ISRCTN93825268 https://doi.org/10.1186/ISRCTN93825268

Short term effect of a hazelnut skin drink on the health of blood vessels

Submission date
06/07/2016

Recruitment status
No longer recruiting

Registration date
20/07/2016

Overall study status
Completed

Last Edited
01/11/2019

Condition category
Circulatory System

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

Plain English summary of protocol

Background and study aims
Cardiovascular disease (CVD, disease of the heart and/or blood vessels) remains one of the main causes of death worldwide. There are a range of factors that play a role in the development of CVD, and one of the main factors that still requires clarification is diet. Studies observing different populations have found that eating more nuts can help protect against the development of CVD. Based on these findings, tree nut consumption is now considered to be an important part of a healthy diet. The benefits of tree nuts are due to their unsaturated fat content, high levels of fibre and the presence of a number of bioactive (has an effect on a living thing) molecules in the kernel and skin. These bioactive molecules range from tocopherols to arginine and to polyphenols, which might have beneficial effects on the cardiovascular system. In particular, the antioxidant capacity of various nuts and their by-products has been widely investigated and several studies have acknowledged that nut by-products are especially rich sources of natural polyphenols which are potentially bioactive. Hazelnuts are typically consumed whole (raw - with skin, or roasted - without skin) or used as an ingredient in a variety of processed foods, especially in bakery and confectionery products. The skin, hard shell, green leafy cover and tree leaves are all by-products of the roasting, cracking, shelling/hulling, and harvesting processes and are now having their composition investigated to try to add economic value to waste from the hazelnut industry. The levels of procyanidin (type of polyphenol) in hazelnut skin is similar to that of cocoa and grape seeds, which studies have shown to be beneficial for the function of cells in blood vessel walls. The aim of this study is to investigate the effect of drinking a 1% hot water infusion of powdered hazelnut skin on blood vessel function, as well as to evaluate the levels bioactive compounds and their bi-products in the body.

Who can participate?
Healthy adults of a normal weight.

What does the study involve?
Participants attend two study visits spaced at least two weeks apart. In preparation for each study visit, participants need to follow a diet low in polyphenols for two days and avoid eating or drinking anything other than water for nine hours before the visit. They are also asked to bring a sample of urine with them, taken in the morning so that polyphenol levels can be measured. At the first study visit, participants drink 238ml of a dummy (placebo) infusion drink. At the second

study visit, participants drink a 238ml of a drink infused with powdered hazelnut skin. Before drinking the drinks and then 1.5 and 3.5 hours afterwards, participants have their blood vessels scanned in order to measure how well they are working. Participants also have blood samples taken before drinking the study drink and then 1.5, 3 and 4.5 hours afterwards to measure the levels bioactive compounds and their bi-products in their body, as well as providing collecting further urine samples 0-5, 5-7, 7-10, 10-24, 24-28, 28-34 and 34-48 hours after drinking the drink.

What are the possible benefits and risks of participating?
There are no direct benefits involved with participating in this study. Risks associated with taking part in this study would exist for people with nut allergies, however extensive screening takes place prior to participants' enrolment in order to exclude such cases.

Where is the study run from?
Medical Research Council Elsie Widdowson Laboratory (UK)

When is the study starting and how long is it expected to run for?
February 2015 to December 2017

Who is funding the study?
1. Soremartec Italia S.R.L. (Italy)
2. Medical Research Council (UK)

Who is the main contact?
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Study information

Scientific Title
An exploratory study profiling secondary polyphenol metabolites and acute modulation of vascular function following ingestion of a hazelnut extract based drink

Acronym
NMBV

Study objectives
Acute markers of vascular and endothelial function will be positively modulated by bioavailable phenolics and their secondary metabolites, following ingestion of a hazelnut extract drink compared with placebo.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Human Biology Research Ethics Committee, University of Cambridge, 21/10/2015, ref: HBREC. 2015.22

Primary study design
Interventional

Study design
Single-centre single-blind non-randomised cross-over study

Study type(s)
Other

Health condition(s) or problem(s) studied
Vascular and endothelial function

Interventions
Participants attend two study visits at which they drink 238ml of a placebo drink (visit one) or 1% hot water infusion of powdered hazelnut skin (visit two). The washout period between the two visits is a minimum of 2 weeks.

