

Induction of Immunosuppression by Benzo (a) Pyrene in Broilers

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Abstract

Benzo[a]pyrene (BaP) is a polycyclic aromatic hydrocarbon which has shown carcinogenic, teratogenic, mutagenic and claimed immune-suppressive potentials. However, the exact mechanism whereby BaP induces such immunotoxicity is not fully explored. The effect of BaP on the immune system and morphology of selected lymphoid organs of broilers were investigated. Forty day-old chicks were divided into control and BaP groups comprising of 20 birds each. The control group was instilled with tricaprillin only while the other received 15 mg BaP/kg intra-tracheally for 5 consecutive days. Live ND vaccine (La Sota strain) was given on Days 7 and 21 to all chickens. Five chickens from each group were sacrificed via cervical dislocation and the liver, lung and lymphoid organs were collected at Days 7, 14, 21 and 35. Tissues were subjected to assay for cytochrome P450 (CYP1), SOD and MDA. In this study, marked expression of CYP1 in the broilers denoted the sensitivity of broilers to BaP exposure. Such expression has in turn led to oxidative stress which led to immune-suppression via damage of lymphoid organs. This warrants judicious assessment of poultry health status with respect to the occurrence of haze or air pollution episodes. Effective immune-modulatory strategies will render adequate flock health and translate maximum profit to the farm.

Keywords: broiler, benzo(a)pyrene (BaP), immunosuppression, oxidative stress, lymphoid organ morphology