



P-50

DUST AND ITS COMPONENTS CAN MODULATE BROILER'S IMMUNE SYSTEM

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Intensive housing of poultry causes high emissions and concentrations of airborne particles, which can lead to respiratory diseases of human and animals. Deposition in the respiratory tract, and transportation of airborne particles depend on their sizes. We studied concentration and size distribution of airborne particles inside livestock houses. Dust concentrations in the different particle size ranges were substantially higher both in counts and mass, in poultry houses (3.43 ± 0.9 mg) than in pig houses (1.29 ± 0.25 mg), and also than in cattle (0.047 ± 0.01 mg) and mink houses (0.0163 ± 0.0003 mg). Pathogen-associated-molecular-patterns (PAMP), such as lipopolysaccharide (LPS), lipoteichoic acid (LTA), β -glucans (BGL), and probably many others are important components of (fine) dust in poultry houses. Broilers were intratracheal (i.t.) challenged with these PAMP. Furthermore, they were challenged with heat-inactivated dust particles and NH₃. Primary and secondary (total) systemic antibody (Ab) responses and (isotype) IgM and IgG responses to the concurrently i.t. administered model antigen, human serum albumin (HuSA), were determined. Growth rate and heart morphology of the broilers were measured, as well. This indicated that airborne dust constituents such as PAMP may lead to an enhanced status of immune reactivity. In the future we will study the effects of the particle's size range on chicken health and immune responses.