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□ ORAL Presentation

**Nano-silicate platelet (NSP) inhibits immunotoxicity induced by ammonia (NH3) gas in the spleen of broiler chickens**

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**Abstract:**

**Background/Objective:** Ammonia NH3 is major pollutants in the poultry farming because it negative effects to the overall health of the birds and poultry worker. The spleen is the largest secondary lymphoid organ in the body and hosts a wide range of immunologic functions alongside its roles in hematopoiesis and red blood cell clearance.Nano-silicates platelets (NSP) is a kind of natural silicate clay exfoliated from montmorillonite (MMT) that have been known as biomedical products for drug delivery, chronic diarrhea, and powerful adsorptive and absorptive properties to biomolecules. Here, we examined nano-silicate platelet (NSP) in the alleviation of immunotoxicity induced by ammonia gas in the spleen of broiler chickens.

**Methods:** 128 chicks (1 day old, initial weight= 46 g) were used and assigned in to the four groups treatments with four replicates and 8 unsexed chicks (ROSS, 308) per pen (cages) (n=8/pen). The groups were named; Control with commercial feed (C); 0.1% nano silicate platelets (NSP) supplemented in the feed (N), 35 ppm ammonia with commercial feed (H); and 0.1% nano silicate platelets (NSP) supplemented in the feed with 35 ppm ammonia (NH). Birds started receiving the standard diet and NSP at day 0 for 35 days and ammonia challenges began at day 14 until 28 once every two days.

**Results:** Results showed that ammonia significantly suppressed the relative weight of spleen, while NSP attenuated the suppression and NSP alone even promoted the relative weight of spleen. Moreover, the addition of 0.1% NSP in the feed alleviated systemic and splenic inflammation in birds under ammonia exposure. Again, the alleviation by NSP were irrelevant to ammonia exposure, by which birds exhibited pronounced immune cell infiltration, focal cells, and lesions in the spleen, as well as remarkable upregulation of pro-inflammatory cytokines including IL-6 and IL-1 (P<0.05 and P<0.01, respectively). By western blot analysis shown that NSP alone significantly increase PCNA I compare to those other groups.

**Conclusion:** We suggest that NSP may act as a detoxifier to intercept incoming foreign particles, such as ammonia, bacteria, and viruses, and filtering them from entering into the circulation to reach the spleen, which alleviates inflammatory status of spleen function and thereby may result in better humoral immunity. This study provided new evidences that NSP may serve as a novel strategy to alleviate inflammation and enhance humoral immunity induced by ammonia gas.

**Keywords:** Ammonia, Broiler, Spleen, Humoral immunity, Nano-silicate platelet.