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Studies on the efficacy of lactobacilli on the immune status and performance of broiler chickens

A Dissertation presented by
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In Microbiology
(Bacteriology- Immunology and Mycology)

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Abstract

This research was initiated with the objective of producing a local probiotic formulation and application programs to further improve broiler production economics and safety. Four isolates of lactobacilli were recovered and characterized biochemically, and genetically, based on the rRNA gene from the gut of mature healthy broilers. *L. johnsonii, L. plantarum, L. crispatus* and *L. reuteri* were selected and mixed with an equal volume and approximate dose of 10^8 CFU/chick was tested. The safety of oral administration of the characterized lactobacilli was established in broilers. An innovative media from chicken feed for propagation of lactic acid producing bacteria was devised to reduce the cost of local commercial production of probiotics. A probiotic application protocol was suggested. Single and two-time probiotic applications (at 0 day or at 0 and 10 days) were tested in groups of broiler chicks reared under field conditions and fed antimicrobials- and anticoccidial- free rations. The modified whey broth surpasses MRS and feed extract media. Performance parameters and antibody immune responses were measured with, and without microbial challenge in two experiments. *Clostridium perfringens* type A was used in challenging bird (10^9 CFU/chick). Higher performance parameters, reduced disease impact and improved histopathological picture of intestine were reported in groups receiving probiotic. Non significant changes in antibody responses were observed. Data analysis shows that an overall 8% increase in broiler production can be achieved using the double dose application approach of the probiotics. A significant ($P \leq 0.05$) risk reduction of *C. perfringens* challenge can be achieved using either one or double dose application approach of the probiotics and conclusions pertaining the use and possible production economics were drawn.

Keywords: Chicken, *Clostridium*, Histopathology, *Lactobacillus*, Poultry, Probiotic.

Dedication

To my mother, my father,

brothers, sisters,

wife and lovely babies

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*All thanks at first and at the end to our merciful God **ALLAH** who gift me all things unconditionally and prayer and peace upon **prophet Mohamed** who taught people all good.*

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