Cecal volatilome and microbiota profile of organic chickens supplemented with black soldier fly live larvae

Giovanna Battelli¹, Valentina Bongiorno², Francesco Gai³, Valeria Zambotto⁴, Marta Gariglio⁵, Laura Gasco⁴, Achille Schiavone²,³, Ilaria Biasato⁶, Ilario Ferrocino⁴

¹Institute of Sciences of Food Production, CNR, Milan, Italy
²Department of Veterinary Sciences, University of Turin, Grugliasco, Italy
³Institute of Sciences of Food Production, CNR, Grugliasco, Italy
⁴Department of Agricultural, Forestry and Food Sciences, University of Turin, Grugliasco, Italy

*Corresponding author: francesco.gai@ispa.cnr.it

INTRODUCTION

✓ Insects have shown to be a potential nutritional replacement in poultry as substitute of traditional protein sources, with positive effects on gut microbiota.

✓ Only few studies have yet investigated the effects of black soldier fly (BSF) live larvae provision on short-chain fatty acids (SCFAs) and microbiota composition in chicken’s gut.

RESULTS & DISCUSSION

✓ Cecal microbiota analysis of birds fed BSF live larvae (Fig.2) showed a higher incidence of:
  • Coprobacillus
  • Synergistaceae
  • Christensenellaceae

  with the latter having the potential to degrade chitin insect meal, a compound with immunoregulatory properties.

✓ Seven SCFAs were identified, with butyrate as the most abundant (Fig.3).

✓ Even if no significant differences were found between treatments, cecal SCFAs concentration in insect-fed animals were noticed to be less variable than in control group.

CONCLUSIONS

Results show that even a dietary 10% supplementation of BSF live larvae can slightly improve microbiota profile and potentially, SCFAs production in LNN chickens.

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For more information on this project please visit: https://poultryinsect.eu or scan this QR code

MATERIAL AND METHODS

➢ 240 Label naked neck (LNN) birds were reared from 21 to 82 days of age;
➢ 4 groups of both gender (M and F), 10 birds/pen; (6 replicates; 60 birds/treatment).
➢ Experimental groups (LM and LF) were fed 10% supplementation of black soldier fly (BSF) live larvae based on the DFI* and compared to control groups (CM and CF) (Fig. 1).
➢ 60 birds were then slaughtered and samples of their cecum content were taken for the following analyses:
  • Microbiota by DNA sequencing techniques
  • Volatilome by SPME-GC-MS

SPME-GC-MS

Fig. 1 Graphical representation of the experimental design.

Fig. 2 Relative abundance of the main bacterial phyla in cecal samples of LNN chickens fed control diet and a 10% BSF live larvae supplementation.

Fig. 3 SPME-GC-MS analysis (total ion chromatogram) showing the 7 key SCFAs identified in cecal samples of LNN chickens.