**58BX2: Acute dose-ranging effects of mango leaf extract (Zynamite® 15%) on cognitive function in healthy young adults**

**Participant Information Sheet**

You are being invited to take part in this research study. Before you decide 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?

*Mangifera indica* (or mango leaf) extract has been found to enhance mental and physical performance. The beneficial components (called polyphenols) occur in other extracts which have been shown to relieve stress and boost cognitive function. A recent study in our lab investigated the effects of a single dose of Zynamite® (60% of polyphenol mangiferin) on performance across a number of cognitive domains (attention, working memory, episodic memory, executive function), as well as during a period of cognitively demanding task performance. The results showed that a single dose of 300 mg Zynamite® significantly improved task performance accuracy across each of the post-dose assessments (30 min, 3 h, 5 h) adding to the body of evidence that mango leaf extract can enhance cognitive function. The aim of this study is to expand on previous research and assess the effects of acute supplementation with three doses (150, 300 and 600 mg) of another formulation of Zynamite® (Zynamite® 15%) on cognitive function and mood.

**Why have I been invited to take part?**

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

* You are in good health
* You are aged 18 to 30 years at the time of giving consent
* You play video-games (arcade, console, computer, smartphone) for no less than 5 hours a week on average and have done so over the previous 6 months

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

* Have symptoms of COVID-19 or fall into the ‘high’ or ‘moderate’ risk categories from coronavirus as defined by [***NHS UK***](https://www.nhs.uk/conditions/coronavirus-covid-19/people-at-higher-risk-from-coronavirus/whos-at-higher-risk-from-coronavirus/)***.***
* Have any pre-existing diagnosed medical condition/illness which will impact taking part in the study

NOTE: the explicit exception to this is controlled hay fever. There may be other, unforeseen, exceptions and these will be considered on a case-by-case basis; i.e. participants may be allowed to progress to screening if they have a condition/illness which would not interact with the active treatments or impede performance. Note: asthma is not permitted in this study.

* Are currently taking prescription medications including habitual use of non-steroidal anti-inflammatory drugs (NSAIDs) (e.g. ibuprofen, aspirin)

NOTE: the explicit exceptions to this are thyroid meds, topical skin creams, contraceptive treatments for female participants, and those taken ‘as needed’ in the treatment of hay fever. As above, there may be other instances of medication use which, where no interaction with the active treatments is likely, and which would not be expected to have any impact on brain function, participants may be able to progress to screening.

* Have high blood pressure (systolic over 139 mm Hg or diastolic over 89 mm Hg- to be assessed in the lab at training)
* Have a Body Mass Index (BMI) outside of the range 18.5-29.9 kg/m2 (- to be assessed in the lab at training)
* Are pregnant, seeking to become pregnant or lactating.
* Have learning and/or behavioural difficulties such as dyslexia or 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 you must have been quit for a minimum of 3 months to be eligible to take part)
* Excessive caffeine intake (>500 mg per day) (-to be assessed during the online screening)

[for info x1 small instant coffee= 60mg, small fresh brewed coffee= 85mg, small tea= 53mg, can of cola= 40mg]

* Have relevant food intolerances/ sensitivities/ allergies
* 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 the supplements you are taking are out of choice and not medically prescribed or advised)- NOTE: Existing use of Vitamin D is permitted
* 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 done so 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
* 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
* Do not have a bank account (required for payment)

\* Please note that this study utilizes the listed 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

We have now received certification that this supplement is suitable for Kosher, Halal, vegetarian and vegan diets. However, the lunch provided in this study contains dairy products so may not be suitable for these diets. A list of food items (and ingredients and allergens) is given below:

|  |  |  |
| --- | --- | --- |
| **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, Basics | Cheddar Cheese (Cows' Milk),Anti-caking Agent: Potato Starch. | 7. Milk |
| Walkers ready salted crisps | Potatoes, Vegetable Oils (Sunflower, Rapeseed, in varying proportions), Salt | NoneNOTE: 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 |

Do I have to take part?

No. It is up to you whether you would like to take part in the study. We are giving you this information sheet to help you make that decision. If you do decide to take part, remember that you can stop being involved in the study whenever you choose, without telling us why. You are completely free to decide whether or not to take part, or to take part and then leave the study before completion. NOTE: We may ask your reason for withdrawal for feedback purposes, but you do not have to tell us. We may also ask if we can use the data you have provided thus far; again, you do not have to agree to this.

What will happen if I take part?

The study will require you to have 6 appointments: appointment 1 to be done remotely, appointments 2-6 involving attending the Brain Performance and Nutrition Research Centre at Northumbria University (Newcastle City Campus):

Appointment 1. Initially you have a screening appointment which will be completed via video/telephone call with the research team at a pre-arranged time. If using video call, the research team will send you a link which you will need to click at the arranged time to start the call. During this session we will discuss the study requirements with you, answer any questions you may have, and consent and demographic information will be taken. The screening appointment will last approximately 30-45 mins.

