The effect of mealworm protein ingestion on muscle protein synthesis rates during recovery from endurance-type exercise in vivo in humans

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Muscle disorders
Study type	Interventional

Summary

ID

NL-OMON51585

Source
ToetsingOnline

Brief title
Insect protein and running (CENTURION)

Condition

- Muscle disorders

Synonym
Muscle anabolism, Muscle growth

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Ministerie van OC&W,Protifarm

R&D,TKI/Health~Holland

Intervention

Keyword: Exercise, Insects, Muscle, Protein

Outcome measures

Primary outcome

Postprandial muscle protein synthesis rates (0-6h)

Secondary outcome

Postprandial muscle protein synthesis rates (0-3 en 3-6h)

Plasma glucose, insuline en aminozuurconcentrations + corresponding peakvalues

and (i)AUC

Plasma 13C6-phenylalanine enrichments

Study description

Background summary

Muscle tissue consists of proteins. These proteins are built up of small building blocks: amino acids. By consuming enough protein in our diet, we make sure that the body is provided with enough amino acids to facilitate muscle protein building. Providing the growing world population with sufficient animal derived protein is a challenge. Edible insects can be produced on a more sustainable commercial scale than conventional animal derived proteins and therefore, can contribute to feeding our future population. So far, little is known about the protein and amino acid composition of edible insects.

Study objective

The goal of this study is therefore to investigate whether the ingestion of mealworm protein can stimulate muscle protein muscle growth after a single endurance exercise session.

Study design

randomized, counter-balanced, cross-over design in which males and females will

ingest either an insect protein shake or a non-caloric placebo after endurance exercise

Intervention

Mealworm protein (bolus based on bodyweight)
running

Study burden and risks

The burden and risks associated with participation are moderate. Insertion of the catheters are comparable to a blood
draw and could result in a small hematoma. taking in total 8 biopsies within 1 study is a lot, but this is in total 4 per day with at least 2 weeks of
recovery in between. Earlier we have taken up to 6 biopsies on 1 day. Muscle biopsies will be taken under local anesthesia by an experienced physician, but may cause some minor discomfort for maximally up to 24 h after completion. The discomfort is comparable to muscle soreness or the pain
one has after bumping into a table. Also there is a possibility of additional bleeding after the biopsies. We will take 26 times blood samples (280 mL total) during the experimental trials. The total amount of blood we draw is about half the amount of a blood donation and will be completely restored in approximately 1 month. Participants come to the university twice: 1 screening (3 hours) and 2 experimental trials (entire day). For both
the screening and the experimental trial, participants have to be fasted, so they are not allowed to eat and drink (except for water) from
22h00 the evening before. Also, 3 days prior to the experimental trial participants should keep their diet as constant as possible, do not
perform any type of intense physical exercise, and do not consume alcohol. During the screening we will perform a DEXA and a maximal running
test. Furthermore, we will ask the participants to fill out a medical questionnaire and record their food intake and activity for 2 days prior to the experimental trial. During the experimental trial, we will collect muscle and blood samples, and participants have to perform
running exercise and consume a protein or placebo drink. There is no direct benefit for the participants, only their contribution to scientific knowledge. The participants will get more insight in their body composition and sports performance (VO2max).

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Inclusion criteria

* Age between 18 and 35 y inclusive
* BMI between 18.5 and 30 kg/m2
* Having given informed consent

Exclusion criteria

* Participating in a structured (progressive) exercise program
* Smoking regularly
* Allergy to house dust mites or crustaceans
* Diagnosed GI tract disorders or diseases
* Diagnosed musculoskeletal disorders
* Diagnosed metabolic disorders (e.g. diabetes)
* Cardiovascular disease
* Hypertension (blood pressure above 140/90 mmHg)
* Donated blood 3 months prior to testday
* Pregnant
* Amenorrhea
* Using third generation oral contraceptives

* Use of any medications known to affect protein metabolism (i.e. corticosteroids, non-steroidal anti-inflammatories).
* Chronic use of gastric acid suppressing medication
* Chronic use of anti-coagulants

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)
Control:	Placebo
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	03-06-2022
Enrollment:	30
Type:	Actual

Ethics review

Approved WMO

Date:	10-02-2022
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL80030.068.21