

Chemistry and Biological Activity of Feed Additive for Poultry Farming

Authors : Malkhaz Jokhadze, Vakhtang Mshvildadze, Levan Makaradze, Ekaterine Mosidze, Salome Barbaqadze, Mariam Murtazashvili, Dali Berashvili, Koba sivsivadze, Lasha Bakuridze, Aliosha Bakuridze

Abstract : Essential oils are one of the most important groups of biologically active substances present in plants. Due to the chemical diversity of components, essential oils and their preparations have a wide spectrum of pharmacological action. They have bactericidal, antiviral, fungicidal, antiprotozoal, anti-inflammatory, spasmolytic, sedative and other activities. They are expectorant, spasmolytic, sedative, hypotensive, secretion enhancing, antioxidant remedies. Based on preliminary pharmacological studies, we have developed a formulation called "Phytobiotic" containing essential oils, a feed additive for poultry as an alternative to antibiotics. Phytobiotic is a water-soluble powder containing a composition of essential oils of thyme, clary, monarda and auxiliary substances: dry extract of liquorice and inhalation lactose. On this stage of research, the goal was to study the chemical composition of provided phytobiotic, identify the main substances and determine their quantity, investigate the biological activity of phytobiotic through *in vitro* and *in vivo* studies. Using gas chromatography-mass spectrometry, 38 components were identified in phytobiotic, representing acyclic-, monocyclic-, bicyclic-, and sesquiterpenes. Together with identification of main active substances, their quantitative content was determined, including acyclic terpene alcohol β -linalool, acyclic terpene ketone linalyl acetate, monocyclic terpenes: D-limonene and γ -terpinene, monocyclic aromatic terpene thymol. Provided phytobiotic has pronounced and at the same time broad spectrum of antibacterial activity. In the cell model, phytobiotic showed weak antioxidant activity, and it was stronger in the ORAC (chemical model) tests. Meanwhile anti-inflammatory activity was also observed. When fowls were supplied feed enriched with phytobiotic, it was observed that gained weight of the chickens in the experimental group exceeded the same data for the control group during the entire period of the experiment. The survival rate of broilers in the experimental group during the growth period was 98% compared to -94% in the control group. As a result of conducted researches probable four different mechanisms which are important for the action of phytobiotics were identified: sensory, metabolic, antioxidant and antibacterial action. General toxic, possible local irritant and allergenic effects of phytobiotic were also investigated. Performed assays proved that formulation is safe.

Keywords : clary, essential oils, monarda, poultry, phytobiotics, thyme

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