

# Effect of drinking water minerals on sweetness and metallic taste perception and emotional response of sweetened beverage

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## Abstract

Taste of drinking water can vary largely due to differences in mineral composition. However, how water chemistry interacts with beverage ingredients and influences final taste perception is rarely reported. The objective of this study was to evaluate the taste perception between interaction of different drinking waters that varied in concentrations of minerals and different types of sweeteners, and characterize the corresponding emotional profiles. Five natural and artificial sweeteners [sucrose, honey, sucralose, saccharin, and acesulfame potassium (ace-K)] at equivalent sweetness levels were individually combined with four synthetic waters (soft water, moderate hard water, hard water and very hard water). Based on pairwise ranking tests, higher concentration of water minerals significantly increased ( $p < 0.05$ ) sweetness perception of sucrose, honey and ace-K, but significantly decreased ( $p < 0.05$ ) perceived sweetness of sucralose. Changes in water minerals did not influence sweetness of saccharin. However, saccharin and ace-K intensified metallic aftertaste to soft and moderate hard water. As iron is one of the most common minerals in natural water, its effect on acceptability and emotional response on sucrose sweetened beverages was investigated. Based on 9-point hedonic scale and check-all-that-apply emotional term ballot, iron (3 mg Fe<sup>2+</sup>/L) created metallic flavor in drinking water that produced *bored* and *disgusted* feelings. Taste interaction between sweet (sucrose) and metallic flavor (ferrous ions) significantly ( $p < 0.05$ ) increased acceptance of very hard water (3 mg Fe<sup>2+</sup>/L), and created a unique emotional profile- “mild”. Water minerals had the potential for amplifying sweetness of sweeteners, and sucrose may increase acceptability of drinking water with metallic flavor.