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POSITIVE EFFECT OF EUGLENA GRACILIS DERIVED PARAMYLON ON IMMUNOGLOBULIN Y CONTENT OF EGG YOLK

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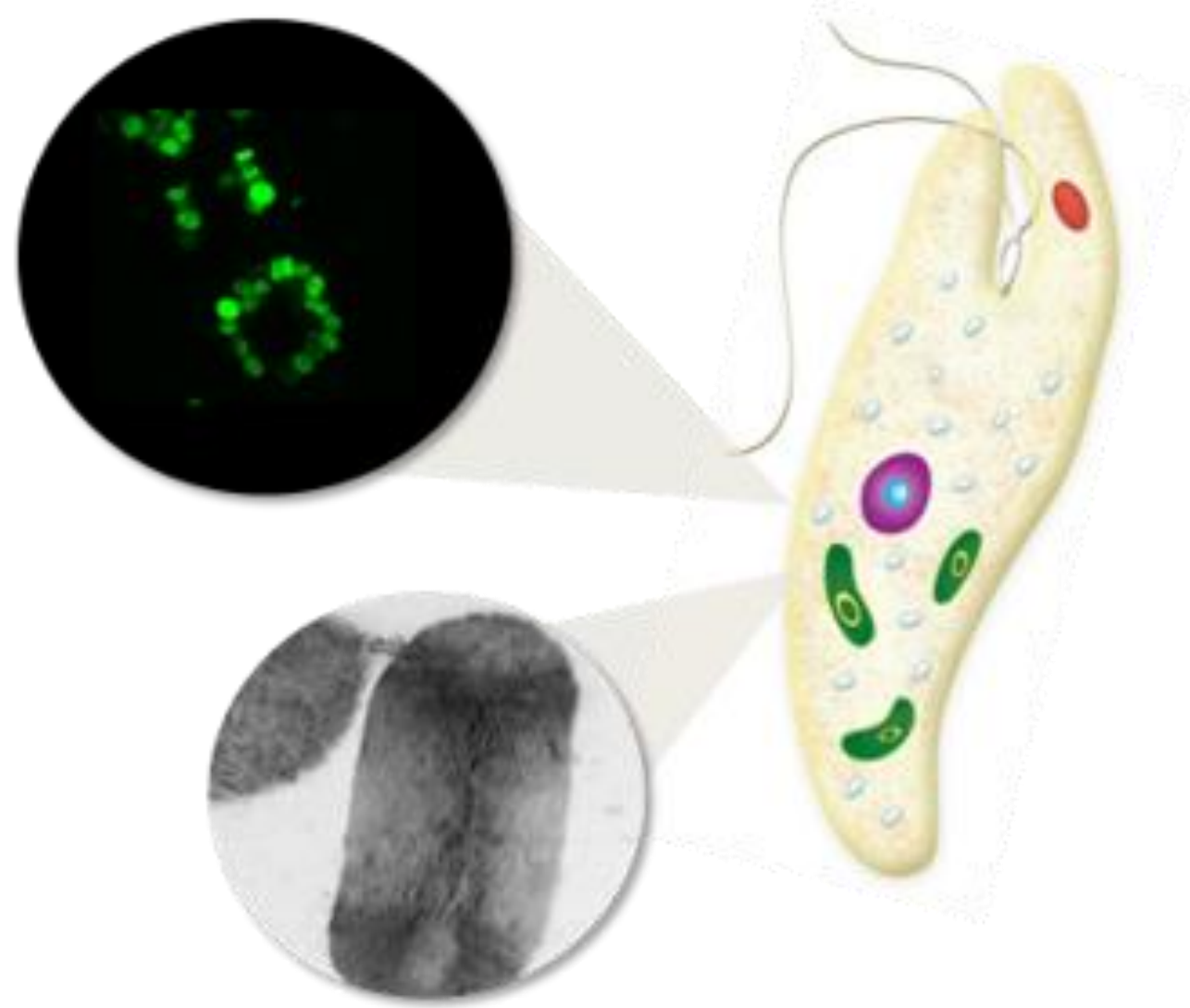
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INTRODUCTION

Paramylon is a linear, unbranched beta-1,3-glucan polymer that is isolated from the single-cell microalga *Euglena gracilis*. Research has shown paramylon has immunomodulatory effects in animals, through binding on the dectin-1 receptor of antigen-presenting cells. Recent studies in mammals have shown that paramylon increases antibody titers of colostrum, resulting in a positive effect on the health and survivability of the offspring. However, no studies are available in birds investigating the effect of paramylon on the immunoglobulin content of eggs and survivability of offspring.

Figure 1. *Euglena gracilis* algae containing paramylon (white spots). Two microscopic views (FITC-labelled paramylon and phase contrast imaging) are highlighted.



