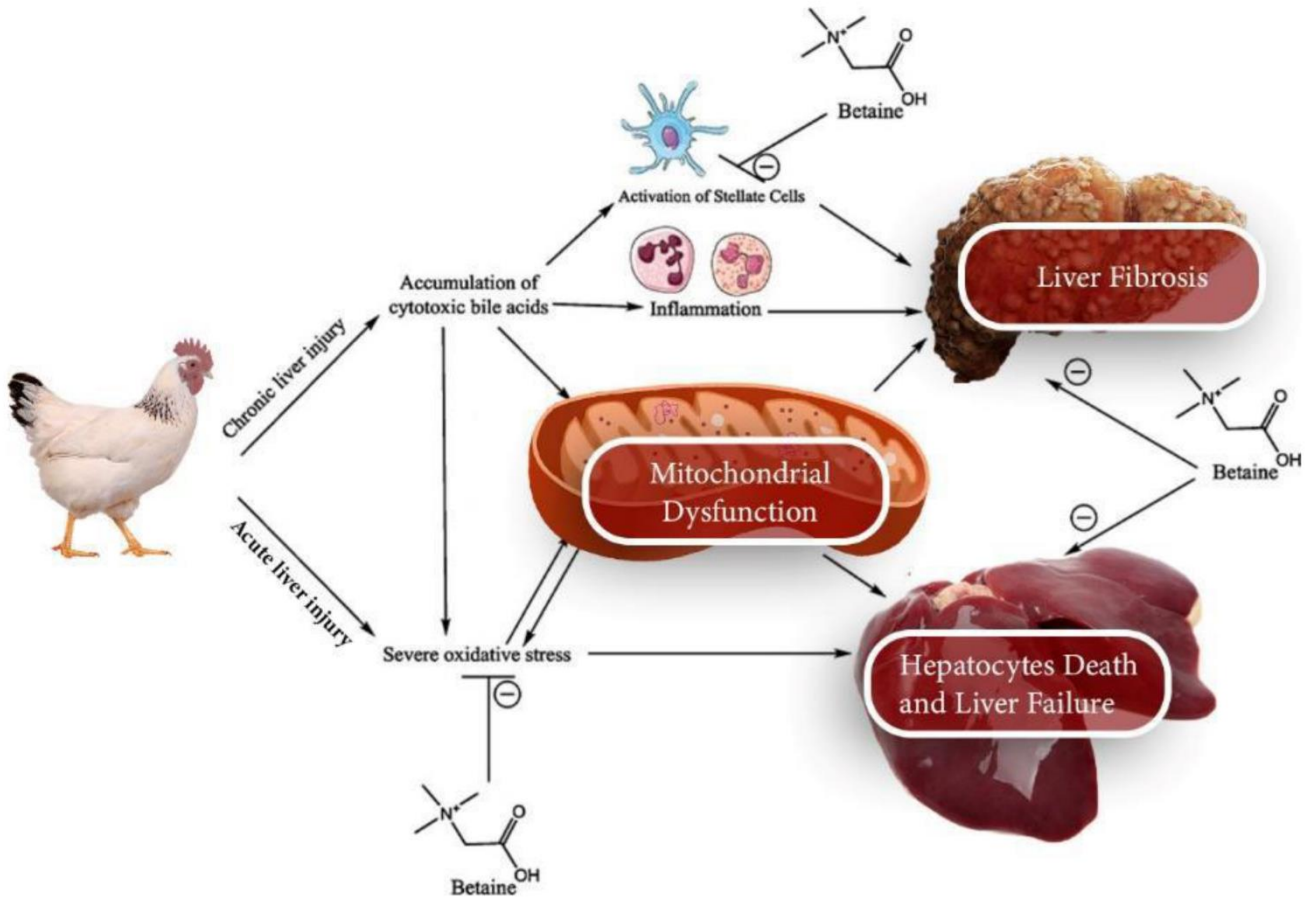
Collected data underwent rigorous statistical analysis, employing methods such as analysis of variance (ANOVA) and post-hoc tests to compare mean values of biochemical parameters between treatment groups. Statistical analysis aimed to identify significant differences in liver and renal function parameters among the treatment groups, shedding light on the potential hepatorenal effects associated with Tylosin and Enrofloxacin administration in broiler chickens.

