



TECHNICAL BULLETIN

A Naturally-Derived Flavor Carrier as an Ingredient in Beverage Systems

Background

Previous research documented flavor, bitterness, and sweetness change in several food and beverage products when Zemea® USP-FCC propanediol was included at 0.1% to 1% (1,000 – 10,000 ppm). It was hypothesized that Zemea® USP-FCC could serve as a flavor carrier and enhance certain inherently bitter flavor systems.

Method

Six panelists experienced in the evaluation of food and beverages screened Zemea® USP-FCC at 5, 20, and 100 ppm in a reduced sugar stevia sweetened orange juice. The reduced sugar stevia sweetened orange juice containing no Zemea® USP-FCC was used as the control. The trained panelists tasted the beverage with and without Zemea® USP-FCC and discussed their perceptions of flavor indicating whether the test or the control product was sweeter, more bitter, and had a stronger overall flavor. The samples containing Zemea® USP-FCC at 5 ppm were identified as having the lowest bitterness perception and were used for paired comparison testing with a larger panel against the control containing no Zemea® USP-FCC.

Paired comparison tests for bitterness were conducted on 40 untrained panelists. The reduced sugar stevia sweetened orange juice was used as the control and was prepared with 0.0005% Zemea® USP-FCC (5 ppm) as the test variable. The products were served in 2-ounce soufflé cups labeled with 3-digit codes at refrigerated temperatures. The panelists were asked to identify the sample that was more bitter. Bottled water and unsalted crackers were available for panelists to clear their palates before and during testing.

Results

The reduced sugar stevia sweetened orange juice without Zemea® USP-FCC was statistically more bitter than the orange juice containing Zemea® USP-FCC (p-value 0.04, one-tailed). It could be hypothesized from these results that Zemea® USP-FCC is effective at making a noticeable difference in the perceived bitterness of beverages resulting in lower bitterness levels.

40 Untrained Panelist Evaluated Each Juice	Stevia Sweetened Orange Juice
Control Juice more bitter	26
PDO at 5 ppm more bitter	14
One-tailed “exact” p-value	0.04

Conclusion

- Adding Zemea® USP-FCC directly at 5 ppm levels to a reduced sugar orange juice matrix with stevia was statistically less bitter than a control containing no Zemea® USP-FCC (p-value).
- Zemea® USP-FCC as a flavor carrier is interacting with components in flavor systems and affecting the perceived bitterness of beverages. Zemea® USP-FCC at 5ppm levels is not expected to have an organoleptic effect on its own.
- These test results indicate that further investigations into using Zemea® USP-FCC as a beverage ingredient will be pursued.
- Zemea® USP-FCC is a pure, naturally-derived carrier and solvent for flavors and extracts. A welcome alternative to petroleum-based carriers, it offers flavorists and food technologists reduced bitterness and enhanced sweetness in food and beverage products, and provides unique solubility properties for flavoring compounds. Other uses include processing aid and humectant.

NOTE:

DuPont Tate & Lyle Bio Products Company, LLC utilized the testing and evaluation services of parent Tate and Lyle – Americas for the work discussed in this Technical Bulletin.

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