Pre-harvest starvation effects on microbial load, weight loss and proximate composition of edible field cricket (*Gryllus bimaculatus*) and desert locust (*Schistocerca gregaria*)

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James P. Egonyu, Simon Labu, Dorothy N. Nyangena, Fathiya Khamis, Xavier Cheseto, Chrysantus Mbi Tanga & Sevgan Subramanian

Abstract

Rearing edible insects on different agricultural waste streams predisposes them to microbial contamination which poses health risks to consumers. In this study, the effect of pre-harvest starvation on microbial load, weight loss and proximate composition of the edible field cricket (*Gryllus bimaculatus*) and the desert locust (*Schistocerca gregaria*) were investigated, with a view to evaluating this practice as a safety measure against pathogenic microbes in farmed edible insects. The allocated starvation times were 0 h, 12 h, 24 h, 36 h and 48 h. The weights of the starved insects were monitored and the weight loss computed. Live starved insects were cultured on standard media for detection of *Salmonella* and *Campylobacter* pathogens; and for microbial quantification. Proximate composition of the starved insects was determined using standard chemical analyses. The weights of both species of starved insects reduced by 20–45%; and their dry matter, crude protein, crude fat, crude ash and crude fibre contents were also significantly reduced by the different durations of starvation. The total viable count (TVC) and yeast and mould count (YMC) reduced significantly from unstarved insects, in both *G. bimaculatus* and *S. gregaria*, reaching their minima after 12 h and 24 h of starvation, respectively. However, the bacterial and fungal loads in both insect species increased with further starvation to levels above or below prestarvation points, respectively. Irrespective of the starvation period, all samples of *G. bimaculatus* and *S. gregaria* tested positive for *Salmonella*, but negative for *Campylobacter* species. Clearly, even though the pre-harvest starvation significantly reduced the microbial loads in the edible insects, there is a need for a benefit–cost analysis of the safety enhancement of the practice vis a vis the losses in weight and the nutritional composition of the insects.

Data availability

The data for this study are available from the corresponding author on reasonable request.

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Author information

James P. Egonyu

Present address: Faculty of Agriculture and Animal Sciences, Busitema University, P. O. Box 203, Soroti, Uganda

Authors and Affiliations

International Centre of Insect Physiology and Ecology (Icipe), P.O. Box 30772, Nairobi, 00100, Kenya

James P. Egonyu, Dorothy N. Nyangena, Fathiya Khamis, Xavier Cheseto, Chrysantus Mbi Tanga & Sevgan Subramanian

Kapyoyon High School, P.O. Box 206, Kapchorwa, Bukwo, Uganda

Simon Labu

Corresponding author

Correspondence to James P. Egonyu.

Ethics declarations

Research involving human participants and/or animals

This study did not involve use of human and/or vertebrate animals.

Conflict of interest

The authors declare that they have no conflict of interest.

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