ETHzürich



Coop Research Program | Call 6

Measurement and optimization of iron bioavailability in insect based foods

Background

In the face of the growing world population, there is a need to develop viable ecological and nutritional alternatives to animal food products. However, animal products are a key dietary source of well-absorbed iron, and iron deficiency and anemia remain highly prevalent in high- and lowincome countries. Insects are generally considered a viable dietary sources of protein, essential fatty acids, minerals and vitamins. Their potential as a dietary source of wellabsorbable iron has, until recently, not been investigated. Chitin, a major component of insect biomass, is a known iron binder and is likely responsible for a decreased iron absorption. Decreasing chitin content could allow the high amounts of iron in insects to be well-absorbed, and enhance the absorption of iron from other foods consumed along with the insect based meal.

Objective

The overall objective of the project is to estimate the potential of different insect species as sources of dietary iron in human subjects, and specifically to develop and test an insect based food with improved iron absorption.

Research Approach

Several approaches to reduce chitin level will be investigated, namely selecting low chitin insect species, enzymatic degradation, and physical removal of chitin. Iron bioavailability will be assessed in low and high chitin containing insect- and plant-based meals. Two insect species will be investigated: *Tenebrio molitor*, the mealworm, and *Xylotrupes gideon*, a species thriving on wood and known to contain negligible amounts of chitin.



Relevance and Expected Outcomes

This projects links an expected high iron bioavailability from insect foods with the identification of insect species which have a potentially extremely low environmental footprint, in particular organisms reared on plant by-products such as compost and wood. It is expected that this study will demonstrate the potential of insect foods to be an important contribution to a sustainable and healthy diet of the future: a novel, low cost, environmentally friendly, sustainable dietary source of highly bioavailable iron to prevent iron deficiency and anemia. Furthermore, it is expected to establish a platform in collaboration with Essento and the "Food from Wood" project of the ZHAW to intrinsically label insects with stable isotopes of iron.

Food System Challenges Addressed

Food security, Micronutrient deficiency, Sustainable development, Alternative protein sources.

https://worldfoodsystem.ethz.ch/research/research-programs/CRP/ Sust-iron-able.html

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Project Cost 235'495 CHF

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