Appointment 2. You will then be invited to attend the lab for the next appointment which is a training visit during which we will take eligibility measurements that we were unable to do via video/telephone call (height and weight to calculate BMI, waist-hip ratio, blood pressure readings). Provided these readings are within our required range, you will undergo training on the study assessments in preparation for your testing visits. No prior experience of computers is required. The training session will last approx. 2 hours. NOTE: Some eligibility assessments (e.g. height and weight to calculate BMI, waist-hip ratio, blood pressure) can only be done in person. Please be aware it is possible that if your measurements are out of the required range for this study this will not be known until appointment 2 and you will not be able to continue with the study. We apologise for any inconvenience or disappointment should this happen.

The screening appointment and the lab-based training visit will take place between -28 and 1 day/s before the first testing day. If more than 28 days elapse between training and the first testing visit, then you will be invited to return for a ‘refresher’ training visit before commencing the study.

Appointments 3 - 6. If you are enrolled onto the study, you will have four subsequent laboratory-based active testing visits which will be identical, with the exception that you will consume a different treatment during each visit. These visits will take place 7 days apart and will follow this procedure:

You will attend the laboratory at a prearranged time having consumed a standardised breakfast of cereal and/or toast at home no later than one hour prior to the visit. You will need to refrain from alcohol for 24 hours and caffeine overnight. On arrival we will discuss your health status and check compliance with study restrictions. You will then complete a 60-minute computerised cognitive assessment which will include a range of memory, attention and reaction time tasks and self-report mood scales. You will then 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 30 mins to allow for absorption. This will be followed by completion of further cognitive/mood assessments which will be identical to the above and will be completed at 30 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 30 min and 180 min post dose assessments. No alternative lunches can be consumed.

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 implementation of COVID-19 safety measures and unexpected delays.

What are the possible benefits of taking part?

You will add to the research effort investigating whether extracts from natural sources can have a significant impact on brain function.

You will also be recompensed £200 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?

Zynamite® 15% is classified as a food or food supplement and is available for purchase within the EU. It is not associated with any significant deleterious side effects.

You may find it uncomfortable to provide information on your mood and to be observed whist completing cognitive tasks. All data you provide contains 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 identify (and destroy) your data. 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 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.

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 COVID-19 pandemic has caused severe disruption to all functions of the University including our research department. The health, safety and wellbeing of our participants and staff has to be the highest priority and we are confident that we have the appropriate measures in place to mitigate risk of transmission so that your risk of contracting or spreading the virus is no greater than that in your day-to-day life.

The University now has a policy where all University staff and students will complete a return to work induction in order to help keep themselves and visitors safe; no staff or students are permitted to return to work without an induction. We can confirm that all members of our research team have successfully completed this induction prior to returning to work. All members of the research team on campus will undergo regular lateral flow testing for COVID-19 in accordance with University policy.

More specifically, the University has adopted a new system regarding face-to-face research. In order to resume/start research projects, researchers must now apply for permission to do so explaining why the research must be conducted in person and how the safety of participants and the research team will be assured with risk assessments in place to demonstrate this. Each application is scrutinized by a committee of University executives and the Health and Safety team and no research may be conducted until approval has been granted. We can confirm that this study has been approved by this committee and is deemed safe to conduct with the following measures in place:

* Wherever possible we will move research activities to be completed remotely e.g. screening to minimise the amount of time your participation will require you to be on campus. However, due to the nature of our data collection methods this will not be possible for all elements of the study including computerised cognitive testing visits. Please do not attend the research centre if:

- You feel unwell or have experienced symptoms of COVID-19, in the past 14 days

- Members of your household have experienced symptoms of COVID-19, in the past 14 days

