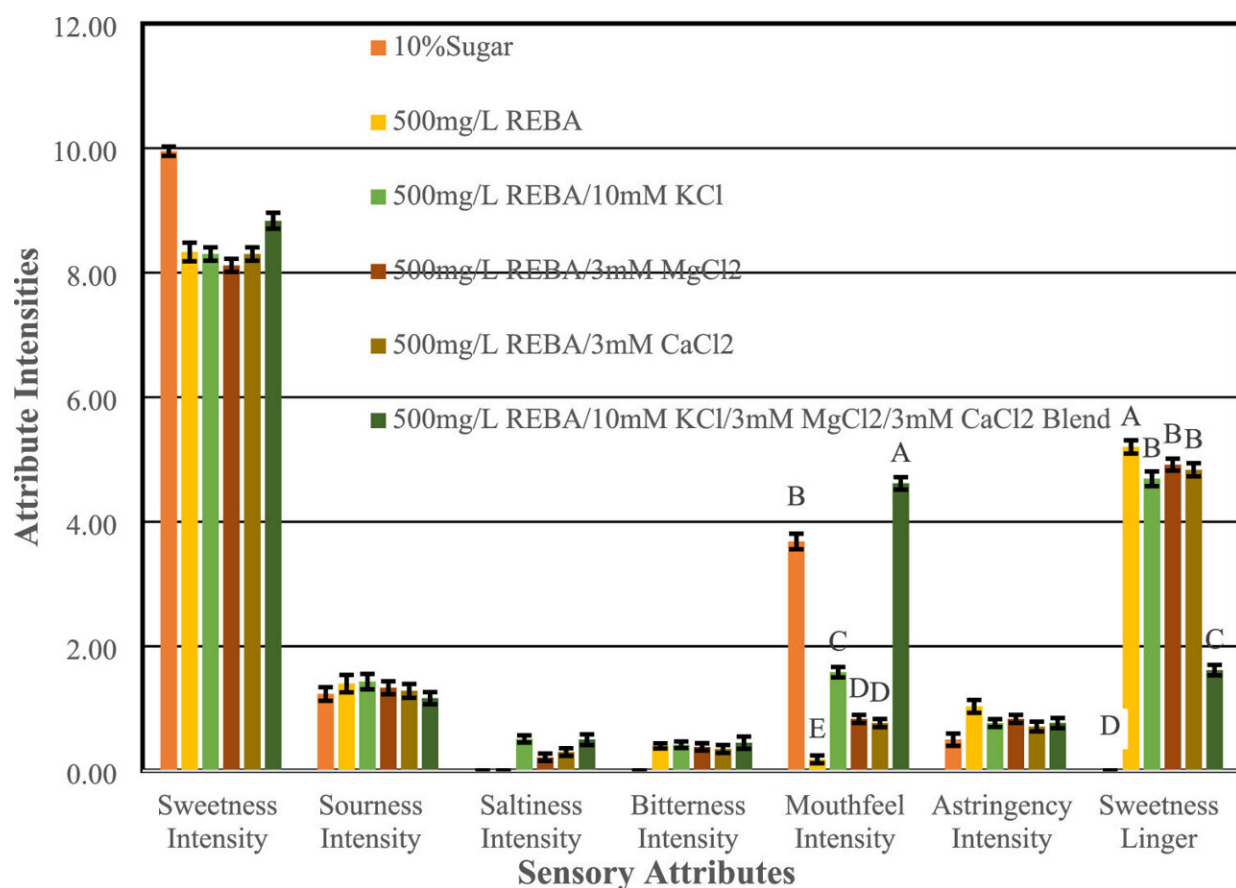


A 'pinch' of mineral salts helps the noncaloric sweeteners go down

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Effects of KCl, MgCl₂, CaCl₂, and a KCl/MgCl₂/CaCl₂ blend on 500 mg/L REBA taste in a CA/TPC buffer in comparison to the taste of sucrose in a CA/TPC buffer. The error bars represent 1 SE. For mouthfeel intensity and sweetness linger, any two samples with no letters in common are significantly different at the 99% confidence level based on Tukey's HSD post hoc test.

Credit: *Journal of Agricultural and Food Chemistry* (2023). DOI: 10.1021/acs.jafc.3c01144

Perfect noncaloric replacements for sugar and high fructose corn syrup just don't exist yet. For example, some alternatives have a lingering sweet aftertaste and lack a sugar-like mouthfeel, leaving consumers unsatisfied. Now, researchers, publishing in the *Journal of Agricultural and Food Chemistry*, propose adding blends of nutritionally important mineral salts to make noncaloric sweeteners seem more like the real thing. Taste-testers indicated that these blends gave zero- and low-calorie drinks a better flavor.

Sugar substitutes are often used in sodas, baked goods and frozen desserts, to appeal to people who want lower-calorie or low-sugar treats. But many natural or synthetic noncaloric sweeteners, such as stevia and aspartame, have a delayed sweetness, which lasts long after a food or drink is consumed.

These substances also don't usually have the same mouthfeel as real sugar. Previously, Grant DuBois and colleagues observed that [sodium chloride](#) and potassium chloride could accelerate the onset of sweetness and eliminate its persistence for one stevia compound, rebaudioside A.

They hypothesized that the salts compress the mucus hydrogel covering [taste buds](#) to allow rebaudioside A molecules to get through and then leave more quickly. But high concentrations were needed to achieve the desired effects, which led to off-tastes. So, the researchers wanted to test other mineral salts on commercially available noncaloric sweeteners to see if the products that they are used in could be improved.

In initial tests with a trained sensory panel, the researchers observed that [calcium chloride](#), [magnesium chloride](#) and [potassium chloride](#) each separately reduced the perceived intensity of rebaudioside A after two minutes. However, again, high amounts of the mineral [salt](#) were needed

to lower the intensity by more than 30%, which caused unpleasant saltiness or bitterness sensations. Next, mixing the three taste-modifying salts had synergistic effects, allowing the team to use lower amounts of each for the same effect. A blend of the potassium, magnesium and calcium salts reduced the lingering sweetness up to 79% and markedly increased the sugar-like mouthfeel of 10 noncaloric alternatives.

Some panelists still reported a slight saltiness in a few sugar substitute formulations with the all-chloride mineral salt blends. So, the team tested reduced-chloride versions in two commercial zero-calorie colas, resolving the faint salty off-taste issue and greatly improving the taste of the beverages.

Additionally, they added salt blends to a reduced-calorie orange juice and a commercial citrus-flavored soft drink made with [high fructose corn syrup](#), which made both beverages taste more like they contained sugar. The researchers say that they have a promising solution for replicating the taste of real sugar in low- and zero-calorie beverages.

More information: Grant DuBois et al, Replication of the Taste of Sugar by Formulation of Noncaloric Sweeteners with Mineral Salt Taste Modulator Compositions, *Journal of Agricultural and Food Chemistry* (2023). [DOI: 10.1021/acs.jafc.3c01144](https://doi.org/10.1021/acs.jafc.3c01144)

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