

Black soldier fly larvae as a substitute for soybean in the diets of laying hens

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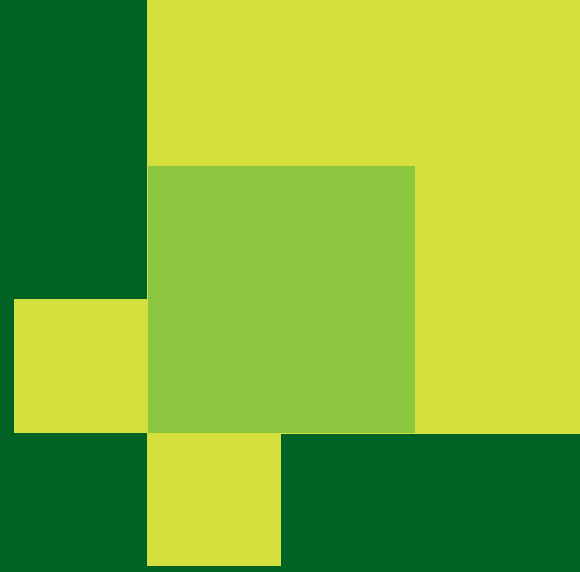
The use of soybean as a feed ingredient for livestock is controversially discussed worldwide, since cultivation and transport may have negative environmental impacts. Thus, interest in integrating insects into livestock nutrition as a potentially more sustainable substitute for soybean is very important, but has been poorly researched so far. This study aimed to examine the feeding value of two origins of black soldier fly (BSF) larvae grown on two different substrates (A and B) compared to soybean-based diets. For this purpose, 50 Lohmann Brown Classic hens (40 weeks of age) were fed five different diets for 7 weeks. The hens were randomly allocated to the diets and kept individually in enriched cages under controlled climate conditions. To determine whether the protein value of the insect material is comparable to that of soybean, the crude protein content of four of the diets (SS-, AA-, AB-, BB-) was set to a level (<15% in DM) which was slightly deficient (recommended: >16%). These diets were opposed to a control diet (SS) covering requirements. Both SS and SS- contained 15% soybean cake and 3% soybean oil, but SS- did not contain sunflower cake. In the other diets the soybean-based feeds from SS- were replaced by defatted BSF larval meals and fats. Insect material A was produced on a mixture of fruits, brewer's grain and pasta production waste, material B was produced on wheat bran, French fries and cereal milling by-products. Diet AA- contained 15% of larval meal A and 2% larval oil A, AB- was based on 15% larval meal A and 2% larval fat B, and BB- contained 15% of larval meal B (rich in residual fat). Feed intake, laying performance and egg weight were measured daily. The hens were weighed weekly. Over a period of six days all eggs per hen were collected and analysed for different egg quality traits. The performance of the hens did not differ significantly between the five treatments within the feeding period. Average feed intake was around 118 g/day, laying percentage 95%, egg weight 65 g and feed conversion efficiency 1.9 g egg/kg feed. Also, egg quality was neither affected by the use of insects nor the apparent protein deficiency. Average shell thickness was 0.4 mm, yolk height 17 mm and shell breaking strength 50 N. Overall, the similar performance of the hens at a very high production level and the comparable egg quality showed that soybean can be completely replaced by BSF meal and fat. The results also indicated that the recommendations for protein supply of layers may be set too high.

A preliminary study on insect full-fat meals preferences in guppy (*Poecilia reticulata*)

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In companion animal nutrition one of the most important factors affecting feed market trends is nutritional preferences of pets, owners observations as well as the sustainability of the product. Due to that pet foods should be based on well accepted by animals and owners feed ingredients; a free choice feeding experiment is reported herein. In a ten-day-long experiment using the free choice model were applied. A group of 60 sexually-mature *Poecilia reticulata*. The animals were randomly divided into 4 identical experimental tanks with a capacity of 32 litres (30×30×35 cm) using 15 individuals in each. The fish were subjected to a 5-day preliminary period, then they were held observation by 5 days of food preferences. As the assessed components, full-fat insect meals were used, with pork gelatine and fish meal as the control treatments. The species of insects used for meals preparation were: Madagascar cockroach (*Gromphadorhina portentosa*), superworm (*Zophobas morio*), black soldier fly (*Hermetia illucens*). The applied components were solidified using pork gelatine in a ratio of 3:2. To avoid the effect of neophobia the results from the first day of experiments were excluded from the final results of the experiment. In the following days the attractivity of feeds was observed during periods of 1, 2, 3, 4 and 5 minutes after offering them to animals. The experiment showed that the most accepted, among all offered components was superworm. The fish interest in Madagascar cockroach, superworm, black soldier fly meals were comparable to fish meal. Pork gelatine was not assessed as attractive for guppies. *P. reticulata* have high food selectivity, among of the tested feed components *Zophobas morio* full fat meal can be recommended as an attractive ingredient to aquarium fish feeds. This work was supported by several sources: Poznań University of Life Sciences; TEAM TECH/2016-2/11-0026, a project entitled: Insects as novel protein sources for fish and poultry, financed by Foundation of Polish Science (POIR 4.4); and the National Centre for Research and Development, no POIR.01.01.01-00-0828/15, entitled: InnSecta: innovative technology of feedstuffs production based on insect biomass.



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