



Northumbria
University
NEWCASTLE

 **brain, performance and**
nutrition research centre
food and diet neuroscience at **northumbria university**

Department of Psychology
Northumberland Building
Northumbria University
Newcastle upon Tyne
NE1 8ST UK
Tel: +44 (0) 191 2437252
Visit: www.bpnrclub.com
 bpnrclub

Dear Parent/Guardian,

For over a decade, the Brain Performance and Nutrition Research Centre (BPNRC) (www.bpnrclub.com), located within Northumbria University, has been investigating how nutritional supplementation can improve performance and wellbeing. Our work aims to create a better understanding of how diet and nutrition support optimal brain health and function across the lifespan. We specialise in conducting trials looking at how particular components of the diet, such as the plant chemicals contained in berries or chocolate, herbal ingredients, fish oils or other novel ingredients impact our memory, ability to concentrate and mood.

Attention Deficit Hyperactivity Disorder (ADHD) is a chronic neurodevelopmental disorder affecting around 5% of the global population (Valero et al., 2022). It is characterised by a heterogeneous pattern of behaviours including hyperactivity, inattention and impulsivity. Typically, in children and adolescents this behaviour presents as having difficulties concentrating and staying on task, being easily distracted or having a short attention span and finding it difficult to stay still or seated. Individuals with ADHD have specific weaknesses in executive functioning, an area of cognition responsible for decision making, working memory and planning (Willcutt et al., 2005). Additionally, the disorder is associated with greater risk of poor academic and employment outcomes (Erskine et al., 2016). In the UK, recent data suggests that ADHD may be under-diagnosed (Hire et al., 2018), this, combined with long waiting lists for referral and diagnosis, results in inadequate provision of treatment. Therefore, alternative methods of treatment, including natural products such as plant extracts, are of particular interest in children without a diagnosis of ADHD. Lemon verbena (*Aloysia citriodora*) is a plant native to South America and is used throughout the world for medicinal purposes. Previous research has indicated that lemon verbena has a number of beneficial health properties, including antioxidant, sedative and anxiolytic effects (Bahramsoltani et al., 2018). The data so far suggests that lemon verbena may be an effective calming agent.

We are therefore currently looking for children and adolescents aged between 8 and 17 to take part in a study investigating the cognitive, behavioural and mood effects of Lemon Verbena extract supplementation and a matched placebo prior to and after 4 and 8 weeks of supplementation. The study will involve your child (and yourself) coming into our laboratory at Northumbria University (City Campus) on four separate days, plus an initial online/telephone screening appointment. The initial screening appointment will take place after school on a weekday and last around 30 minutes. The first lab visit will be a training visit and will take place after school on a weekday and will last approximately 2 hours and the remaining 3 visits are testing visits and will take place on a weekend and last approximately 1.5 hours each. Your child will receive £120 in vouchers for taking part. Parents/guardians will receive £30 towards travel expenses at the end of the study.

The study has received ethical approval from the Northumbria University Psychology Staff Ethics Committee, reference number 49191.

Thank you for taking the time to read this letter. If you are interested in taking part you can find out some additional information at the links below:

<https://bpnrclab.link/lemonverbena/children>

<https://bpnrclab.link/lemonverbena/parents>

Finally, we also have studies running for adults, some of which also run at the weekends. If you would be interested in taking part in a trial, or know anybody who would be, you can find information about our current trials on our website.

Kind Regards,



Dr Ellen Smith

Senior Research Assistant

- Bahramsoltani, R., Rostamiasrabadi, P., Shahpiri, Z., Marques, A. M., Rahimi, R., & Farzaei, M. H. (2018). Aloysia citrodora Paláu (Lemon verbena): A review of phytochemistry and pharmacology. *Journal of ethnopharmacology*, 222, 34-51.
- Erskine, H. E., Norman, R. E., Ferrari, A. J., Chan, G. C., Copeland, W. E., Whiteford, H. A., & Scott, J. G. (2016). Long-term outcomes of attention-deficit/hyperactivity disorder and conduct disorder: a systematic review and meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*, 55(10), 841-850.
- Hire, A. J., Ashcroft, D. M., Springate, D. A., & Steinke, D. T. (2018). ADHD in the United Kingdom: regional and socioeconomic variations in incidence rates amongst children and adolescents (2004-2013). *Journal of attention disorders*, 22(2), 134-142.
- Valero, M., Cebolla, A., & Colomer, C. (2022). Mindfulness training for children with ADHD and their parents: a randomized control trial. *Journal of attention disorders*, 26(5), 755-766.
- Willcutt, E. G., Doyle, A. E., Nigg, J. T., Faraone, S. V., & Pennington, B. F. (2005). Validity of the executive function theory of attention-deficit/hyperactivity disorder: a meta-analytic review. *Biological psychiatry*, 57(11), 1336-1346.