For study visit, participants will need to follow a low polyphenol diet for 2 days before this visit and avoid eating and drinking anything other than water for 9 hours before the start of the visit. They will also be required to provide a fasting urine sample on the morning of the visit and collect their urine from the time they consume the hazelnut or placebo drink and for 48 hours afterwards. This visit will last approximately 8 hours.

Baseline vascular measurements, fasting blood sample and baseline urine sample are collected prior to drink ingestion. Vascular measurements are repeated 1.5 and 3.5 hours post drink ingestion. Additional blood samples are collected at 1.5, 3 and 4.5 hours post drink ingestion and urine samples collected between 0-5, 5-7, 7-10, 10-24, 24-28, 28-34 and 34-48 hours post drink ingestion.

Intervention Type
Other

Primary outcome(s)
Endothelial function is measured by flow mediated dilatation (FMD) pre-ingestion of the study drink and then 1.5 and 3.5 hours post drink ingestion and EndoFMS using Vicorder pre-ingestion of the study drink and then 4.5 hours post drink ingestion at each study visit.

Key secondary outcome(s)
1. Pattern of appearance of secondary phenolic metabolites in plasma (pre-ingestion of the study drink and then 1.5, 3 and 4.5 hours post drink ingestion) and urine (pre-ingestion of the study drink and then 0-5, 5-7, 7-10, 10-24, 24-28, 28-34 and 34-48 hours post drink ingestion) at each study visit
2. Vascular smooth muscle function are measured using Sphygmocor applanation tonometry and the Vicorder systems pre-ingestion of the study drink and then 1.5 and 3.5 hours post drink ingestion at each study visit

Completion date
31/12/2017

Eligibility

Key inclusion criteria
1. Healthy men and women
2. BMI between 18.5-25kg/m²
3. Aged between 18-65 years

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Other

Lower age limit
18 Years

Upper age limit
65 Years

Sex
All

Total final enrolment
41

Key exclusion criteria
1. All diagnosed cardiovascular risk factors or disorders such as history of myocardial infarction, acute coronary syndromes, stroke or transient ischaemic attacks, intermittent claudication, rheumatoid arthritis or inflammatory diseases
2. Diabetes and disorders of glycaemic control
3. Irritable and inflammatory bowel disorders and acid peptic disease
4. Any active tumours / cancers with poor prognosis
5. Current active mental illness
6. Regular use of non-steroidal anti-inflammatory drugs (NSAIDs)
7. Smoking
8. Nut allergies or intolerances and any other relevant food allergies
9. Lipid or cholesterol lowering tablets
10. High dose aspirin and analogues >100mg/ day
11. Sustained use of nutritional supplements and/ or prescription medication including any hormonal/ contraceptive preparation, likely to impact on study measurements or safety

Date of first enrolment
07/03/2016

Date of final enrolment
30/04/2017

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
MRC Elsie Widdowson Laboratory
120 Fulbourn Road
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Sponsor information

Organisation
Medical Research Council

ROR
https://ror.org/03x94j517

Funder(s)

Funder type
Industry

Funder Name
Soremartec Italia S.R.L.

Funder Name
Medical Research Council

Alternative Name(s)
Medical Research Council (United Kingdom), UK Medical Research Council, Medical Research Committee and Advisory Council, MRC

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
Participant level data will be stored in the MRC EWL NMBV Repository with access by the dedicated research team and there would not be any external web link but rather an internal intranet link only. Access may be requested by writing to the Principal Investigator after December 2017 and permission will be dependent on internal MRC approval procedures. Participant consent was obtained, data are link-anonymised and there are no special ethical /legal considerations other than the usual regulations governing research ethics committees in the UK as outline by the GAfREC framework.

IPD sharing plan summary

Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/12/2019	01/11/2019	Yes	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes