Analysis of nutritional composition of edible insects to enhance nutritional security in sub-Saharan Africa (*EntoNutri)*

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Introduction

•Insects form an integral part of many Asian, Latin American and African cuisines.

•In Kenya and Uganda edible insects already make up 5-10% of the total protein intake.

•Trade in edible insects is also a major source of income.

•Edible insects have the potential to play a vital role for food/nutrition security in both countries.

• However there is little knowledge on sustainable rearing and harvesting techniques.

•Insects and their feed can be contaminated by heavy metals or insecticides.

The EntoNutri Project

•EntoNutri is a multinational, multidisciplinary project.

•Its goal is to improve food/nutrition security and the economic wellbeing of rural and urban communities, mainly smallholders, women and youth.

•To be achieved by developing, disseminating and promoting environmentally sustainable insect-based technologies

=> ↑productivity and consumption of insects as food.

•The Food Security Center of the University of Hohenheim is also a partner in this project.

•Its specific project goal is to establish the nutritional profile of target insect species along the process chain.

•The main focus is put on the micronutrient composition, as the contribution of insects to consumer's micronutrient intake is unknown.

Target species

Long-horned grasshopper (*R. differens*)

House cricket (*A. domesticus*)
Source:icipe_quarterly_e-bulletin_Volume_6_Issue_No_2_2016

Zambezi emperor worm (*Imbrasia zambesina*)

Shea butter caterpillar (*Cirina forda*)

Cabbage tree emperor moth (*Bunaea alcinoe*)

Methodology

•Analysis will be performed in fresh and processed samples

•Vitamins will be analysed via HPLC methods established at the Institute of Biological Chemistry and Nutrition of the University of Hohenheim

•Dietary minerals, heavy metals and insecticides will be analysed either by Mass Spectrometry or Gas Chromatography at the Core Facility of the University of Hohenheim

Preliminary Results

Table 1: Characteristics of sampled insect species

Sample number	Sample name	Kind of processing	Sampling Location
1	R. differens	without wings, freeze-dried	Kampala, Uganda
2	R. differens	without wings, freeze-dried	Kabale, Uganda
3	R. differens	with wings, freeze-dried	Mbarara, Uganda
4	R. differens	without wings, freeze-dried	Mbarara, Uganda
5	R. differens	with wings, freeze-dried	Hoima, Uganda
6	R. differens	with wings, freeze-dried	Kabale, Uganda
7	R. differens	without wings, freeze-dried	Nyendo-Masaka, Uganda
8	R. differens	with wings, freeze-dried	Nyendo-Masaka, Uganda
9	R. differens	without wings, freeze-dried	Nyendo-Masaka, Uganda
10	R. differens	without wings, heat-dried	Kampala, Uganda
11	R. differens	without wings, heat-dried	Nyendo-Masaka, Uganda
12	R. differens	with wings, heat-dried	Nyendo-Masaka, Uganda
13	R. differens	with wings, heat-dried	Hoima, Uganda
14	Bunea alcinoe	gutted, freeze-dried	Embu, Kenya
15	Cirina forda	gutted, freeze-dried	Embu, Kenya
16	Imbrasia zambesina	gutted, freeze-dried	Kambiti, Kenya
17	Gryllus bimaculatus	freeze-dried	Nairobi, Kenya

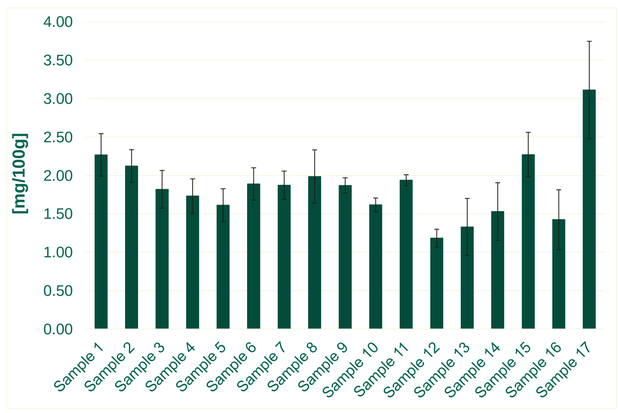

Figure 1: Mean riboflavin content of sampled insect species. Content is expressed as mg/100g of dried sample material. Error bars represent standard deviation (n=12).

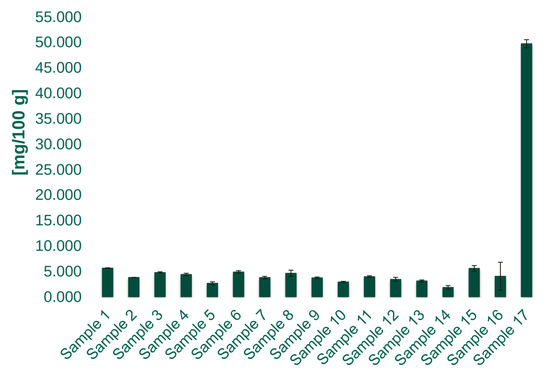

Figure 2: Mean β-carotene content of sampled insect species. Content is expressed as mg/100g of dried sample material. Error bars represent standard deviation (n=9).

Conclusion

- First results show that insects are promising sources of riboflavin and carotenoids.
- Processed samples of R. differens contain similar amounts of riboflavin and carotenoids when compared to unprocessed samples.
- Possible effects of processing on other samples will be studied.

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