

Research Article



Efficacy of Feed Sterilization with Ozone in Reducing Microorganisms and Mycotoxins and Improving Some Productive Traits in Broilers

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Abstract | This study investigated the effect of sterilizing feed with different concentrations of ozone (O₃) gas on the presence of microorganisms, mycotoxin concentrations, and various feed characteristics. A total of 225 one-day-old unsexed broiler chicks (Ross-308) were used, distributed randomly into five experimental groups with 45 chicks per group, and each group was further subdivided into three replicates of 15 birds each. The experimental treatments were as follows: T1 served as the control (feed not sterilized with ozone), while T2, T3, T4, and T5 involved feed sterilized with ozone at concentrations of 33.3, 66.6, 99.9, and 133.3 mg/5 kg, for durations of 5, 10, 15, and 20 minutes, respectively. The results demonstrated that ozone gas effectively inhibited microorganisms in the feed, as indicated by a significant reduction ($P \leq 0.05$) in the logarithm of total bacterial counts and *E. coli* counts in the ozone-treated feeds compared to the control. Furthermore, ozone treatments T4 and T5 resulted in a significant decrease ($P \leq 0.05$) in the concentrations of aflatoxin and ochratoxin compared to the other treatments. Additionally, all ozone gas treatments led to a significant reduction ($P \leq 0.05$) in T-2 toxin concentration compared to the control. In terms of production traits, birds fed with T3 feed showed a significant improvement ($P \leq 0.05$) in average live body weight and weight gain rate compared to the control group (T1). Moreover, a significant improvement ($P \leq 0.05$) in feed conversion efficiency was observed for all ozone treatment groups compared to the control.

Keywords | Poultry, Production, Contamination bacteria, Mycotoxins, Ozone

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INTRODUCTION

Poultry feeds are susceptible to contamination with microorganisms (bacteria or fungi) from a variety of sources including feed ingredients contaminated with plant or animal origin, during processing, transportation or storage or from the poultry fields themselves (Maciorowski et al., 2007). Many fungal species are known to produce mycotoxins in feed during crop growth or after harvest. Contamination with mycotoxins negatively affects a large number of raw materials and finished feeds intended for animal production. Among these, the economic impact on animal production includes the cost of disposing of contaminated feed and the decrease in animal productivity,

where the pollution affects the nutritional value and degree of acceptability of the contaminated feeds (Magnoli et al., 2019). Therefore, this is accompanied by many negative health effects on birds, including the decreases in the rate of feed consumption, weight gain due to feed conversion rate weak, egg production, and resistance weak to infectious diseases, that increasing the mortality rate (Nazarizadeh and Pourreza, 2019; Sineque et al., 2017).

Microorganism-free feed is crucial to maintaining poultry health and ensuring optimal bird performance. Contaminated feeds may cause pathogenic bacteria, fungi, protozoa and viruses to enter the digestive system of poultry, leading to various diseases and infections.