



Caramel Color Replacement in Dressings & Sauces

ADS TECHNICAL COMMITTEE MEETING
SUNDAY, APRIL 28, 2019

Presentation Outline

- ▶ Committee Members
- ▶ Project Overview
- ▶ Caramel Color Replacement in Balsamic Vinaigrette
- ▶ Caramel Color Replacement in BBQ Sauce
- ▶ Regulatory Overview

Caramel Color Replacement Committee Members

- ▶ Zach Bender Brooks' Bottling Co.
- ▶ Ryan Brooks Brooks' Bottling Co.
- ▶ Amanda Cypher Wisconsin Spice
- ▶ Michael Donovan Sensient Natural Ingredients
- ▶ Leslie Drew Ingredion
- ▶ Darian Fuselier Chesapeake Spice
- ▶ Seth Hinton TreeHouse / Bay Valley Foods

Caramel Color Replacement Committee Members

- ▶ Dave Horowitz DuPont Nutrition & Health
- ▶ Caitlin Jamison Jungbunzlauer
- ▶ Karen Jensen Reily Foods Co
- ▶ Alysha Kane Ken's Foods
- ▶ Joel Minkoff Brooks' Bottling Co
- ▶ Jim Patacchiola Brooks' Bottling Co
- ▶ Rick Perez Sunsweet Growers

Project Overview

- ▶ To see if there are practical alternatives for Caramel Color
- ▶ Selected two Caramel Color Targets: one for Balsamic and the other for BBQ
- ▶ “Cost in Use” was not a consideration for this project
- ▶ Limited Time for Qualitative Color Stability Evaluation
- ▶ This Report is Non-Commercial

Caramel Color Replacement – Balsamic Vinaigrette

- FRUIT & VEGETABLE EXTRACT - A
- FRUIT EXTRACT - B
- FRUIT EXTRACT – C
- ROASTED BARLEY MALT - D
- CARAMELIZED APPLE CONCENTRATE – E
- CARAMELIZED ONION JUICE - F
- ROASTED BARLEY MALT - G
- PRUNE JUICE CONCENTRATE - H

Generic Balsamic Formula Overview

	Reference – Non Caramel Color Balsamic	Target – Balsamic with Added Caramel Color
Ingredients	%	%
Non Caramel Color Balsamic	20.0000	20.0000
Sucrose	16.5000	16.5000
Red Vinegar 100 Grain	8.0000	8.0000
Water	37.2500	37.0500
PGA	0.0800	0.0800
Xanthan Gum	0.2200	0.2200
EDTA	0.0075	0.0075
Garlic Powder	0.1000	0.1000
Black Pepper	0.1400	0.1400
Salt	1.7000	1.7000
Dijon Mustard	0.5000	0.5000
Olive Oil	6.0000	6.0000
Soybean Oil	8.5000	8.5000
<i>Caramel Color – Class IV</i>	-	<i>0.2000</i>
Total	100.0000	100.0000