- You have knowingly been in contact with anyone displaying COVID-19 symptoms

- You have tested positive for COVID-19 within the past 14 days

- You are awaiting the outcome of a COVID-19 test

- You have been advised to self-isolate

- You have re-entered the UK in the last 14 days

* We will now operate with fewer participants attending the lab per day with dedicated times for testing and training. With this in mind, please be aware availability for bookings is limited and that it may not be possible for us to be as flexible with rescheduling as we have been in the past. Please do not sign up to a study or visit if you are unsure if you can attend. If something crops up urgently meaning that you need to be rescheduled, we will do our best to accommodate you but please note this may not always be possible and may result in delayed attendance and even withdrawal from the study.
* Participants are encouraged to choose, where possible, the safest way to travel to Campus. Free parking is already available to participants when pre-booked (24 hours notice required- subject to availability) and you will be encouraged to make use of this where possible (please contact the research team with your registration details in order to request a space). Government guidance on walking, cycling, travelling in private vehicles and on public transport can be accessed [here](https://www.gov.uk/guidance/coronavirus-covid-19-safer-travel-guidance-for-passengers#travel-safely-during-the-coronavirus-outbreak)
* At the time of writing, the current government guidance is that everyone must maintain social distancing and that adults (unless exempt) must wear face coverings in enclosed public places. You will find instructions for social distancing and face coverings at the entrance to all university buildings. Please follow this guidance at all times and ensure that you attend your visit with a face covering available. If you are exempt from wearing a face covering please let the research team know. In this instance we will source you a disposable visor. On arrival to our lab, you will be required to change to a type IIR face mask which we will provide.
* We now require research staff and participants to wear a type IIR (disposable surgical) face mask whenever we are testing including when seated 2m away from each other in the lab. On arrival to the research centre, you will be required to change to a type IIR face mask which we will provide. Research staff will wear these masks and in some cases visors where close up contact is required e.g. taking blood pressure and height and weight measures. Staff and participants will work side-to-side or back-to-back wherever possible. If you are exempt from wearing a face covering please inform the research team ASAP.
* You will be allocated an arrival time and we request you stick to this time as much as possible. If you find that there is a queue outside of (or within) the research centre, please observe social distancing by following the markings on the floor and keeping left. If you are going to be late please call the lab on 0191 243 7252 to check that it is still OK for you to attend. As before, we will do our best to accommodate you but please note this may not always be possible and may result in delayed attendance or even withdrawal from the study.
* Prior to arrival to the unit, you will be emailed and required to complete some questions to confirm that you do not currently have symptoms of COVID-19 and are not likely to have contracted COVID-19 in the days running up to the study visit.
* Universities, along with a number of venues, are required by law to use the NHS Test and Trace system in addition to any manual process we may also have in place for those who don’t have a smartphone. Particularly venues within our university that are open to the public are required to collect details of customers, visitors and staff and display an official QR code poster to strengthen our Covid-19 safety measures on campus. We have an NHS Test and Trace QR within our research centre on the 4th floor. Please scan the QR code using the NHS COVID-19 app when you arrive within the research centre. You can download the app from the Apple app store or Google Play.
* Alcohol gel will be provided at entry and exit points to the University and throughout the campus including the research centre; please use at regular intervals and before and after handling equipment including your designated testing laptop.
* During your visit, avoid touching your eyes, nose, mouth with unwashed hands, cover your cough or sneeze with a tissue, and throw it away in a bin and wash/gel your hands.
* We will now be operating a one-way system in and out of the research centre. You will be required to enter Northumberland Building via the Digital Commons entrance (the entrance where the lifts are) from the Quad (the Quad is where the library, Habita and the Students Union are located). You will enter the BPNRC through the research centre main doors (where the intercom is) and exit via our fire escape (next to where the main testing labs and researchers’ offices are) onto College Road. Note: when going to the toilet you can still use the usual corridor rather than going out of the building (just be mindful of social distancing and keep left).
* If you find yourself in a meet-meet situation in a corridor where social distancing cannot be adhered to please keep left and follow floor markings. One-way systems and directional signage are in place across the University Campus to guide visitors safely around the site. Please take note of these signs and all other signage, e.g. use of face coverings, handwashing advice, and adhere to them across Campus.
* Lift use should be avoided where possible. If you decide to use the lifts, please give priority to those who need to use a lift, follow the revised maximum occupancy as displayed outside the lift and maintain social distancing, adhering to floor markings where appropriate
* Using the toilet: Social distancing should be maintained in the corridor whilst waiting. Guidance to be displayed on poster outside the toilet. Anyone waiting to use a toilet cubicle or sink must ensure social distancing and stand at least 1 m back to allow the previous occupant space to leave.
* During study day breaks participants will be required to remain in their testing lab until the next assessment start time. With this in mind, we request that participants bring in their own bottled water as access to the water coolers is currently prohibited. We also strongly advise that you bring a book, newspaper, magazine or tablet (with headphones if using an app with audio) to pass the time during these breaks (note you must take all newspapers and magazines home with you).
* We also ask that participants bring their own pens to all sessions to complete study paperwork and take them with them upon leaving. If you forget we will issue you with a pen, but this must be returned to us at the end of testing for sterilising
* Participants will be seated in testing labs with a 2-metre gap between them. You are encouraged to observe social distancing guidelines and keep physical interaction with others to a minimum.
* All surfaces and door handles will be cleaned frequently with desks cleaned by staff after each use.
* Fire procedures remain unchanged (the researcher will direct you to your nearest assembly point where you should remain until told by Fire Marshals/Security that it is safe to re-enter the building), but social distancing must be observed when leaving the building and when congregating in the assembly points.
* We appreciate that these are uncertain times and that participating in our research may add to stress or anxiety you are already experiencing as a result of the COVID-19 pandemic and the difficulties it has caused. Please be assured that your participation is, and always has and always will be, completely voluntary. You can withdraw from the study at any time, even if it is the middle if a testing session, and do not have to give a reason why (although we may ask why for feedback but you do not have to give an answer). The health, safety and wellbeing of our participants is of our highest priority and we understand should you decide to withdraw your interest.

