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Technically Speaking

Targeting Texture for Instant Protein Beverages

Health and wellness trends continue to penetrate the instant beverage category as consumer demand drives growth for nutritionally fortified products. Subsequently, product developers are challenged with creating innovative, consumer-friendly beverages that maximize nutritional value without negatively impacting sensory attributes.

Fortified instant beverages have an increased amount of perceivable particulates due to the addition of vitamin-mineral blends, fiber, protein and other nutritional ingredients.

These ingredients, especially the protein selection, also can increase the astringency of the beverage. As a result, the textural properties of the finished beverage are impacted.

To target texture in these protein beverages, product developers can leverage the benefits of single ingredient hydrocolloid solutions, such as xanthan gum, or they can take advantage of the synergies found in hydrocolloid systems.

Ticaloid® Ultrasmooth, from TIC Gums, is a hydrocolloid system that enhances texture in instant protein beverage applications. This cold water soluble system dissolves easily into solution allowing consumers to experience the textural benefits upon reconstitution.

Objective

To determine the impact of hydrocolloids on texture in an instant protein beverage through the descriptive sensory evaluation of a control sample (containing no hydrocolloids), a single ingredient hydrocolloid sample (xanthan gum), and a hydrocolloid system sample (Ticaloid® Ultrasmooth).

Sensory Evaluation Methods

To compare the Ticaloid® Ultrasmooth, xanthan gum, and the control samples, instant chocolate protein beverages were developed by the Gum Gurus®(Table 1). The usage level of the hydrocolloids in the finished beverage was 0.2%. TIC Pretested® Inulin LV 110 was used as a source of fiber in all three formulations.

Table 1. Sample Formulations of Dry Ingredients per Packet

Ingredients	Control (%)	Xanthan Gum (%)	Ticaloid® Ultrasmooth (%)
Whey Protein Isolate	41.37	40.96	40.96
Whey Protein Concentrate	9.20	9.10	9.10
Sugar	25.29	25.03	25.03
TIC Pretested® Inulin LV 110 Powder	9.20	9.10	9.10
Cocoa Powder	4.83	4.78	4.78
Sweetness Enhancer	0.57	0.57	0.57
Vanilla Flavor	0.69	0.68	0.68
Chocolate Flavor	1.15	1.14	1.14
Vitamin-Mineral Blend	7.13	7.05	7.05
Salt	0.57	0.57	0.57
Xanthan Gum	0.00	1.02	0.00
Ticaloid® Ultrasmooth Powder	0.00	0.00	1.02
Total	100.00	100.00	100.00

Sensory Evaluation Methods Continued

An independent research facility conducted the sensory testing and analysis. Samples were prepared by adding 1 packet (44g) to 6 ounces of deionized water in a protein shaker bottle. The samples were then shaken manually for 25 seconds and allowed to rest for one minute before evaluation. Samples at 21°C, in lidded soufflé cups with random three-digit codes were presented to six trained descriptive analysis panelists. Each sample was then evaluated in duplicate for the following textural attributes* using a 15 point scale:

- Viscosity (initial)
- Slipperiness (manipulation)
- Awareness of Particulates
- Mouth Clearing
- Astringent (chemical)

* Definitions and scale information for the textural attributes can be found in Table 4.

Descriptive Analysis Results

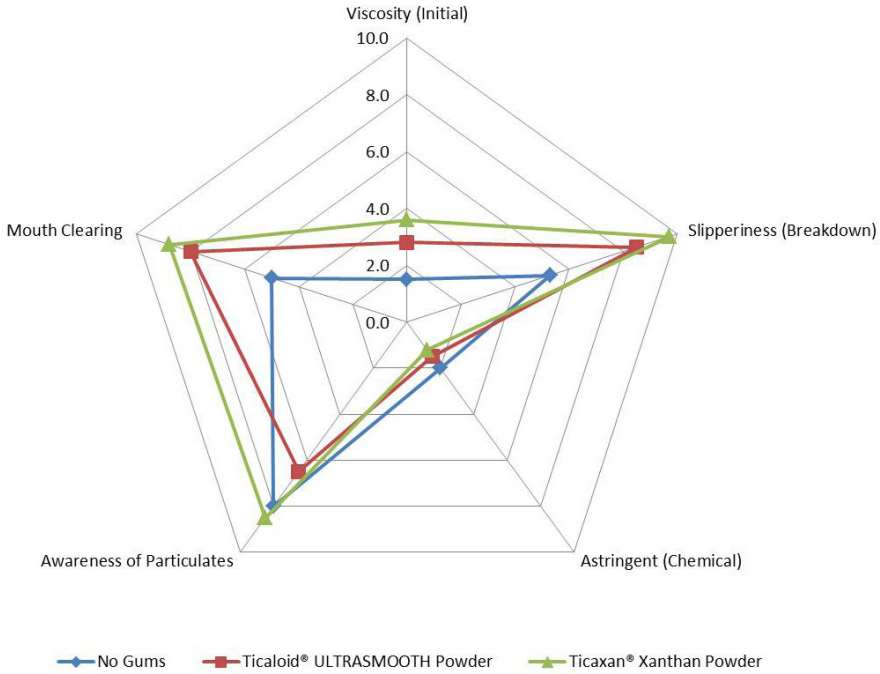
Results show that although panelists determined the flavor profile to be consistent with that of the marketplace, the addition of hydrocolloids impacted the textural attributes evaluated.