Balsamic Vinaigrette

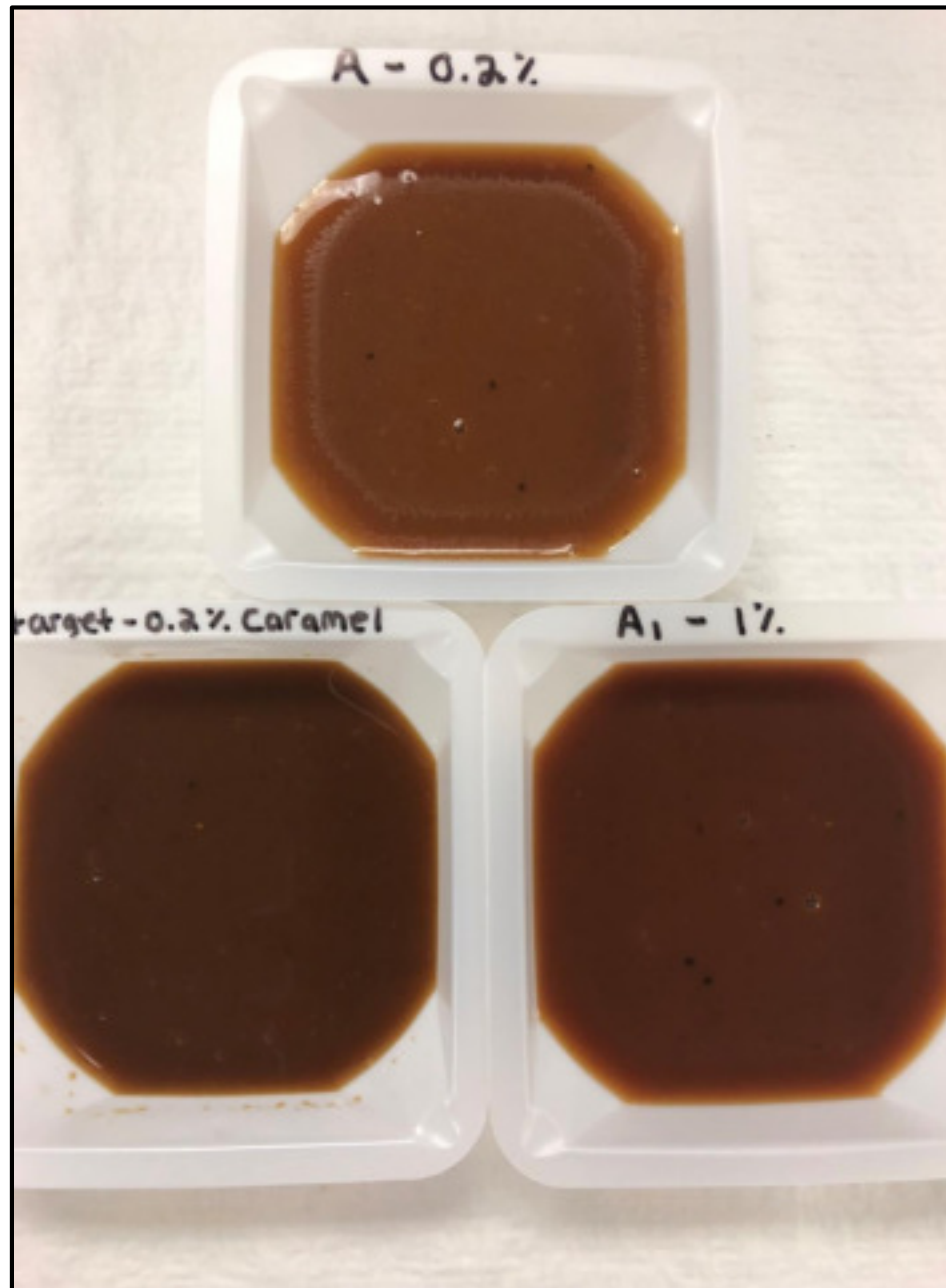
Balsamic – No Caramel Color



