

Effects of short-chain fructooligosaccharides on zootechnical performances in poultry layers

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Short-chain fructooligosaccharides (scFOS) are formed by one, two or three fructose molecules linked to a sucrose molecule by a β 1-2 link. They are recognized to stimulate the growth of bifidobacteria and lactobacilli populations within the gastrointestinal tract of humans (Gibson and Roberfroid, 1995) but also in animals and particularly in poultry (Xu et al., 2003). In broilers, these scFOS-induced changes of microflora have been related to improvement of growth performance (Ammerman et al., 1988; Wu et al., 1999) and inhibition of *Salmonella* spp. growth. The main objective of this study was to evaluate the potentiality of scFOS to improve the laying performance in poultry layers.

In the same room of a private Spanish farm, 252 layers (Hy-line W98) were randomly allocated to two dietary treatments. One group received a meal feed composed of 35% wheat, 24% barley and 25% soybean meal and containing β -glucanases, xylanases and phytases enzymes. The other group received the same diet enriched with 0.1% of scFOS. From 20 to 52 weeks of age, the laying performance of the layers was recorded on a daily basis including mortality, number of eggs, number of dirty and/or broken eggs. Level of feed intake was evaluated every fifteen days, as well as egg weight. Data were analyzed according the glm procedure of SAS.

Mortality was very low throughout study, thus it was not possible to make a statement on the effect of scFOS on this parameter (2/126 in the scFOS group and 4/126 in the control group). The control group produced 22, 929 eggs during the 32-week period whereas, the scFOS group produced 23, 003 eggs. Layers reached their maximum rate of lay (around 93%) after 8 weeks, whatever the diet. No difference was observed on the mean rate of lay between the two diets. However, egg mass was significantly increased by the inclusion of scFOS in the diet ($p < 0.001$). Level of intake was similar among diets (Table). As observed in broilers, Feed Conversion Ratio (FCR) was improved in the scFOS-fed group ($p < 0.001$). The eggs produced by the scFOS group were significantly bigger than those produced by the control group ($p < 0.001$). The study of correlation using the Pearson test, showed that the increase in egg mass was correlated with the increase in egg weight ($r^2 = 0.84$; $p < 0.001$) and the improved FCR ($r^2 = -0.52$; $p < 0.001$). The scFOS-diet also reduced the percentage of dirty eggs ($p < 0.01$) which can be explained by the improved digestive health. The percentage of broken eggs remained very low throughout the study whatever the diet ($0.9 \pm 0.6\%$ for the scFOS group and $0.4 \pm 0.3\%$ for the control group).

The results of this study confirmed results obtained in broilers concerning the improvement of feed utilisation with a scFOS diet. This study also showed that scFOS can improve laying performance in layers under field conditions.

Table Effects of scFOS on laying performance and quality of eggs in poultry layers.

	Control diet	scFOS diet	
Mean rate of lay start (%)	92.1 \pm 2.7	92.5 \pm 2.0	NS
Mean rate of lay end (%)	92.7 \pm 2.3	93.3 \pm 1.9	NS
Egg mass (g/day)	58.0 \pm 2.2	60.5 \pm 3.3	***
Level of intake (g/day)	100.0 \pm 4.5	100.6 \pm 5.0	NS
FCR (g/g)	1.72 \pm 0.08	1.68 \pm 0.12	***
Egg weight (g)	62.5 \pm 1.7	64.5 \pm 2.2	***
Dirty eggs (%)	2.5 \pm 1.4	1.5 \pm 0.8	**

Values are means \pm standard error. NS = not significant, ** = $p < 0.01$; *** = $p < 0.001$.

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