OBJECTIVE

The objective of this proof-of-concept study was to assess the effect of paramylon on the immunoglobulin content of eggs when supplied to the bird, in which laying hens were used as a model for breeding hens.

MATERIALS AND METHODS

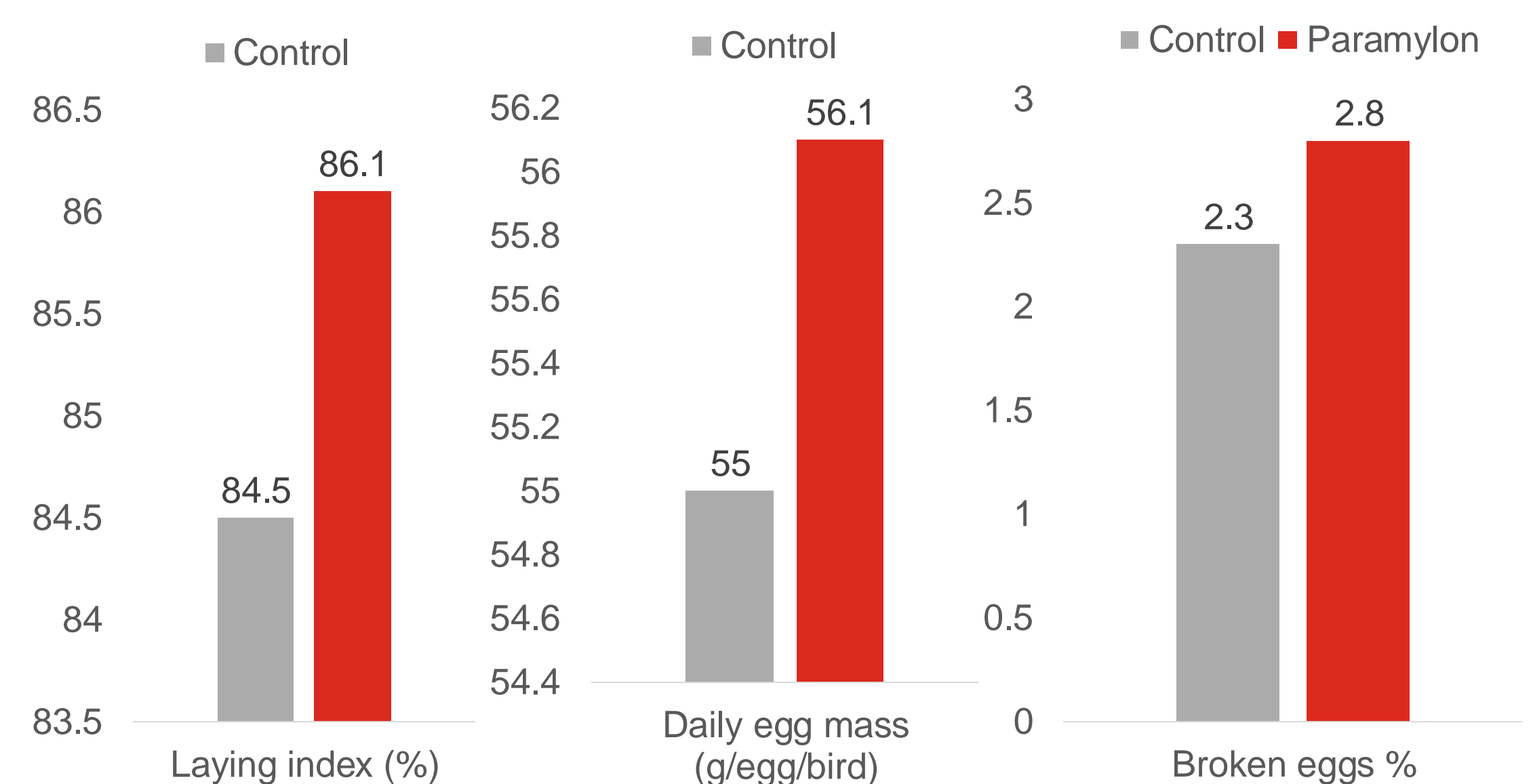
- Housing: One building equipped by enriched cages.
- Animals: 500 Lohmann brown laying hens of 18 weeks of age at start of the trial.
- Duration: 32 weeks.
- Treatments: (10 replicates each)
 - Control (C) group
 - Paramylon (P) group: drinking water application of 75 ppm paramylon at specific time points (5 days at arrival and every 35 days for 5 days).
- Measurements:
 - Performance: laying index, FCR, daily egg mass, and % of broken eggs.
 - Immunoglobulin Y (IgY) content of egg yolk was measured monthly in 20 eggs per treatment by ELISA.

RESULTS

Performance

Performance results of the trial show numerical differences (Fig. 2): increased laying index for P compared to C, as well as higher daily egg mass and reductions in broken eggs were noted for P compared to C. No difference in FCR (kg/doc) was recorded (P and C: 0.78).