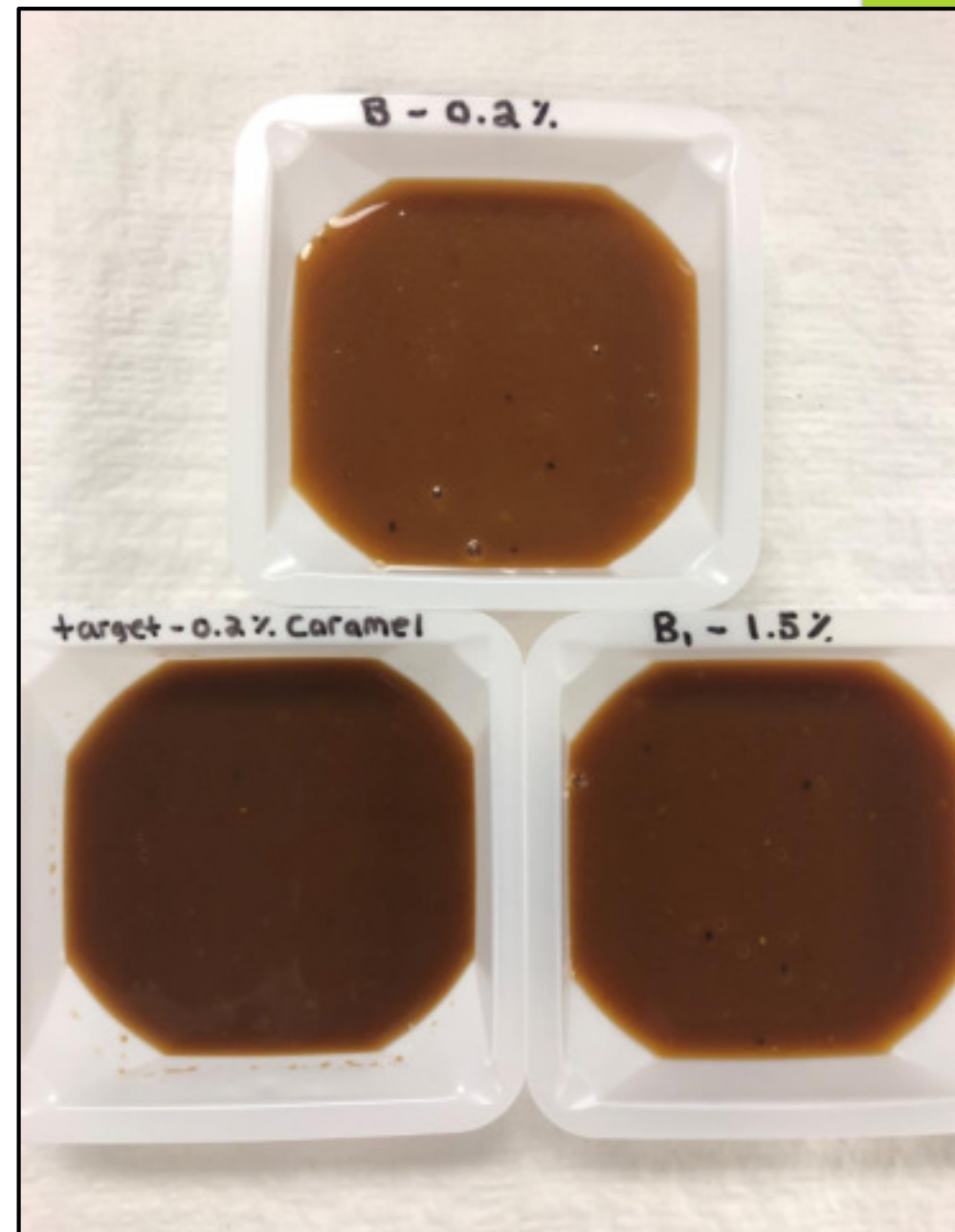
Target – 0.2% Caramel Color



