Physiological and self-reported effects of Kombucha on well-being, induced stress, and inflammation.

PARTICIPANT INFORMATION SHEET

You are being invited to participate in one of our collaborative research studies being conducted by the Well-being and Health Assessment Research Unit (WARU) and Psychology Department at Aberystwyth University, funded by Innovate UK. Before you decide to participate, please read the information below about the project, and what will be involved. Take the time to read this information carefully and if you wish, discuss it with friends, relatives, or your GP. Please ask us if you are unclear on any information and take time to decide whether you want to take part. It is your decision.

Why have I been offered entry into this study?

You have been offered entry into this study as you have expressed interest in the activities at WARU and may be interested in participating in one of our studies. Additionally, we believe you may fit the eligibility criteria we are looking for. Taking part in this research is entirely voluntary. If you do not want to take part please say so. If you decide to take part you will be given this information sheet to keep (and be asked to sign a consent form). If you decide to take part, you can change your mind at any time and withdraw from the study up to one month after participation, without giving a reason. After this, the research will have been prepared for analysis and write-up, but every effort will be made to withdraw your data after this point where possible. To withdraw from the study please email waru@aber.ac.uk. You do not need to provide a reason for withdrawing.

Why is this study being performed?

Epidemiological studies have linked tea consumption to decreased incidence of cognitive decline and lower levels of emotional distress. Probiotic, fermented products such as kombucha, (fermented with a symbiotic culture (scoby) of bacteria and yeasts), have attracted significant interest due to their potential beneficial health-giving and wellness properties. Kombucha has multiple functional properties, including promoting favourable intestinal microbiome colonisation to improve gastrointestinal function, and anti-inflammatory, antioxidant, and metabolic activity including reduced cholesterol levels and blood pressure. This project will randomise individuals into the intervention (kombucha) or placebo (flavoured water) arm for 8 weeks and seeks to assess physiological and self-reported effects of Kombucha on well-being, induced stress, and inflammation.

What exactly would I have to do as a participant?

If you pass our eligibility checks (done in-person or over the phone), we will invite you to attend an in-person induction session at WARU. During this induction, we will ask you to sign a consent form and to complete a medical health questionnaire. You will also be instructed on how to use our at-home urine sampling kits, which will also be handed to you during this appointment. We will also request to measure your height and weight and to take your venous blood draw (followed by optional tea and toast). Please arrive in a fasted state. You will be randomised into the intervention or placebo arm of the trial (blinded however you can ask to find out at the end of the trial)

On your next visit to WARU (testing day 1), please bring your urine samples with you. These should be collected on the morning of your appointment. We will then measure your heart rate and blood pressure and ask that you complete some self-report questionnaires. *Please note that if you typically experience high blood pressure between 135/85 mmHg to 150/95 mmHg at home, or if we observe a reading of 140/90 mmHg and 160/100 mmHg in the lab (on test day 1), then you will unfortunately not be eligible to participate. These numbers have been taken from the British Heart Foundation (March 2023). This is because we anticipate participants to experience short-term elevations in blood pressure during the hand-immersion trials of the MAST.* You will have to wait an hour between when you last consumed food or water, to when your first saliva sample is taken (required as a measure of objective well-being state). You can choose to split your appointment into a morning and an afternoon session if you would rather not wait around on campus. Please arrange this with the researcher prior to your arrival. Once you have taken your first saliva sample (which the researchers will guide you through) and completed another small questionnaire, you will be asked to roll up your sleeves, remove any jewellery, and to wash your hands and arms with soap and water in preparation for the Maastricht Acute Stress Test (MAST).

The MAST involves you completing a series of ice water (2^{o}C) submersion of your hand (up to your wrist) in a controlled manner for short periods over a 15minute duration. Submersion is expected to cause manageable levels of acute pain, all of which will be within your control because you can remove your hand at any point (although for the purpose of the MAST, you will be encouraged to wait for the signal on the screen). During the period of the task, you will see instructions on a screen of when to immerse or removed your hand and also be asked to complete some basic arithmetic tasks. During this task you will also be connected to some passive recording devices to measure your heart rate and electrical levels from your skin (known as electrodermal activity). You will also be video recorded during the experiment as part of the protocol. [*More in depth instructions will be provided to you on the day of testing with an opportunity to ask questions*]. Immediately after the MAST is completed you will complete some more questionnaires and provide saliva samples at set times (with guidance).

After the testing and samples have been collected you will be provided with your first week or two of trial drinks and you will be asked to consume 330ml throughout the course of the day (a whole bottle), every day, for 8 weeks. During this time, the researchers will be in touch (via phone or email, whichever you'd prefer) to see how you're doing. Additionally, the researchers will arrange

a weekly or biweekly appointment for you to collect your kombucha/placebo samples. Equally, if you would like or need to contact the researchers for any reason during the 8-week intervention, then please use the contact details provided at the end of this sheet.

After the 8-week intervention, you will be invited to return for the final testing day with your urine samples. You will be asked to repeat the same series of events as those completed during testing day 1, and a separate day (within 48 hours of day 56) will be arranged for your venous blood draws.

There will be an optional feedback questionnaire at the end, and you will be informed about which group you were in (kombucha or carbonated placebo).

What are the benefits in volunteering?

If you choose to take part and complete all sessions, you will be awarded £20 for every session you spend on campus. However, if you cannot or choose not to adhere to the 8-week intervention, or do not attend the final day of testing (for any reason), then you will still be reimbursed for the time you dedicated during testing day 1.

If you are an Aberystwyth University Psychology student, then you will also be awarded 5 SONA credits for each completed visit.