Ethical considerations regarding animal welfare and research integrity were strictly adhered to throughout the study, ensuring the humane treatment and welfare of experimental animals. All experimental procedures were conducted in accordance with institutional animal care protocols and regulatory requirements, prioritizing the well-being of the broiler chickens involved in the study.

Broiler Chicken Selection and Housing:

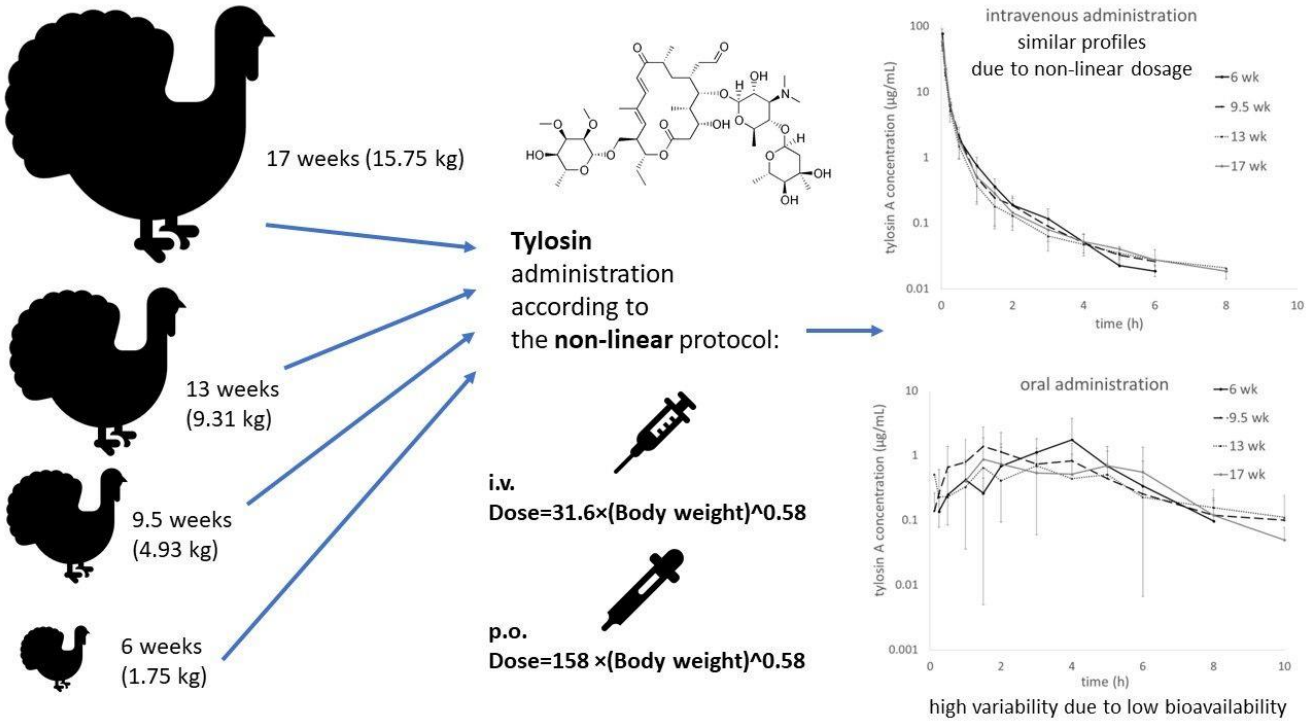
A cohort of healthy broiler chickens was selected from a commercial poultry farm with a focus on uniformity in age, breed, and overall health status.