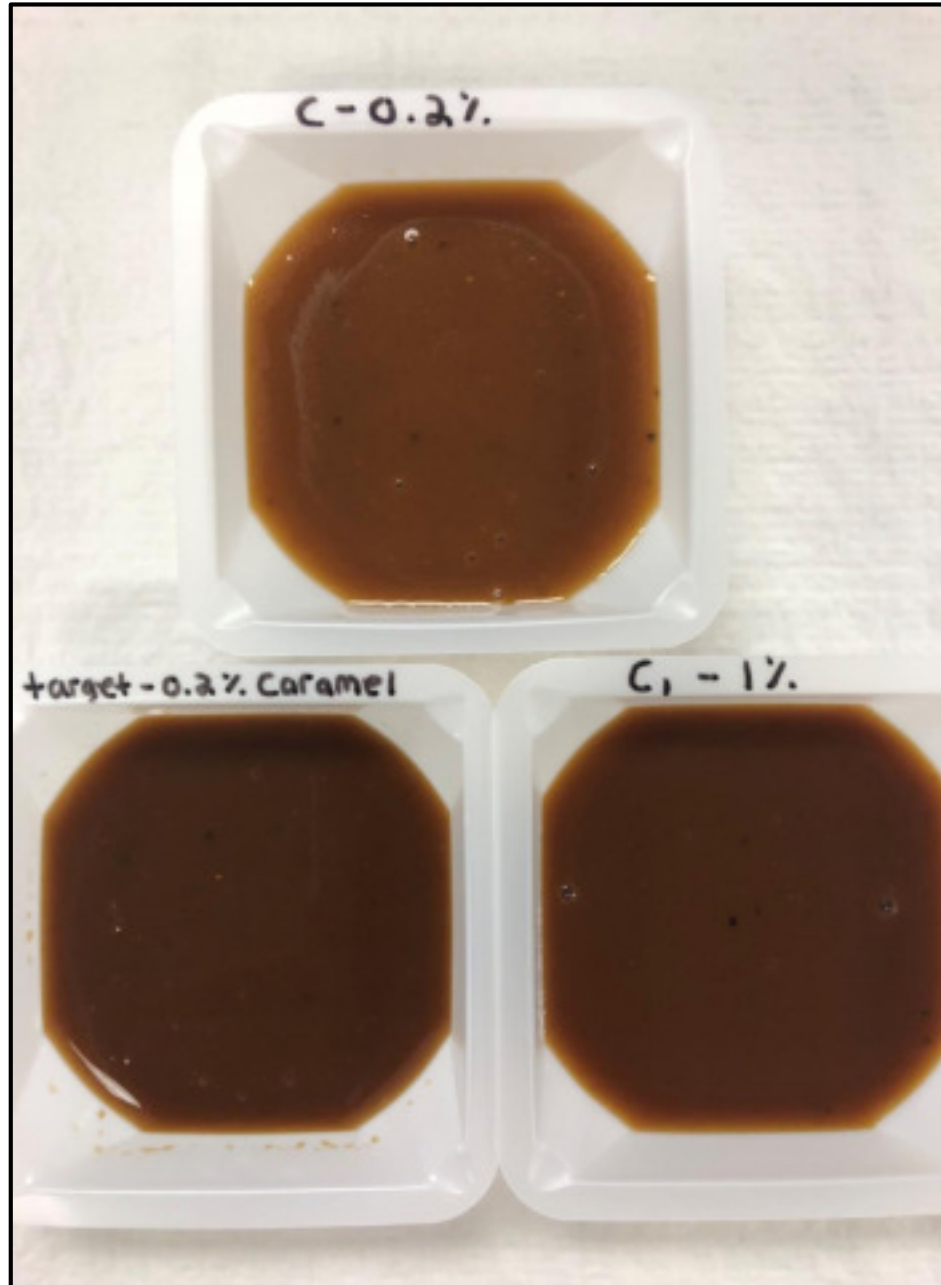
► Fruit & Vegetable Extract - A



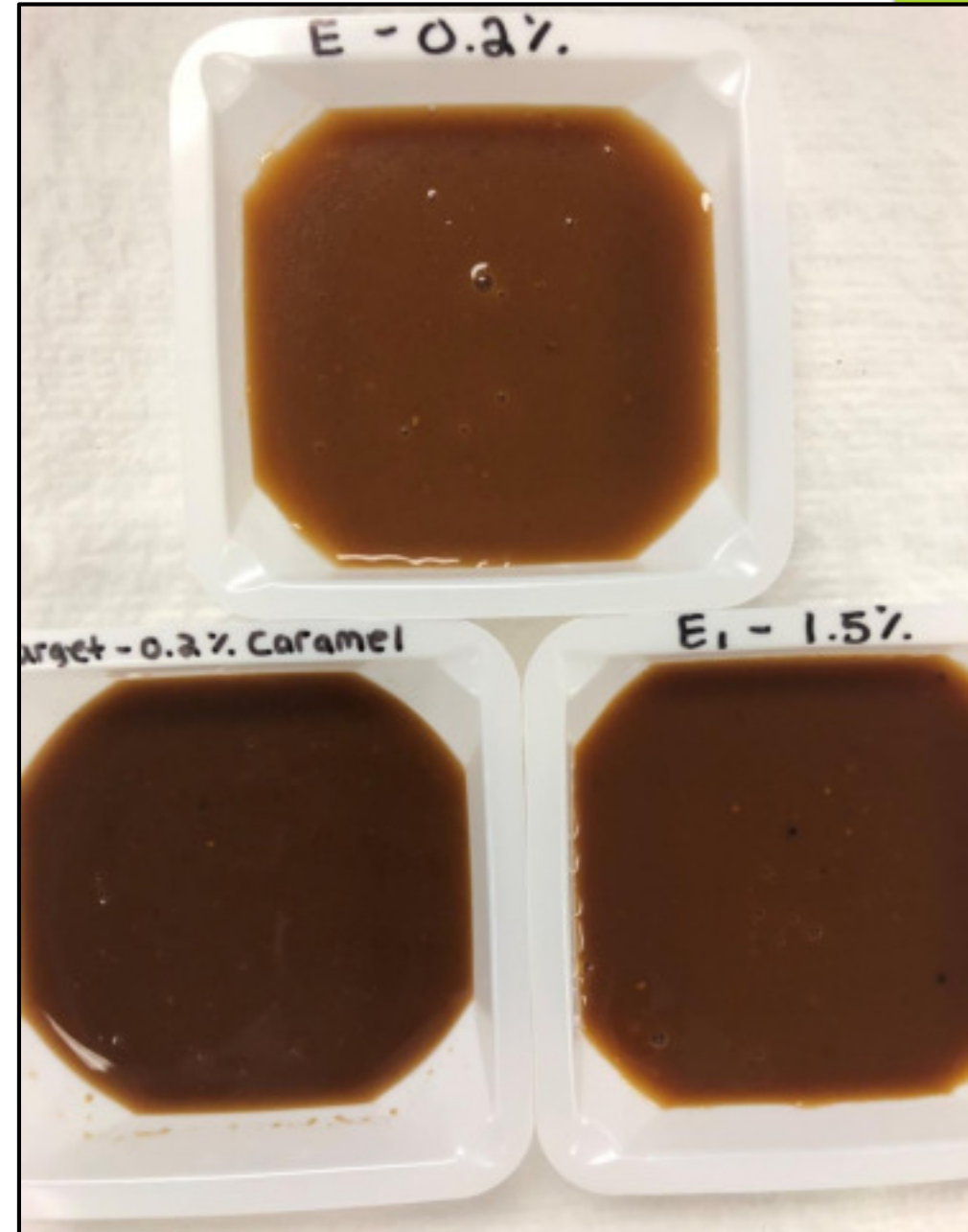