Table 2. Descriptive Analysis Results*

Attribute	Control (No Hydrocolloids)	Xanthan Gum	Ticaloid® Ultrasmooth
Viscosity	1.5 c	3.6 a	2.8 b
Slipperiness	5.3 c	9.7 a	8.5 b
Awareness of Particulates	8.0 b	8.5 b	6.5 a
Mouth Clearing	5.0 c	8.8 a	8.0 b
Astringent	2.0 a	1.2 b	1.5 b

*Means that do not share a letter are significantly different ($p < 0.05$)

Figure 1. Texture Profiles of Instant Protein Beverages



The samples that contain hydrocolloids (xanthan gum and Ticaloid® Ultrasmooth) display a substantial increase in viscosity compared to the control. Sample viscosity was measured using a Brookfield LV Viscometer at 20 rpm (Table 3). Panelists also were able to detect significant viscosity differences during their sensory analysis ($p < 0.05$).

Table 3. Sample Viscosities

Sample	Viscosity (cP)
Control (No Hydrocolloids)	3.3
Xanthan Gum	126.3
Ticaloid® Ultrasmooth	59.1

Samples containing hydrocolloids also had noticeably higher slipperiness and mouth clearing compared to the control. The sample containing xanthan gum had the highest slipperiness and fastest mouth clearing and the sample containing Ticaloid® Ultrasmooth fell between the control and the xanthan gum sample for both attributes. All three samples were significantly different for slipperiness and mouth clearing ($p < 0.05$).

Furthermore, sensory panel evaluations showed that samples containing hydrocolloids were significantly less astringent compared to the control ($p < 0.05$).

Panel results also demonstrated significantly less awareness of particulates in the sample containing Ticaloid® Ultrasmooth compared to the other samples ($p < 0.05$). Formulating with Ticaloid® Ultrasmooth more effectively decreases the perception of grit in the finished beverage than using a single ingredient hydrocolloid solution, such as xanthan gum.

Conclusion

Samples with hydrocolloids show a measurable impact on texture in comparison to the control. The sensory evaluation determined there was an increase in viscosity, slipperiness, and mouth clearing while decreasing astringency. Ticaloid® Ultrasmooth shows an advantage over xanthan gum in reducing the perception of particulates in the finished beverage.

Use of Ticaloid® Ultrasmooth in instant protein beverages containing vitamin-mineral blends, fiber, and other nutritional ingredients enhances the texture, creating a smoother finished product.

Table 4. Texture Revolution® Lexicon Terms

Texture Lexicon Term	Texture Lexicon Definitions	Typically Associated Consumer Terms	Scale (0-15)
Viscosity (Initial)	Rate of flow per unit force: the force to draw between lips from spoon, and the rate of flow across tongue.	Thickness	0 = Low viscosity 15 = High viscosity
Slipperiness (Manipulation)	Ease to slide product over lips.	Slickness or sleekness	0 = Not slippery 15 = Very slippery
Astringent (Chemical)	The feeling on the tongue or other skin surfaces of the oral cavity described as puckering/ dry and associated with tannins or alum.	Mouth drying associated with products such as strong brewed tea	0 = Not astringent 15 = Very astringent
Awareness of Particulates (Breakdown)	Amount of grainy, gritty, or lumpy particles or other inclusions in the mass.	Not smooth, gritty or grainy	0 = No awareness of particulates 15 = High awareness of particulates
Mouth Clearing	The speed with which the sample clears from the mouth after swallowing or expectorating.	Easy to swallow	0 = Very slow clearing speed 15 = Very fast clearing speed

Components of Texture

Visit **www.texturerevolution.com** to learn about the Texture Revolution® and how we help provide a common language for developers to assess the textural components of food and beverages.

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The Gum Gurus® will work with you to interpret this information and recommend the best texture solutions.

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