Faculty of Health & Life Sciences

Study Title: 62C5: Acute effects of sage extract, fruit polyphenols and caffeine on cognitive function in healthy young adults

Investigator: Prof. David Kennedy

Participant Information Sheet

You are being invited to take part in this research study. Before you decide whether to take part, it is important for you to read this leaflet so you understand why the study is being carried out and what it will involve.

Reading this leaflet, discussing it with others or asking any questions you might have will help you decide whether or not you would like to take part.

What is the Purpose of the Study?

Plants contain a wide range of plant compounds (phytochemicals) which when added to beverages may result in improved brain function or mood. Potential ingredients include sage (*Salvia officinalis/lavandulaefolia*) extracts, polyphenols (plant compounds found in fruits and vegetables) and caffeine, all of which have been shown to have cognition (brain function) and mood enhancing properties. A similar recent study conducted within our research centre showed improvements in accuracy and speed on a range of different cognitive tasks after a drink containing sage extract and caffeine.

The aim of this study is to explore this further by assessing the cognitive and mood effects of 4 different beverages:

1. Containing sage extract
2. Containing fruit polyphenol extract
3. Containing caffeine
4. Placebo (a treatment with no active properties)

Why have I been invited?

You have been invited because you meet the following criteria*:

- You self-assess yourself as being in good health
- You are aged 18 to 45 years at the time of giving consent
- You are a native speaker of English or fluent in English

You are not eligible to take part in this trial if you:

- Have any pre-existing medical condition/illness which will impact taking part in the study. - Please discuss any medical condition/illness with the researcher prior to booking lab appointments. They will advise if this condition/illness would exclude you from partaking with the study.

- Are currently taking prescription medications. (except contraception, thyroid medications and those taken 'as needed' in the treatment of asthma and hay fever). Please discuss medication with the researcher prior to booking lab appointments, as there may be other medications that may be allowed.
- Have high blood pressure (systolic over 139 mm Hg or diastolic over 89 mm Hg); or have low blood pressure (systolic below 90 mm Hg or diastolic below 60 mm Hg)- note that we must measure this in the lab using our blood pressure monitors and can only use our measurements to assess eligibility rather than home or GP readings.
- Have a Body Mass Index (BMI) outside of the range 18.5-35 kg/m2
- Are pregnant, seeking to become pregnant or lactating.
- Have a diagnosed neurological condition, or learning/behavioural or neurodevelopmental differences (e.g. dyslexia, autism, ADHD)
- Have a visual impairment that cannot be corrected with glasses or contact lenses (including colour-blindness)
- Smoke tobacco or vape nicotine or use nicotine replacement products (if you have recently quit smoking/nicotine use you will be eligible to take part if you have not used these products for at least 3 months)
- Have an excessive daily caffeine intake (> 500 mg per day) (this will be calculated at screening but feel free to query this with the researcher prior to attendance if you are unsure)
- Have relevant food allergies/ intolerances/ sensitivities (please discuss with the researcher prior to attendance if you are unsure of relevance)
- Have taken antibiotics within the past 4 weeks
- Have taken dietary supplements e.g. vitamins, omega 3 fish oils etc. in the last 4 weeks (Note: participation is possible following a 4 week supplement washout prior to participating and for the duration of the study on the proviso that your supplements are taken are out of choice and not medically prescribed or advised- please discuss with the researcher if unsure. NOTE: we would never advise stopping supplements prescribed by your doctor e.g. iron, calcium etc., only those you use out of choice)
- Have any health condition that would prevent fulfilment of the study requirements (this includes non-diagnosed conditions for which no medication may be taken)
- Are unable to complete all of the study assessments
- Are currently participating in other clinical or nutrition intervention studies, or have in the past 4 weeks
- Have been diagnosed with/ undergoing treatment for alcohol or drug abuse in the last 12 months
- Have been diagnosed with/ undergoing treatment for a psychiatric disorder in the last 12 months (including medically diagnosed anxiety and depression)
- Suffer from frequent migraines that require medication (more than or equal to 1 per month)
- Have sleep disorders or are taking sleep aid medication (night shift is permitted but you must avoid attending testing visits coming straight off a night shift- discuss with the research team when planning your visits)

- Have any known active infections
- Will be non-compliant with regards treatment consumption
- Are unable/unwilling to consume the beverage containing artificial sweetener (e.g. aspartame, sucralose, acesulfame potassium, etc.)

* Please note that this study utilizes the following criteria for methodological reasons and marketing purposes related to the investigational product. All criteria have been fully considered and have a sound rationale. Whilst it would be too lengthy to include here, these are available on request by emailing the study investigator; david.kennedy@northumbria.ac.uk

IMPORTANT: We have received certification that this supplement is suitable for Halal, vegetarian and vegan diets. However, the lunch provided in this study contains dairy so may not be suitable for followers of a vegan diet.

