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Intestinal microflora stabilization with combining prebiotic effect and antimicrobial

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Abstract: Phytobiotics, as it is demonstrated under both *in vitro* and *in vivo* conditions, can address gut health challenges in the poultry industry and can be used as novel growth promoters. Traditional herbs play an important role in eliminating pathogenic infections, represent a novel solution for antibiotic resistance at an affordable price and serve the consumer's need for antibiotic free production. Combining herbal plant extracts with an optimal prebiotic allows products to work through multiple modes of action and ensures normal growth of the commensal microflora while inhibiting the growth of undesired pathogens and enhancing production parameters. The aim of this research project was to develop a natural growth promoter which has a selective inhibiting effect on the Gram positive pathogenic bacterial infections (*C. perfringens*); without limiting the multiplication of the commensal flora. 20 herbs were selectively screened individually and in combination for anti-clostridial activity *in vitro* using minimal inhibition concentration assay to determine combinations which inhibit the growth of *C. perfringens* at low concentrations; while having no effect on the normal microbiome. Additionally, due to the synergistic effect of the phytobiotic and prebiotic combination enhanced bioactivity was observed *in vivo*. *In vivo* testing to determine product efficacy was done on commercial broiler chicken farms in both Europe and Latin America. Results showed that in experimental trials production parameters (BWG, mortality and FCR) were significantly improved and incidence of necrotic enteritis was reduced in groups that received the phytobiotic/prebiotic included as part of the commercial basal broiler diet when compared to the non-treated groups. Metagenomic analysis revealed that the phytobiotic/prebiotic inhibits the growth of *C. perfringens* in the small intestine, the product does not influence the growth of *C. perfringens* in the large intestine, and therefore ensures optimal butyric acid production in the large intestine. These results suggest our novel phytobiotic/prebiotic efficiently controls *Clostridium perfringens* and improves production parameters when used in broiler chickens; providing a promising alternative to antibiotic growth promoters.