Fatty Acids Enhance the Perceived Taste Intensity of Non-Nutritive Sweeteners, Saccharin & Sucralose, in Male and Female Rats.

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Abstract

Non-nutritive sweeteners are becoming increasingly popular as an alternative to sucrose as people begin looking for non-caloric alternatives to sugar. However, it is widely reported that these non-nutritive sweeteners can taste bitter at higher concentrations. Previous research by Loney et al (2011) demonstrated that rats either prefer or avoid non-nutritive sweeteners at high concentrations. The present study set out to extend the findings of Loney et al. by adding a fatty acid to different concentrations of non-nutritive sweeteners. Our previous research demonstrated a conditioned taste aversion paradigm in which rats detect the presence of linoleic and oleic acids at high and low concentrations. It is suggested that fatty acids intensifies the perception of taste. Because of this, we propose that rats that are avoiders will avoid sucralose at lower concentrations and preferers will prefer sucralose at lower concentrations than either group without linoleic acid. We also set out to determine that preference or avoidance of sucralose extended to, saccharin, another non-nutritive sweetener. Avoiders and preferers were determined by a series of two-bottle preferences tests with increasing concentrations of sucralose and water. Short-term testing using a Davis Rig supported our hypothesis that the addition of linoleic acid would intensifies the avoiding and preferring behavior of different groups (avoiders or prefers). The results suggest, for the first time, that the presence of linoleic acid intensifies bimodal preferences of sucralose, but not saccharin.