For more information and guidance here are links to some of the University’s COVID-19 policies and wider government advice:

* [Northumbria’s COVID 19 pages](https://one.northumbria.ac.uk/service/cs/hs/Pages/Covid-19.aspx)
* <https://www.gov.uk/coronavirus>
* [The Government review of the 2 metre rule](https://www.gov.uk/government/publications/review-of-two-metre-social-distancing-guidance/review-of-two-metre-social-distancing-guidance)
* [Working safely during COVID in offices](https://eur02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fassets.publishing.service.gov.uk%2Fmedia%2F5eb97e7686650c278d4496ea%2Fworking-safely-during-covid-19-offices-contact-centres-0310720.pdf&data=02%7C01%7Cjo.forster%40northumbria.ac.uk%7C6cd959be62d84490294708d83dffffb0%7Ce757cfdd1f354457af8f7c9c6b1437e3%7C0%7C0%7C637327517134146842&sdata=VRl%2Bd4F2ses8c0FuSE7DgfBfuUzs5eAxWlUSZp6yYpY%3D&reserved=0)
* [Working safely during COVID in labs and research facilities](https://www.gov.uk/guidance/working-safely-during-coronavirus-covid-19/labs-and-research-facilities)
* PHE quick guides for correct donning and doffing of PPE for [non-Aerosol generated procedures (AGPs)](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878678/PHE_11606_Taking_off_PPE_064_revised_8_April.pdf) as well as for [AGPs](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879103/PHE_COVID-19_Donning_quick_guide_gown_version.pdf).
* [Government advice on face coverings found here](https://www.gov.uk/government/news/public-advised-to-cover-faces-in-enclosed-spaces)

Should you have any queries or concerns please contact your lead researcher who will be happy to discuss any queries or restrictions with you.

We thank you in advance for your patience and compliance with the above.

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

Yes, when you consent to take part in the study you will be allocated a unique subject identification number (e.g. 516), which will identify your subsequent data. Regarding anonymization, the only document containing the full names of participants alongside their related anonymised code is the participant identification list and this will be stored as a password protected document on secure computers/servers accessed only by the research team. Should this document need to be printed it will be stored in a locked filing cabinet separate from all other forms of data pertaining to this study. Your electronic data, including your consent form, will be stored on secure computers/servers accessed only by the research team.

How will my data be stored?

We will store your data for a minimum of 7 years following completion of this study unless the sponsor of the study or the journal article we publish within requires an extension of this period. Please note that the data retained after the 7-year period will only be anonymized data rather than personally identifiable data.

During this 7-year period your consent forms will be kept on secure servers. All electronic data will be stored on the University U drive (within the restricted access BPNRC server), which is password protected. All data will be stored in accordance with University guidelines and GDPR.

What categories of personal data will be collected and processed in this study?

During the screening and training visits we will take demographic data from you and this documents such things as your height/ weight, Waist-to-Hip ratio, blood pressure readings, biological sex, race, lifestyle habits, years in education and that you do not meet any of the exclusion criteria. During the testing visits we will collect your cognitive and mood data.

**What is the legal basis for processing personal data?**

The legal basis for processing the personal data required for the purposes of this study is that the research is necessary for scientific research purposes.

Who are the recipients or categories of recipients of personal data, if any?

Only the research team here at Northumbria University will have access to your personal data. The funder of the study or the journal article that we publish the study within may request access to the study data but this will either contain only your participant code (e.g. 516) or no identifying information at all, never your name, and this will be shared using encrypted passwords or the secure ‘SharePoint’ tool.

**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 you or the data you have provided will not 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 but again you and your data will not be personally identifiable. We can provide you with a summary of the findings from the study if you email the researcher at the address listed below.

**Who is Organizing and Funding the Study?**

The study is funded by Nektium Pharma who are the international manufacturers of the supplement. The study was designed and is organised by staff at Northumbria University.

**Who has reviewed this study?**

This study has been reviewed and approved by the Northumbria University Department of Psychology Staff Ethics Committee.

**What are my rights as a participant in this study?**

Under the GDPR legislation you have right of access to your personal data (to do so you should submit a Subject Access Request); a right in certain circumstances to have inaccurate personal data rectified; and a right to object to decisions being taken by automated means. If you are dissatisfied with the University’s processing of personal data, you have the right to complain to the Information Commissioner’s Office. For more information see [the ICO website](http://www.ico.org.uk/).

**further information:**

**Researcher email:** **hl.ZynamiteCog@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****).**