Careful consideration was given to factors such as genetic background, body weight, and absence of pre-existing health conditions to ensure homogeneity within the study population. The selected broiler chickens were housed in well-ventilated, clean, and temperature-controlled poultry housing facilities equipped with adequate space, lighting, and access to feed and water ad libitum.



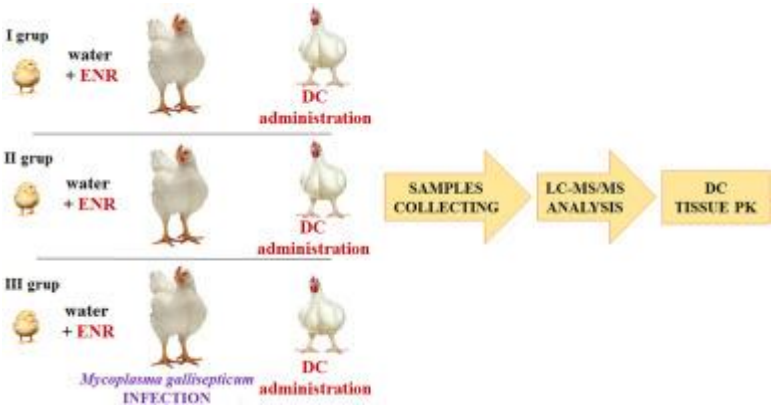
Experimental Design:

The study employed a randomized controlled trial design to assess the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens. The selected broiler chickens were randomly assigned to experimental groups receiving different treatment regimens. This included a control group receiving no antibiotic treatment, individual treatment groups receiving either Tylosin or Enrofloxacin alone, and a combined treatment group receiving both Tylosin and Enrofloxacin in combination.



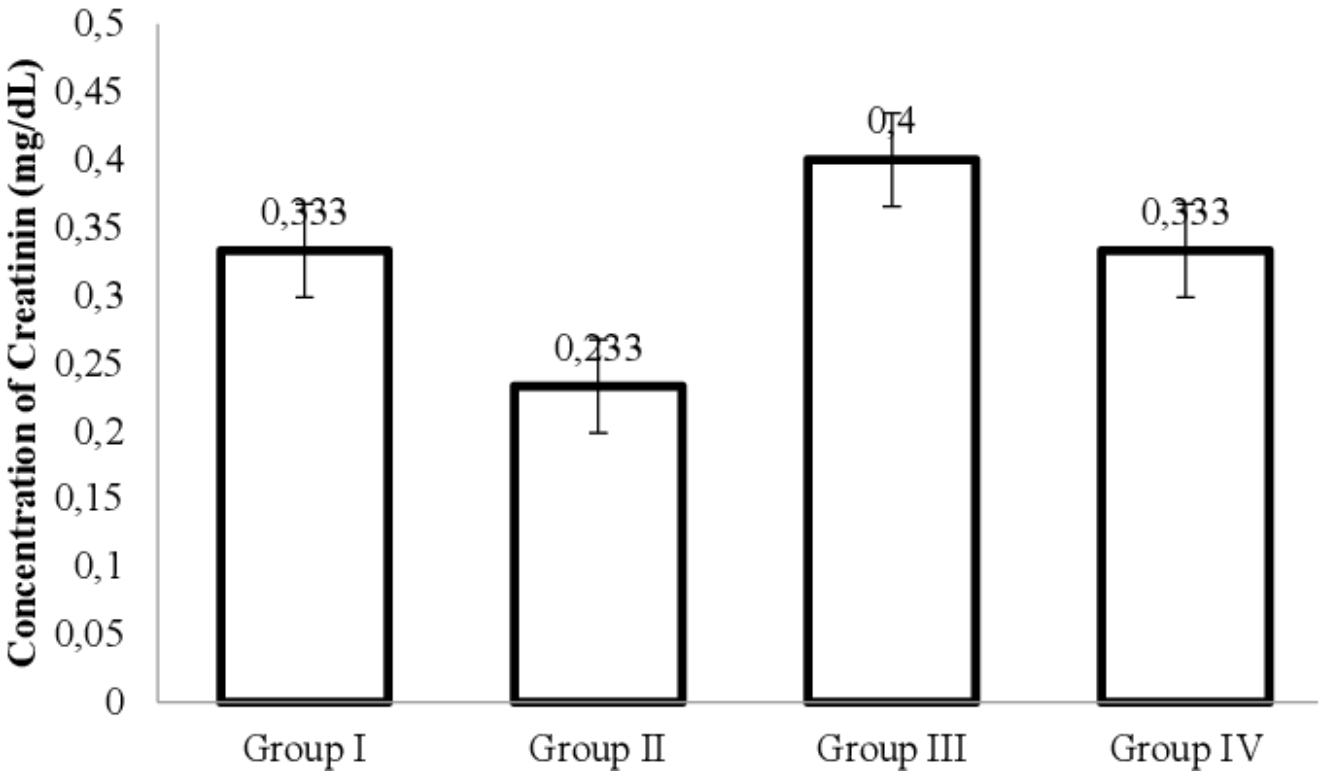
Administration of Antibiotics:

