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"Global food security and food safety:
The role of universities"

Development and Implementation of Insect-Based Products to Enhance Food and Nutritional Security in Sub-Saharan Africa

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Abstract

With a growing world population, increasingly demanding consumers, and a limited amount of agricultural land, there is an urgent need to find alternatives to conventional meat products. Livestock production is a leading cause of anthropogenic-induced climate change. More sustainable diets are needed, with reduced meat consumption or the use of alternative protein sources. Insects are promoted as human food and animal feed worldwide. In tropical countries, edible insects are harvested naturally, but overexploitation, habitat changes, and environmental contamination threaten this resource. Therefore, sustainable harvesting practices need to be developed and implemented. The consumption of crickets (e.g. the house cricket *Acheta domesticus*), the longhorn grasshopper (*Ruspolia differens*), and a variety of saturniid caterpillars (e.g. *Imbrasia zambesina* and *Cirina forda*) is part of the food culture of some communities in Kenya and Uganda and constitutes 5 – 10 % of protein intake of the rural and urban populace. For many, trade in edible insects is a major source of income and considerably contributes to livelihood improvements. Recently chitin (the main component of the arthropod exoskeleton) is attracting considerable attention due to its role in enhancing immunity, promoting growth of beneficial bacteria and inhibiting the growth and activity of pathogenic microorganisms. Furthermore, its consumption could improve the health of rural communities across Africa and beyond. Therefore the potential of the insects as a source of micronutrients, e.g. minerals like zinc and iron or vitamins, to combat hidden hunger is investigated. EntoNUTRI - a 3-year project - is a complementary partnership of icipe, University of Bonn, University of Hohenheim's Food Security Centre (FSC), and national agricultural research systems (NARS) from Kenya and Uganda to enhance food and nutritional security through the use of insects as food and sponsored by the Federal Ministry for Economic Cooperation and Development (BMZ). Our findings suggest major environmental advantages of insect farming compared to livestock production: (1) limited land and water consumption; (2) lower greenhouse gas emissions; (3) higher feed conversion efficiencies; (4) transformation of low-value organic by-products into high-quality food or feed. However, edible insect species intended for production should be screened for risks to humans, animals, plants, and biodiversity.

Keywords: Edible insects, food security, icipe, insects farming, Kenya, Uganda

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