Proceedings of the Nutrition Society (2024), **83 (OCE1)**, E138 doi:10.1017/S0029665124001563

47th Annual Scientific Meeting of the Nutrition Society of Australia and Nutrition Society of New Zealand, 28 November – 1 December 2023, Nutrition & Wellbeing in Oceania

Bitter taste sensitivity and frequency of bitter food intake in healthy Australian adults: a cross-sectional, mixed-methods study

S. Chen[1], L. Hassan[2], A. Turner[3], L. Newman[4], J. Danaher[4] and J. Biesiekierski[1,2]
[1]*Department of Nutrition, Dietetics & Food, Monash University, Notting Hill, Australia*
[2]*Department of Dietetics, Nutrition and Sport, La Trobe University, Bundoora, Australia*
[3]*General Practice Clinical Unit, Faculty of Medicine, University of Queensland, Australia*
[4]*School of Science, STEM College, RMIT University, Bundoora, Australia*

Bitter taste perception plays a dual role in human nutrition and evolutionary biology; being identifiable in nutrient-dense foods such as cruciferous vegetables and historically signalled toxic compounds. The *TAS2R38* gene, part of the taste 2 receptor family, is central to individual differences in bitter taste perception(1). While genetic variations are influential, dietary habits and food preparation also impact taste perception. However, research investigating the interplay between these factors and genetic variations in influencing bitter taste sensitivity and food intake is limited. This study aimed to elucidate the relationship between bitter taste sensitivity and TAS2R38 haplotype variations in the context of bitter food consumption among Australian adults. A cross-sectional, mixed-methods study was conducted. Healthy adults who had maintained a stable diet for at least three months were eligible. Data collection was via an online survey (REDCap), capturing self-reported demographics, dietary patterns specific to bitter foods including metrics of bitter food avoidance, frequency, liking and perceived healthfulness, alongside a Dietary Quality Index (DQI) derived from a food frequency questionnaire(2). Bitter taste sensitivity was assessed using self-reported intensity perceptions of 6-n-propylthiouracil (PROP) taste strips(3). Genotyping was conducted via TaqMan qPCR assays on DNA extracted from buccal swabs to ascertain *TAS2R38* haplotypes. Data analysis utilised Analysis of Covariance (ANCOVA) and regression models, with all tests adjusted for confounding variables such as gender, age, and smoking status. A total of 222 participants (47.5 ± 17.7 years; 86% female; BMI 27.3 ± 7.1 kg/m^2) completed the study. PROP sensitivity was strongly correlated with *TAS2R38* haplotype, with supertasters predominantly having PAV/PAV, medium tasters with PAV/AVI, and non-tasters with AVI/AVI ($p = 0.002$). However, no relationship was observed between PROP sensitivity and either the frequency, liking, or avoidance of bitter foods ($p>0.05$). DQI was significantly related to bitter food consumption; individuals in the lowest DQI quintile consumed bitter foods more frequently than those in the third ($p = 0.007$) and top quintiles ($p = 0.001$). The perceived healthfulness of bitter foods was significantly higher in those with AVI/AVI haplotypes (non-tasters) compared to those with PAV/AVI (medium tasters) ($p = 0.001$). Counterintuitively, participants who reported greater enjoyment of bitter tastes consumed bitter foods less frequently ($p<0.001$). Our study confirms that *TAS2R38* variants are predictive of PROP taste sensitivity, consistent with literature that identifies PAV/PAV individuals as supertasters. However, neither PROP sensitivity nor *TAS2R38* haplotype influenced bitter food frequency or preference consumption patterns. Interestingly, those with lower Dietary Quality Index scores and less enjoyment of bitter taste consumed bitter foods more often. These observations highlight the need to investigate other factors influencing bitter food intake, such as additional sensory characteristics or psychological and behavioural aspects.

Keywords: bitter sensitivity; bitter food intake; diet quality

Ethics Declaration

Yes

Financial Support

This work was supported by a La Trobe University School of Allied Health Project Grant; and, La Trobe-RMIT Joint ECR Funding (LN, JD, JB).

References

1. Beckett EL, Martin C, Yates Z *et al.* (2014) *Food & Function* **5**, 3040–3054.
2. Milte CM, Thorpe MG, Crawford D *et al.* (2015) *Exp Gerontol* **64**, 8–16.
3. Tepper BJ (2008) *Annu Rev Nutr* **28**, 367–88.