In addition to the financial incentive, by participating in this research, you will allow us to gain important insight into the effects of kombucha on well-being, working memory, and inflammation, which will strengthen our understanding of the physiological benefits of post-biotics on the gut and gut-brain axis. Findings from the project will be disseminated to you directly once data analysis has been completed.

Are there potential disadvantages or side effects?

The Kombucha has already been tested for any adverse effects in a human cohort, however, if any negative effects occur, please refrain from continuing in the study.

Please note that some of the questionnaires will require you to answer questions relating to your mental and physical health. You will not receive feedback on your questionnaire scores because they are NOT intended for diagnostic or clinical purposes. However, if you have any concerns regarding the scoring criteria, or about your health in general upon completing these questionnaires, then we recommend that you speak to your GP. If you have any questions regarding any of the questionnaires and how they are used, then please contact WARU at waru@aber.ac.uk. If you would like to speak to someone generally about your mental health, or if you have any other mental health concerns, then we recommend that you use one of the support services listed at the end of this document.

The MAST involves you completing a series of ice water (2oC) submersion of your hand (up to your wrist) in a controlled manner for short periods over a 15-minute duration. Submersion is

expected to cause manageable levels of acute pain, all of which will be within your control because you can remove your hand at any point (although for the purpose of the MAST, you will be encouraged to wait for the signal on the screen which will prompt you to remove your hand from the water). However, if at any point throughout the duration of the experiment, you decide you would not like to continue, then please inform the researcher. They will stop the experiment, and you will still receive financial compensation for your time. In addition, your decision to end the MAST will NOT exclude you from participating in the rest of the trial, provided you are still willing to commit to taking the daily kombucha/placebo for the full 8 weeks, and you are willing to provide urine and venous blood samples at the end of the 8 weeks.

What if I no longer want to be a part of the study?

Whilst we would be sorry to see you leave the study, participation is entirely voluntary, and you are free to withdraw at any stage without explanation. All data collected over the investigation can be withdrawn up to one month after participation. However, if you request to withdraw your data at a later date, we will endeavour to withdraw your data where possible. If you chose to leave the study, this will not affect your involvement in future research studies managed by the WARU team.

What if I feel unwell during the study, or if something else goes wrong during the study?

If you, or a member of your family/household become unwell during the study, please alert a member of the research team immediately using the contact information at the end of this document. Participation in the study should be suspended immediately until further discussion with the research team has taken place. If you become unwell at any point and need medical assistance, please contact 111 and seek advice from the NHS health sector or your doctor's surgery. We have a duty of care towards you and can help monitor your health remotely over 14 days and will help in any way we can.

During the MAST, if you decide that the acute pain during a water submersion trial is too much, then please inform the researcher. They will stop the experiment, and you will still receive financial compensation for your time. In addition, your decision to end the MAST will NOT exclude you from participating in the rest of the trial, provided you are still willing to commit to taking the daily kombucha/placebo for the full 8 weeks, and you are willing to provide urine and venous blood samples at the end of the 8 weeks

Will the information and data be confidential?

Yes. Only those researchers involved will be able to look at the information you provide. Specific details, which identify you, will only be available to the researchers, and they will be stored in a password-protected file on OneDrive. Any paper files containing identifiable information (i.e. your consent form) will be stored in a lockable cabinet in a key-card secured office that only the immediate research team have access to. After the end of the study, any information relating to you will be made pseudonymous (coded without your name associated). You will not be identifiable in any publication that may arise from this research. If you meet the exclusion criteria for the study, then your personal details shall be removed from the study.

Please note that in exceptional circumstances confidentiality may have to be breached in cases where persons are considered to be at risk or if required by law.

Will my GP be informed?

No.

What will happen to the data collected?

Any paper questionnaire data will be made into a digital copy in Redcap, associated with your unique, pseudonymised code, and the paper versions will be stored in a locked filing cabinet. Your blood, saliva, and urine samples will be examined at analytical laboratories in Aberystwyth University and AberInnovation. All samples will be stored securely and anonymously. Upon completion of the study, the samples will be destroyed or stored in our laboratory freezers in accordance with government regulations. Your name and details will no longer be associated with the samples. Samples will be securely stored for future use if further validation is required, for up to 5 years.

Who has reviewed the project?

This project has been reviewed and approved by the Research Ethics Panel, Aberystwyth University (ethics@aber.ac.uk). In accordance with the British Psychological Society's Code of Ethics and Conduct, as the research team, we are required to conduct the research in accordance guidelines set out.

Does the project conform to GDPR guidelines?

This research is being conducted in accordance with the GDPR guidelines. The AU Data Protection Manager provides oversight of AU activities involving the processing of UK GDPR and special category data, and can be contacted at infocompliance@aber.ac.uk. Your personal data will be stored securely. The legal basis that would be used to process your personal data will be 'a task in the public interest'. If you are concerned about how your personal data is being processed, please contact AU in the first instance at infocompliance@aber.ac.uk. If you remain dissatisfied, you may wish to contact the Information Commissioner's Office (ICO). Contact details, and details of data subject rights, are available on the ICO website at: https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/.

What do I do next?

Either contact the research team (waru@aber.ac.uk) or phone 01970622299 to confirm your wish to proceed, and we will contact you shortly. If you have any further questions after reading this document, please do not hesitate to contact us. We hope you agree to participate and look forward to hearing from you very soon.

Many thanks,

The WARU Team

Contact for support:

Samaritans: 01970 116 123

jo@samaritans.org

https://www.samaritans.org/branches/samaritans-aberystwyth-and-mid-wales

Mind: 01970 626 225

info@mindaberystwyth.org

http://mindaberystwyth.org/

Mentalhealth.org.uk: https://www.mentalhealth.org.uk/your-mental-health/getting-help