



Prebiotics reduce feather pecking behavior, and improve trace element profile and redox balance in Mule ducks

U. T. Mahmoud, M. A. M. Mahmoud, M. Abd-Elkareem, F. A. M. Ahmed, and N. S. A. Khalil

Abstract:

The aim of this study was to evaluate the prebiotic effects of mannan-oligosaccharide (MOS) and β -glucan (BG) combination (MOS-BG prebiotics) on feather pecking behavior, some physiological aspects and brain histology in Mule ducks. A total of 48 Mule ducks (15 days of age) were assigned to 3 treatments; 4 control (C) groups of ducks fed a basal diet only, 4 low-dose AGRIMOS[®] (LA) (1.5 g/kg diet) groups, and 4 high-dose AGRIMOS[®] (HA) (3 g/kg diet) groups. The experiment lasted for 6 weeks. Feather pecking behavior was recorded by direct observation for altogether 1 hour/pen/week. Blood samples and brain tissues were collected from 2 ducks per pen (8 ducks per treatment group) at the end of the experiment. Feather pecking frequency and feather scores of the wings, back, and vent regions were significantly lower in HA compared to C groups, but higher in LA groups. Dopamine levels were highest in LA groups, followed by C and HA groups, and serotonin levels showed an opposite outcome pattern. Iron levels were highest in LA groups and vitamin C levels highest in HA groups. A dose-dependent increase in both magnesium level and superoxide dismutase activity was observed in LA and HA groups. Both LA and HA groups showed similarly increased zinc, copper and vitamin E levels, glutathione peroxidase activity and total antioxidant capacity as well as decreased total peroxide levels and oxidative stress indices were found. This, points to a possible welfare enhancing effect of MOS-BG prebiotics in ducks. However, no clear association between feather pecking behavior and antioxidant capacity was apparent. Additionally, the extent of feather pecking behavior was not reflected by any histological or cytological changes in the brain tissues or neurons, respectively. Considering the low sample size and the unexplainable result of more feather pecking when fed with low doses of prebiotics further investigations are needed. However, the study indicates that utilization of MOS-BG prebiotics at the high dose may attenuate feather pecking behavior and enhance the oxidative stability and trace element reserve.

Keywords:

Prebiotics feather pecking behavior trace element profile redox balance Mule ducks

Published In:

Journal of Veterinary Behavior: Clinical Applications and Research , 43 , 28-38