A list of food items, ingredients and allergens is given in the table:

Food item	**Ingredients**	**Manufacturers listed allergens (number pertains to 14 food allergens as defined by food.gov.uk)**
Hovis soft white bread	**Wheat** Flour (with added Calcium, Iron, Niacin, Thiamin), Water, Yeast, **Soya** Flour, Salt, Preservative: E282, Emulsifiers: E472e, E471, E481, Flour Treatment Agent: Ascorbic Acid	2. Cereals containing gluten (Wheat) 13. Soya
Sainsbury's Mild Grated Cheddar	Cheddar Cheese (Cows' **Milk**), Anti-caking Agent: Potato Starch.	7. Milk
Walkers ready salted crisps	Potatoes, Vegetable Oils (Sunflower, Rapeseed, in varying proportions), Salt	None NOTE: Made in a factory that also handles: Milk, Wheat, Gluten, Barley, Soya, Celery, Mustard
Ambrosia Devon custard pot	Skimmed **Milk**, **Buttermilk**, Sugar, Modified Starch, Palm Oil, Whey (**Milk**), Natural Flavouring, Colours (Curcumin, Annatto), Total Milk content 73%	7. Milk
Lurpak spreadable	Butter (64%) (**Milk**), Rapeseed Oil, Water, Lactic Culture (**Milk**), Salt	7. Milk
Study investigational products	Sage extract, grape seed extract, caffeine, citric acid, malic acid, potassium benzoate, potassium sorbate, tri-sodium citrate, ascorbic acid, stevia, and natural flavours.	The ingredients used do not contain substances having allergenic properties for which labelling is required, as listed in Annex IIIA of the Directive 2000/13/EC and subsequent amendments. The ingredients do not contain allergens or proteins from a major food allergen as described in US Food Allergen Labelling and Consumer Protection Act (FALCPA) of

		2004.
(Optional item) McVitties Digestive Biscuits	Flour (55%) (Wheat Flour, Calcium, Iron, Niacin, Thiamin), Vegetable Oil (Palm), Wholemeal Wheat Flour (16%), Sugar, Partially Inverted Sugar Syrup, Raising Agents (Sodium Bicarbonate, Malic Acid, Ammonium Bicarbonate), Salt	2. Cereals containing gluten (Wheat) 7. Milk

What will happen if I take part?

You will have an initial remote screening session (Appointment 1) followed by visits to the laboratory on 5 separate occasions: an introductory/training visit (Appointment 2) and four active study days (Appointments 3-6).

Appointment 1: The remote screening session will be completed via telephone call and will comprise: briefing on requirements of the study, obtaining of informed consent via completion of an online consent form, health screening, collection of demographic data and completion of the Caffeine Consumption Questionnaire (CCQ). This will take approximately 30-40 mins to complete.

Appointment 2: The introductory/training visit to the laboratory (Day 0) will begin with physiological eligibility measures that cannot be completed remotely (e.g. blood pressure, height and weight, waist-hip ratio) followed by training on the cognitive and mood measures. This will take approximately 3 hours to complete.

Appointments 3-6: The methodology on your remaining visits will be identical, with the exception that you will consume a different treatment drink during each visit.

You will attend the laboratory at a prearranged time in the morning, having abstained from alcohol (24 hr) and caffeine (overnight), following a standardised breakfast of cereal and/or toast at home eaten no later than 1 hour prior to arrival. On arrival on each day you will complete a 60-minute computerised cognitive/mood assessment. After the first cognitive assessment you will take your allocated treatment for the day (neither you nor the researcher will know at this stage which treatment you are taking so as not to influence the results) and rest in the lab for 60 mins to allow for absorption. You will then undergo cognitive/mood assessments identical to the above at 60 minutes, 180 minutes and 300 minutes post-dose. You will be provided with a standardized lunch (comprising of a cheese sandwich on white bread, crisps and a custard pot) between the 180 min and 300 min post dose assessments (approx. 1.30pm). You will also be given the option of a snack (digestive biscuits) after the 60 min post dose assessment (approx. 11.30 am). No alternative snacks and lunches can be consumed. Please see the food items (and associated allergens) used in the study in the previous section titled '**Why have I been invited to take part?'**. NOTE: You should not participate if any of these allergens apply to you.

Each of these visits will take approximately 8 hours to complete.

After your final appointment you will be debriefed and your remuneration via bank transfer organized (please note that this can take as long as 2-3 weeks to reach your account).

Note: Timings given here are approximates for illustrative purposes and may be subject to change due to unexpected delays.