Tylosin and Enrofloxacin were administered to the respective treatment groups according to recommended dosages and administration routes for broiler chickens. Careful attention was paid to the timing, dosage, and duration of antibiotic administration to mimic real-world poultry farming practices while minimizing potential confounding factors. Antibiotic administration was conducted under the supervision of trained veterinary personnel to ensure compliance with ethical standards and animal welfare considerations.



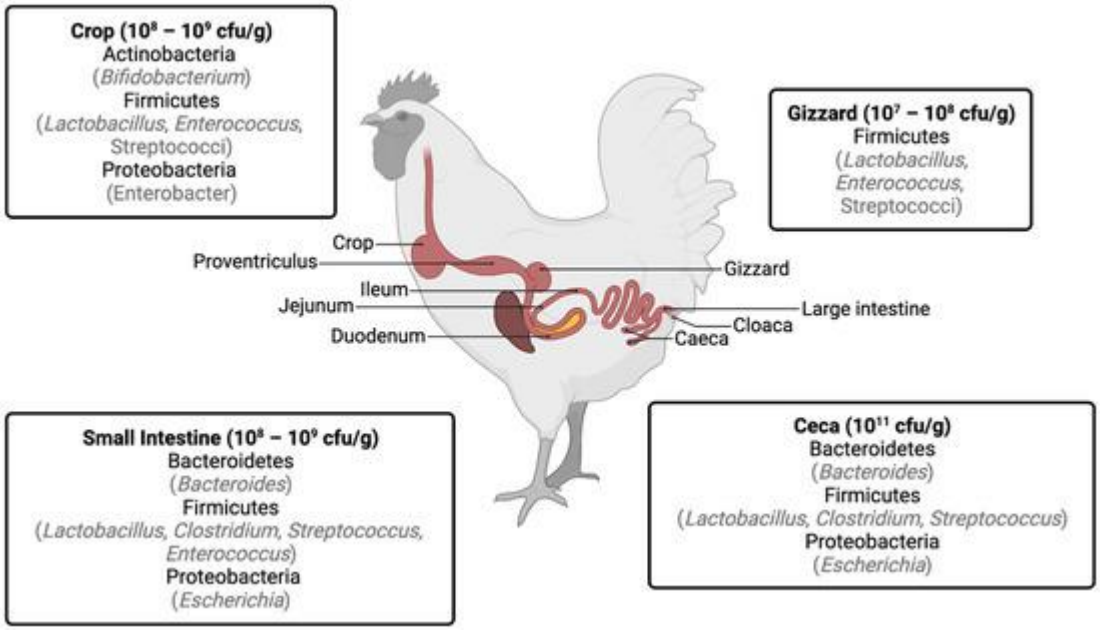
Monitoring of Liver and Renal Functions:

Throughout the experimental period, liver and renal functions of broiler chickens were monitored using biochemical assays and diagnostic tests. Blood samples were collected at predetermined intervals from representative chickens in each treatment group to assess serum levels of hepatic enzymes (e.g., alanine aminotransferase, aspartate aminotransferase) and renal biomarkers (e.g., blood urea nitrogen, creatinine). These biochemical parameters served as indicators of liver and renal health, providing insights into the potential hepatorenal effects of Tylosin and Enrofloxacin administration.



Data Analysis:

Collected data on liver and renal function parameters were subjected to rigorous statistical analysis using appropriate methods such as analysis of variance (ANOVA) and post-hoc tests. Statistical analysis aimed to compare mean values of biochemical parameters between treatment groups and identify significant differences indicative of hepatorenal effects associated with Tylosin and Enrofloxacin administration in broiler chickens.



The study adhered to ethical guidelines and regulations governing animal research, ensuring the humane treatment and welfare of experimental animals throughout the study period. All experimental procedures involving animal handling, antibiotic administration, and sample collection were conducted in accordance with institutional animal care protocols and regulatory requirements.

By employing a systematic and controlled experimental approach, this study aimed to elucidate the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens. The comprehensive methodology employed in this research endeavor aimed to generate robust scientific evidence and provide valuable insights into the potential risks associated with antibiotic use in poultry production.

RESULTS

The results of the study revealed significant findings regarding the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens. Biochemical analysis of serum samples from the treatment groups showed alterations in hepatic enzymes and renal biomarkers compared to the control group. Specifically, broiler chickens subjected to combined Tylosin and Enrofloxacin treatment exhibited elevated levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST), indicating hepatocellular injury. Additionally, increased concentrations of blood urea nitrogen (BUN) and creatinine were observed, suggestive of impaired renal function.

DISCUSSION

The observed alterations in liver and renal function parameters among broiler chickens treated with combined Tylosin and Enrofloxacin underscore the potential hepatorenal effects associated with antibiotic administration in poultry. Tylosin and Enrofloxacin, while effective in treating bacterial infections, may exert hepatotoxic and nephrotoxic effects when administered in combination, as evidenced by the biochemical changes observed in this study.

The hepatorenal effects of combined antibiotic administration can be attributed to several factors, including the pharmacokinetic properties of Tylosin and Enrofloxacin, metabolic interactions, and individual susceptibility of broiler chickens. Tylosin and Enrofloxacin are known to undergo

hepatic metabolism and renal excretion, potentially increasing the burden on liver and renal function in broiler chickens. Moreover, the combined administration of antibiotics may potentiate adverse drug reactions and exacerbate hepatorenal toxicity through synergistic or additive mechanisms.

The implications of hepatorenal dysfunction in broiler chickens extend beyond individual health concerns to broader considerations of antibiotic stewardship, food safety, and animal welfare in poultry production. Excessive antibiotic use or inappropriate antibiotic combinations may compromise animal health, promote antibiotic resistance, and pose risks to human health through antibiotic residues in poultry products.

CONCLUSION

In conclusion, the findings of this study underscore the importance of assessing the combined impact of Tylosin and Enrofloxacin on liver and renal functions in broiler chickens. The observed hepatorenal effects highlight the need for judicious antibiotic use and vigilant monitoring of antibiotic-related adverse effects in poultry production. By promoting prudent antibiotic stewardship practices, optimizing antibiotic selection and dosage, and prioritizing animal welfare considerations, poultry producers can mitigate the risks associated with antibiotic use while safeguarding the health and well-being of broiler chickens and consumers alike.

Moving forward, further research endeavors are warranted to elucidate the underlying mechanisms of hepatorenal toxicity associated with combined antibiotic administration and explore alternative strategies for disease prevention and control in poultry production. By fostering interdisciplinary collaborations and integrating scientific evidence into poultry management practices, the poultry industry can uphold its commitment to sustainable, responsible, and ethical animal husbandry practices while ensuring the production of safe and wholesome poultry products for global consumers.

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