ETH zürich

World Food System Center
Symposium 2020

Measuring dietary iron absorption from mealworms (*Tenebrio molitor*) in young women and assessing the effect of chitin on iron bioavailability: a stable isotope study

Nikolin Hilaj[1], Valeria Galetti[1], Roberta Murad Lima[1], Adam Krzystek[1], Christophe Zeder[1], Michael Zimmermann[1], Diego Moretti[2]

[1]Human Nutrition Laboratory, Health Science and Technology, ETH Zurich; [2]Department of Health, FFHS

FFHS Fernfachhochschule Schweiz

essento

ensectable swiss insects

coop

World Food System Center

Background and Rationale

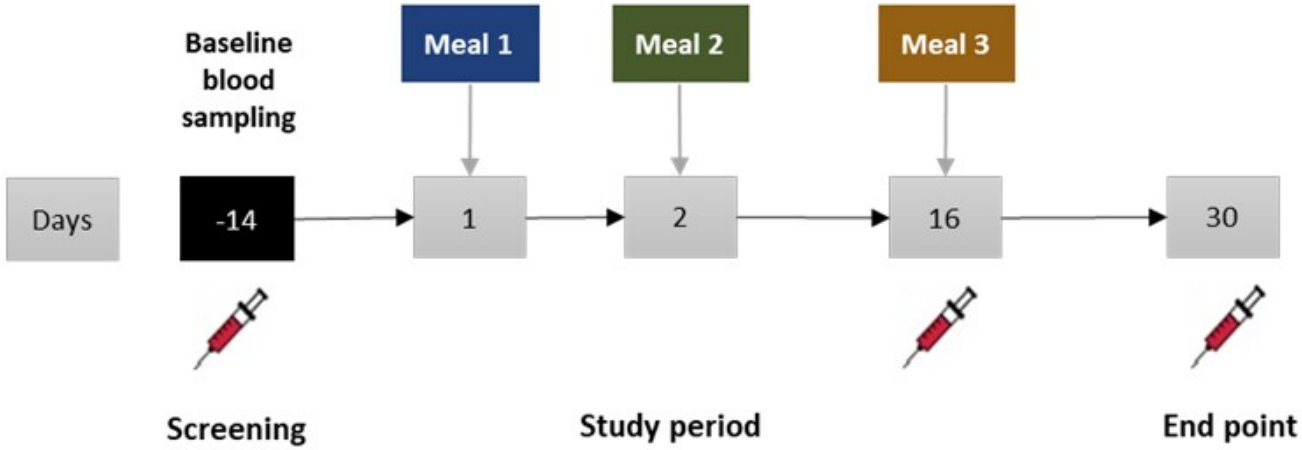
- **Iron deficiency** is estimated to affect up to 1.5-2 billion people worldwide.
- Edible insects such as mealworms (***Tenebrio molitor***) are considered as an alternative source of proteins, but in addition are also **rich sources of minerals**.
- Our recent stable **isotope studies in humans** with adult crickets suggest the presence of an **absorption inhibitor** which lowers iron absorption from cricket iron in humans, as well as from plant food iron.
- **Chitin**, a major component of insect biomass, is a known iron binder.

Hypothesis:

Decreasing chitin content could allow the high amounts of iron in insects to be well-absorbed, and enhance the absorption of iron from plant-based foods.

Objectives and Methods

- Measure iron absorption from *T.molitor* in young women.
- Assess the effect of:
  - chitin on iron absorption (primary objective).
  - of *T.molitor* biomass on iron absorption (secondary objective).



Meal 1: Maize + ^{54}Fe
Meal 2 :Maize + (^{57}Fe) T.molitor **native** chitin + ^{58}Fe
Meal 3: Maize + (^{57}Fe) T.molitor **reduced** chitin + ^{58}Fe

ACTION TRACK #2:
SHIFT TO SUSTAINABLE CONSUMPTION PATTERNS

Innovative nutritional questions (high iron bioavailability from insect foods) linked to the identification of insect species which have a potentially extremely low environmental footprint, in particular organisms reared on plant, agricultural and food industry by-products (bran, spent grains). We expect to demonstrate the potential of insect foods as an important contribution to a low cost, environmentally friendly, sustainable dietary source of highly bioavailable iron to prevent iron deficiency and anemia.