You will also be recompensed £280 for completing this study which is intended to cover your time commitment and any other out-of-pocket expenses you might incur as a result of taking part.

What are the possible disadvantages of taking part?

The active study products in use here, sage (Salvia officinalis) extracts, fruit polyphenol extract and caffeine, are not associated with any deleterious side effects at the doses to be administered.

You may find it uncomfortable to provide information on your mood and to be observed whist completing cognitive tasks. However, all data you provide will contain only your participant code (e.g. 516) and not your name. This data would only ever be linked to you if you asked us to withdraw your data from the study; here we would have to break your anonymized code in order to destroy your data. Regarding any further stress you might experience from being observed during task completion, this aspect of the study has been fully risk assessed but if you did feel under too much pressure during the study then you are encouraged to stop the session and you may then resume, reschedule or withdraw at will without any reason needing to be given. If you choose to withdraw the study team will ask if we can use the data provided so far or if you would like it to be removed from all analyses- this is entirely your choice. If you have any concerns about your mental health, sources of help include your GP, Samaritans (116 123) or you can self-refer to talking therapies in Newcastle (talkinghelpsnewcastle.org).

You will be required to remain seated at a desk for the duration of the cognitive and mood assessments. Prolonged computer testing may cause some minor discomfort and you may feel tired at times. It is therefore important that the correct eyewear is brought along to the testing session and that you inform the researcher of any back/arm/wrist problems you may have.

The tasks used in this study will be a combination of memory, reaction time and attention tasks and are intended to be mentally demanding. It is likely you will feel fatigued whilst completing these tasks but we require participants to try their best at all times when completing these tasks in order to obtain meaningful and usable data.

The study and its procedures have been fully risk assessed.

How will my participation experience be impacted by COVID-19 and what measures are in place to protect myself and others?

The health, safety and wellbeing of our participants and staff is always of our highest priority and we have risk assessments in place to help mitigate the spread of COVID-19 so that your risk of contracting or spreading the virus is no greater than that in your day-to-day life. Your researcher will

advise you of any specifics that you need to observe whilst in attendance. Note that the measures listed in our risk assessment are subject to change in line with University and government guidelines. Should you have any queries or concerns please contact your lead researcher who will be happy to discuss any queries or measures with you. We thank you for your continued support and compliance with the above.

Will my taking part in this study be kept confidential and anonymous?

Yes, as noted above, your name will not be written on any of the data we collect; the written information you provide will have a participant code, not your name. Your name will also never appear in any reports or documents resulting from this study. The consent form you have signed will be stored separately from your other data. The data collected from you in this study will be confidential. The only exception to this confidentiality is if the researcher feels that you or others may be harmed if information is not shared.

How will my data be stored, and how long will it be stored for?

Paper records will be stored in a locked filing cabinet and electronic information will be stored on password-protected restricted access computer servers/cloud. All data will be treated in accordance with GDPR. Individual testing laptops will also hold data until it is transferred via USB or external hard drive to the aforementioned server. This data will all be pseudonymised as detailed above and accessible only to the research team.

All information and data gathered during this research will be stored in line with GDPR Legislation and will be retained for at least two years.

If the research is published in a scientific journal it may be kept for longer before being destroyed. During that time the data may be used by members of the research team only for purposes appropriate to the research question, but at no point will your personal information or data be revealed.

What will happen to the results of the study and could personal data collected be used in future research?

The general findings might be reported in a scientific journal or presented at a research conference, however the data will be anonymized and neither you nor the data you have provided will be personally identifiable. The findings may also be used in future studies (e.g. when conducting meta-analyses) or shared with other organizations/ institutions that have been involved with the study. We will send a summary of the results to you once the study has completed and the data has been analysed. Please note that this can sometimes be several months after the study has completed. Results will be sent to the email address that you have used to communicate with us throughout the study.

Who is Organizing and Funding the Study?

Faculty of Health & Life Sciences

The study was designed and is being conducted by the research team here at Northumbria University. The funding is provided by an international beverage manufacturer for the purposes of testing their investigational product.

Who has reviewed this study?

Before this study could begin, permission was obtained from Northumbria University and this study has been approved by the University Ethical Approval System (Ref. 52916) at Northumbria University.

How can I withdraw from the study?

If you would like to withdraw from the study at any point, please contact the researcher using the details below and ask to withdraw your data. This will be possible up until two weeks following study completion.

Contact for further information:

Researcher email: HL.sage3.study@northumbria.ac.uk

Investigator email: david.kennedy@northumbria.ac.uk

Name and contact details of the Records & Information Manager at Northumbria University: Duncan James (dp.officer@northumbria.ac.uk).