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Edible insects (cricket Acheta domesticus) in school meals for improved nutrition in pre-school children in Kenya

Submission date
25/02/2017

Recruitment status
No longer recruiting

Registration date
16/03/2017

Overall study status
Completed

Last Edited
14/10/2022

Condition category
Nutritional, Metabolic, Endocrine

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
In Kenya children aged from six months to five years are usually given porridge in between meals and this usually continues when the children join nursery school. Protein and mineral deficiency is common in Kenyan children and insects have been shown to contain sufficient proteins and minerals when supplemented in complementary food. Cricket rearing is new in Kenya and farmed crickets could be used to improve the nutritional status and gut health of schoolchildren in Kenya. The aim of this study is to assess the acceptance and impact on nutrition of a daily school meal of a cricket-based porridge, to provide information on cricket as an alternative animal protein source which may be cheaper and affordable to many Kenyans and therefore help curb child malnutrition.

Who can participate?
Children aged 3-7 attending Cheptigit nursery school

What does the study involve?
Participating children are given a daily portion of porridge from Monday to Friday for 6 months. The children are randomly allocated to receive either cricket-based porridge, milk-based porridge, or plant-based porridge. The children are assessed for their acceptance of the food with questionnaires. Their height, weight, skinfolds, and mid upper arm circumference are measured. They also provide finger prick blood samples and stool samples.

What are the possible benefits and risks of participating?
Children participating in this study may benefit from the daily porridge and the monthly health checks. They may feel a little pain during the finger prick. There are no other anticipated risks in this study.

Where is the study run from?
Cheptigit nursery school (Kenya)

When is the study starting and how long is it expected to run for?
February 2017 to August 2017

Who is funding the study?
The Consultative Research Committee for Development Research (FFU), Danida, Ministry of Foreign Affairs (Denmark)

Who is the main contact?
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Additional identifiers

Protocol serial number
MKU/ERC/0274

Study information

Scientific Title
The impact of edible cricket in a school meal programme on nutritional status, gut microbiota and health in pre-school children (age 3-4 years): an individually randomized, single-blinded controlled trial in Uasin Gishu County, Kenya

Acronym
CRICKFOOD

Study objectives
School meal serving with a fortified porridge made with edible insect (cricket) supports growth (linear and weight) at least equal to a positive control group receiving a fortified porridge with milk powder, and better than a negative control of a fully plant based fortified porridge.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Mount Kenya University Ethical Review Committee, 09/01/2017, ref: MKU/ERC/0274

Study design
Individually randomized single-blinded trial

Primary study design
Interventional

Study type(s)

Prevention

Health condition(s) or problem(s) studied
Nutrition

Interventions
The intervention will involve feeding children in a school setup. The children in the pre primary section will be given porridge every five days in a week. Treatment is a daily food supplement served as a school meal. Children will be randomly allocated (simple randomization) to be given 65 grams of either milk based, cricket based or cereal based flour in form of porridge:
1. Intervention: a fortified porridge with edible insects (cricket)
2. Positive control: a similarly fortified porridge with milk powder
3. Negative control: a fortified plant-based porridge
The food groups are blinded for investigators, while food group cannot be blinded to participants due to different appearance and taste. Children will be served porridge every day from Monday to Friday while at school for a period of six months. The children will line up for porridge depending on their trial arm and then they will be served and observed as they take the porridge and any remaining volume recorded.

There will be baseline measures and dietary intake questionnaires at the beginning and at the end of the trial, with baseline and end line measures of stool, hemoglobin through finger prick, fatty acid analysis, weight, height, and mid upper arm circumference. Every month the children will undergo morbidity checks, weight, height, and mid upper arm circumference measures.

Intervention Type
Supplement

Primary outcome(s)
Weight for Height (Z score), measured using Seca digital weight measuring scale at 1,2, 3, 4, 5 and 6 months

Key secondary outcome(s))
1. Porridge acceptability, measured daily using amount of porridge consumed assessed by weighing any remaining quantity of the porridge at the end of the meal
2. School attendance, measured daily using school registration of each child
3. Stool microbiota, analysed using a stool sample at baseline and endline (6 months)
4. EED (Environmental Enteric Dysfunction) prevalence, measured using a stool sample (indicators to be assessed: myeloperoxidase and neopterin) at baseline and endline (6 months)

Completion date
14/08/2017

Eligibility

Key inclusion criteria
1. Children attending Cheptigit nursery school
2. Weight for Height (WHZ) – ≥-3 Z scores
3. Caregivers who will accept that their children participate in the study and sign the consent form

4. Children who are willing to take porridge and follow the study procedure and therefore assent to the study procedure
5. Age 3-7 years

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Child

Lower age limit
3 years

Upper age limit
7 years

Sex
All

Total final enrolment
138

Key exclusion criteria
1. Weight for Height (WHZ) ≤ 3 Z scores
2. Children allergic to any ingredients in the porridge
3. Children whose parents do not consent to the study
4. Children with obvious signs of disease

Date of first enrolment
10/03/2017

Date of final enrolment
30/03/2017

Locations

Countries of recruitment
Kenya

Study participating centre
Cheptigit nursery school
Kenya
00200

Sponsor information

Organisation
University of Copenhagen

ROR
https://ror.org/035b05819

Organisation
Jomo Kenyatta University of Agriculture and Technology

Funder(s)

Funder type
Government

Funder Name
The Consultative Research Committee for Development Research (FFU), Danida, Ministry of Foreign Affairs, Denmark. Funded under the grant for the project 'GREEiNSECT - insects for green economy' (www.greeinsect.ku.dk)

Results and Publications

Individual participant data (IPD) sharing plan
This study is collaborative research between John Kinyuru, Jomo Kenyetta University of Agriculture and Tecnology (JKUAT), Nairobi, Kenya (jkinyuru@agr.jkuat.ac.ke) and Nanna Roos, University of Copenhagen, Denmark (nro@nexs.ku.dk). Request for access to dataset should be sent jointly to these collaborating partners.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Study website	Study website	11/11/2025	11/11/2025	No	Yes
Thesis results		23/07/2019	14/10/2022	No	No