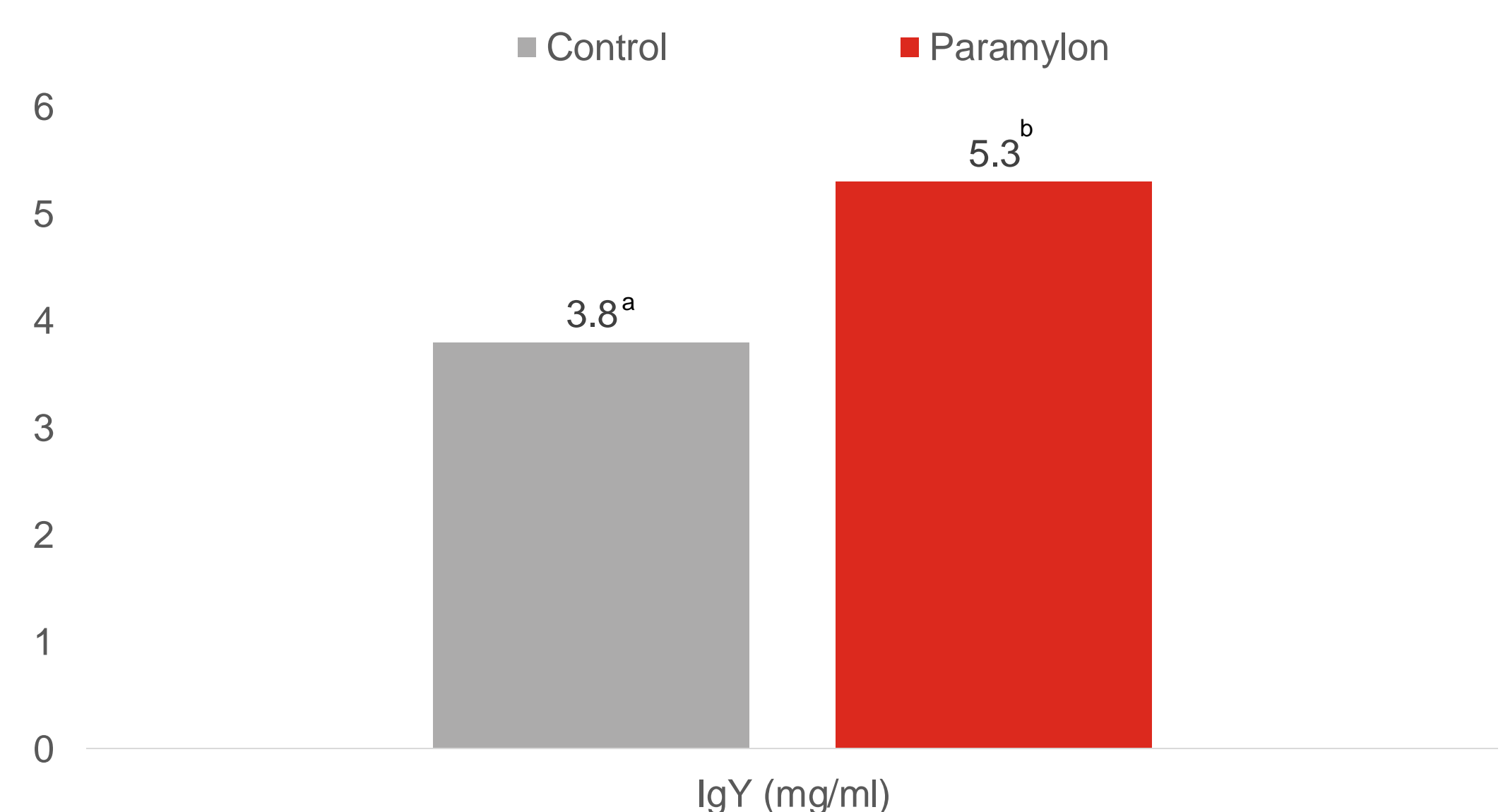
Figure 2. Summary of performance results from week 18 to week 50 of age.



Immunology

IgY content of egg yolk (Fig. 3) from P birds was significantly increased compared to eggs of C birds at each time point ($p < 0.001$) over the entire study.

Figure 3. Average of total IgY content of egg yolk from 18 to 50 weeks of age. Different superscripts indicate significant difference ($P < 0.001$).



CONCLUSIONS AND DISCUSSION

This proof-of-concept study shows the potential of paramylon to increase immunoglobulin content in eggs. Further research should be performed in breeding hens to evaluate a potential impact on the health and survivability of day-old chicks. Furthermore, this study shows paramylon is safe to use with no negative impact on performance, a concern raised by producers when using immunomodulatory products.