

Insect rearing on manure: are micro-organisms and antibiotics being transferred from the substrate to the larvae?

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Introduction

Insects are believed to be a sustainable protein alternative for feed and food, however, food safety is an important factor. Besides the production method, the insect species, and the harvest stage, the substrate used is known to be important in the biological and chemical hazards of the non-processed insects [1]. This study aimed to assess the microbiological and chemical risks from rearing black soldier fly larvae on solid pig manure. Additionally, two washing procedures were evaluated.

Methods

Larvae of the black soldier fly were reared at 24°C for 20 days until fully grown with fresh pig manure as substrate. This manure was spiked with *Listeria* spp. or sulfadiazine, lincomycine, and doxycycline. Fresh manure, harvested larvae, and residual substrate were analysed for dry matter content and microbiology. Larvae were washed with a physiological water (10 washing steps) and with ethanol and analysed in both cases. Fresh manure and harvested larvae of the chemical hazard trial were also analysed for the presence of antibiotics.

Results

A microbiological hazard of rearing insects on the solid fraction of fresh pig manure seems to be present for certain bacterial groups. *E. coli* and *Listeria* spp. disappeared after insect farming: they were no longer present in the residual substrate or the larvae. Yeast and fungi slightly decreased in the residual substrate. *Salmonella* as well as sulfite reducing anaerobic organisms decreased in both larvae and residual substrate. Washing the larvae did not decrease the number of micro-organisms found. For the spiked antibiotics, carry-over percentages from the manure to the larvae between 0.12% and 0.83% were found.

Discussion

A transfer of micro-organisms and antibiotics from the substrate to the larval biomass was found. For substrates, other than manure, the same transfer mechanism may result in contamination of the larval biomass. For the larval growing stage, we could not establish an effective washing procedure. Farming insects for feed or food certainly needs special attention.

References

1. EFSA Journal (2015) 13 (10) 4257: 1-60.