

S9- 0042 Development of a method for prediction of eggshell damage in order to improve egg handling and packing processes

Bart Alders, Simon van Mourik
Vencomatic Group, Eersel, The Netherlands
Corresponding author: bart.alders@vencomatic-group.com

Increasing the maximum age of laying hens in order to produce more top quality eggs per hen housed, will increase the risk of egg shell damage due to a loss of shell strength. This raises the question of how egg shell damage occurrence may be reduced during collection, packing and transport. We performed a model based study focused on hairline cracks in eggs of 88 week old hens, and simulated side collisions on 1235 eggs using a specially designed pendulum. The kinetic energy at the moment of impact was related to the accelerations measured inside the transport chain by an electronic egg. Further, several egg mechanical properties were measured. Our model correctly predicted that impacts of 3.4 mJ, typical for automated egg handling processes in the Netherlands, result in a crack percentage of 7.7%. Our model predicts that a moderate decrease of 30% in impact energy will result in a drastic reduction of crack occurrence, from 7.7% down to 0.3- 1%, whereas an increase of 30% will increase crack occurrence to 42-55%. These predictions show a relatively high sensitivity of crack occurrence towards collision severity. The combined model predictions and correlations imply that, under current operational circumstances, collisions play a far more important role in hairline fractures than the measured egg properties. This suggests that to reduce hairline cracks, a reduction of collision severity is of first priority when increasing the age of laying hens.

Keywords: egg quality, electronic egg, eggshell damage

S9- 0043 The Effect of different immune adjuvants on the immunogenicity of laying hens

Xiaojuan Yu, Xiaoyu Li, Yongping Xu, Lili Wang, Yuan Li, Kailin Jing, Meixia Zhang
Department of Bioscience and Biotechnology, Dalian University of Technology, Dalian 116024, China
Corresponding author: 6888544@qq.com

Specific egg yolk immunoglobulin (IgY) has gradually become a promising alternative to antibiotics in the prevention and control of bacterial disease as it possesses many advantages, including safe, high efficiency and easy preparation. However, low antibody titer and production rate is one of the problems to be solved in the study of IgY. For screening immunologic adjuvants of high efficiency, security, low cost, easy injection, low side effect suitable for egg-laying hen to solve it, this experiment will take ETEC K88 standard strain as model antigen, respectively blended with different CpG- ODN (F1- F5) sequences which are synthesis of artificial design, Astragalus polysaccharides, Chitosa and Freund' s adjuvant to make inactivated vaccines, immuned brown crust egg-laying hen. 40 120-day-old chickens were randomly divided into 10 groups. All the chickens were immunized three times. Blood samples were collected to measure IL- 2 secretion and IFN- γ secretion by ELISA test respectively. Results showed that CpG-ODN could induced IL-2 and IFN- γ expression obviously, especially CpG-ODN F2. The highest expression yield were 38ng/L and 54 ng/L, respectively. After the third immunization, the egg productions of Group chitosa, FA (Freund' s adjuvant), and Propolis decreased more than the other groups. Enzyme - linked immunosorbent assay (ELISA) results showed that the highest IgY titer was up to 360000 and the IgY titer remained stable till 9 week in F2 groups. Thus we came to a conclusion that Group CpG-ODN F2 and Astragalus polysaccharides were better to be developed as potential adjuvats for egg yolk antibodies production.

Keywords: CpG-ODN; IL-2; IFN- γ ; egg yolk immunoglobulin (IgY)