Metabolic availability of three protein sources in older and younger men as measured with the indicator amino acid oxidation method

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To determine the amino acid metabolic availability of protein in milk, sorghum and black beans in older (65-80 years) and younger (20-35 years) men using the IAAO method

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON56568

Source ToetsingOnline

Brief title Metabolic availability of protein in older and younger men

Condition

• Other condition

Synonym ageing, senescence

Health condition

veroudering

Research involving

Human

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Sponsors and support

Primary sponsor: Wageningen Universiteit **Source(s) of monetary or material Support:** Arla Foods, Dairy Management Inc., FrieslandCampina B.V., Nestlé, TKI

Intervention

Keyword: ageing, availability, protein

Outcome measures

Primary outcome

13C-enrichment in breath samples will be expressed in APE. CO2 production rate

(VCO2) will be measured by indirect calorimetry and expressed in mL/min. The

rate of 13CO2 production (F13CO2) will be calculated using these two

measurements. The slope for the graded intakes of the limiting amino acid and

the oxidation level will be constructed for the reference and the test

proteins. The ratio between the reference and test protein will be calculated

to represent metabolic availability of the limiting amino acid in each protein

source.

Secondary outcome

Not applicable

Study description

Background summary

Meeting amino acid requirements is one of the factors that is important for older adults to prevent development of sarcopenia. Dietary protein quality is of importance, as determined by amino acid composition and bioavailability of the amino acids from the consumed protein. The effect of ageing on metabolic availability of indispensable amino acids of foods in humans is not well studied. The indicator amino acid oxidation (IAAO) method is an indirect, non-invasive method to determine amino acid metabolic availability in humans.

Study objective

To determine the amino acid metabolic availability of protein in milk, sorghum and black beans in older (65-80 years) and younger (20-35 years) men using the IAAO method

Study design

A postprandial dietary intervention study will be performed using the IAAO method. Participants will come either 7 times to test metabolic availability of methionine in beans or 10 times to test metabolic availability of lysine in milk and sorghum.

Intervention

Graded intakes of the limiting amino acid (lysine or methionine) in a reference amino acid mixture or the test protein source (milk, sorghum or black beans) will be consumed by the participants on different test days. One test day equals one intake level of the limiting amino acid which meal is divided over 9 hourly portions. 13C-labelled phenylalanine (Phe) is supplied from the 5th hour onwards. Breath samples will be taken regularly.

Study burden and risks

Research in older adults is necessary to provide them with suitable nutritional advice. The participants will not benefit directly from participating in this study. Stable isotopes occur in nature, are not radioactive and are not harmful for the subjects. The burden of this study concerns the obliged consumption of meals and time investment of the test days.

Contacts

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Stippeneng 4

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years) Elderly (65 years and older)

Inclusion criteria

- Gender: male
- Age: 20-35 years or 65-80 years
- Body Mass Index (BMI): 18.5 30.0 kg/m2
- Healthy as assessed with a questionnaire
- Regular and normal eating habits as assessed with a Food Frequency Questionnaire (FFQ)
- Willing to comply with study procedures and use of data
- Having given written informed consent

Exclusion criteria

Chronic disease, for example: - Diabetes mellitus / being treated for high blood glucose - Severe cardiovascular disease (exception: hypertension) -Hepatic disease (e.g. hepatitis) - Renal disease - Cancer - Bowel disease (e.g. inflammatory bowel disease, ulcers, bleeding) - Pancreatitis History of medical or surgical events that may affect GI function, study outcomes or disease risk for participants, for example: - Bariatric surgery -Gastrointestinal tract surgery - Digestive tract disorder - Chewing problems -History of deep venous thrombosis without anti-coagulation medication Medicine use that interferes with, protein metabolism, GI function and the study outcomes, for example: - Glucose lowering drugs - Proton pump inhibitors - Laxatives

Habits that interfere with the study outcomes: - Protein supplement use (current use or less than 2 weeks past use) - Smoking - Drug abuse - Alcohol

consumption >21 units/week or >4/day - Following a weight-loss diet, medically prescribed diet or other diet with a low calorie intake or an unbalanced nutrient intake like a vegan or very low carbohydrate diet - Moderate to high intense physical activity for more than 5 hours a week Other: - Self-reported allergy or intolerance to the tested products - Weight loss of more than 3 kg in the 3 months prior to study screening - Current participation in other research and <2 months prior participation in other research - Not having a general practitioner - Not willing to accept information-transfer concerning participation in the study, or information regarding his or her health to his general practitioner - Working or doing a MSc thesis at the department of Human Nutrition and Health at Wageningen University and Research

Study design

Design

Study type: Interventional	
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Prevention

Recruitment

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NL	
Recruitment status:	Recruiting
Start date (anticipated):	15-02-2024
Enrollment:	28
Туре:	Actual

Ethics review

Approved WMO	
Date:	24-01-2024
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO	
Date:	26-09-2024

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Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

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
 NL84684.091.23