► Fruit Extract - B



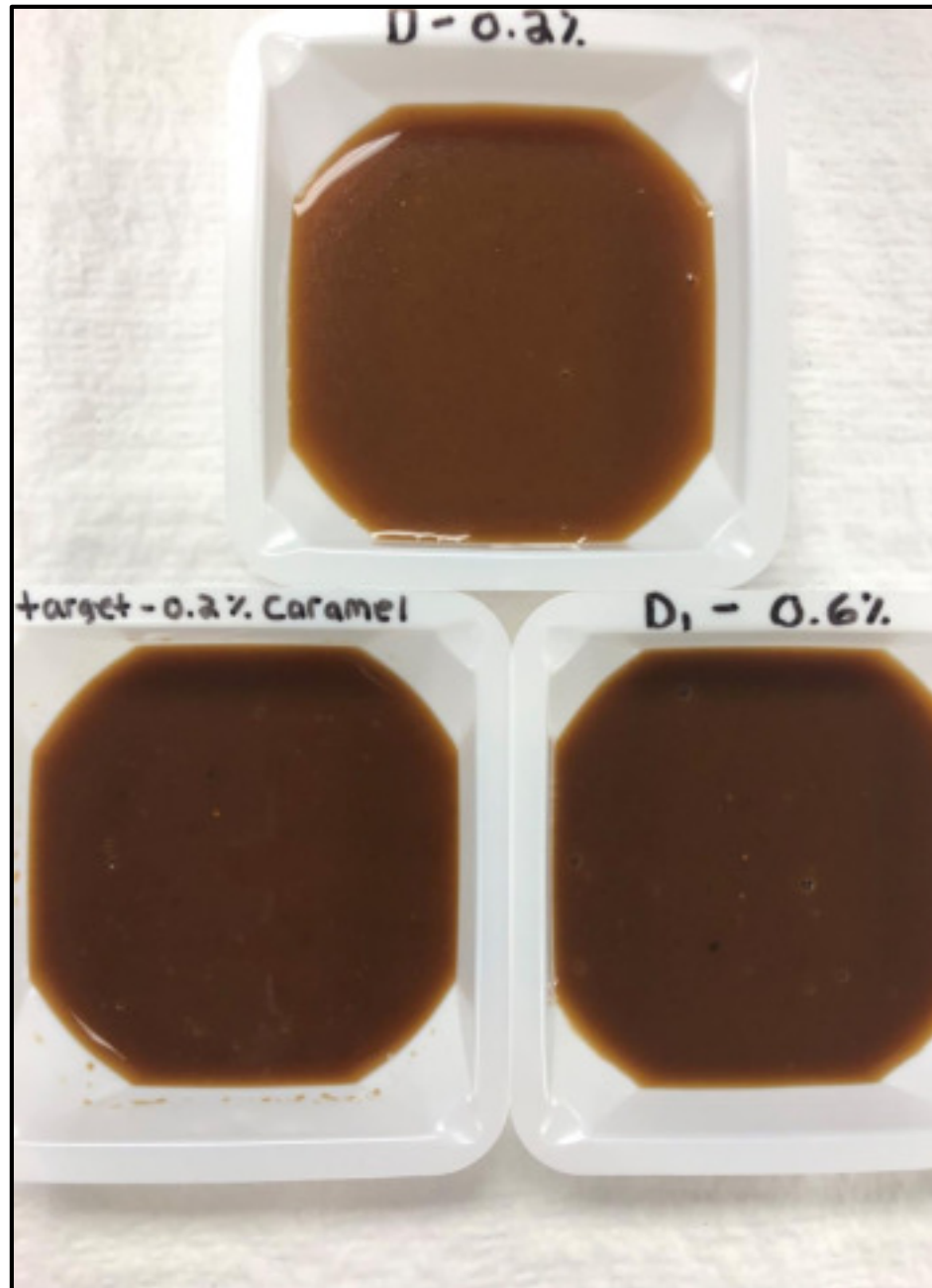
► Fruit Extract - C



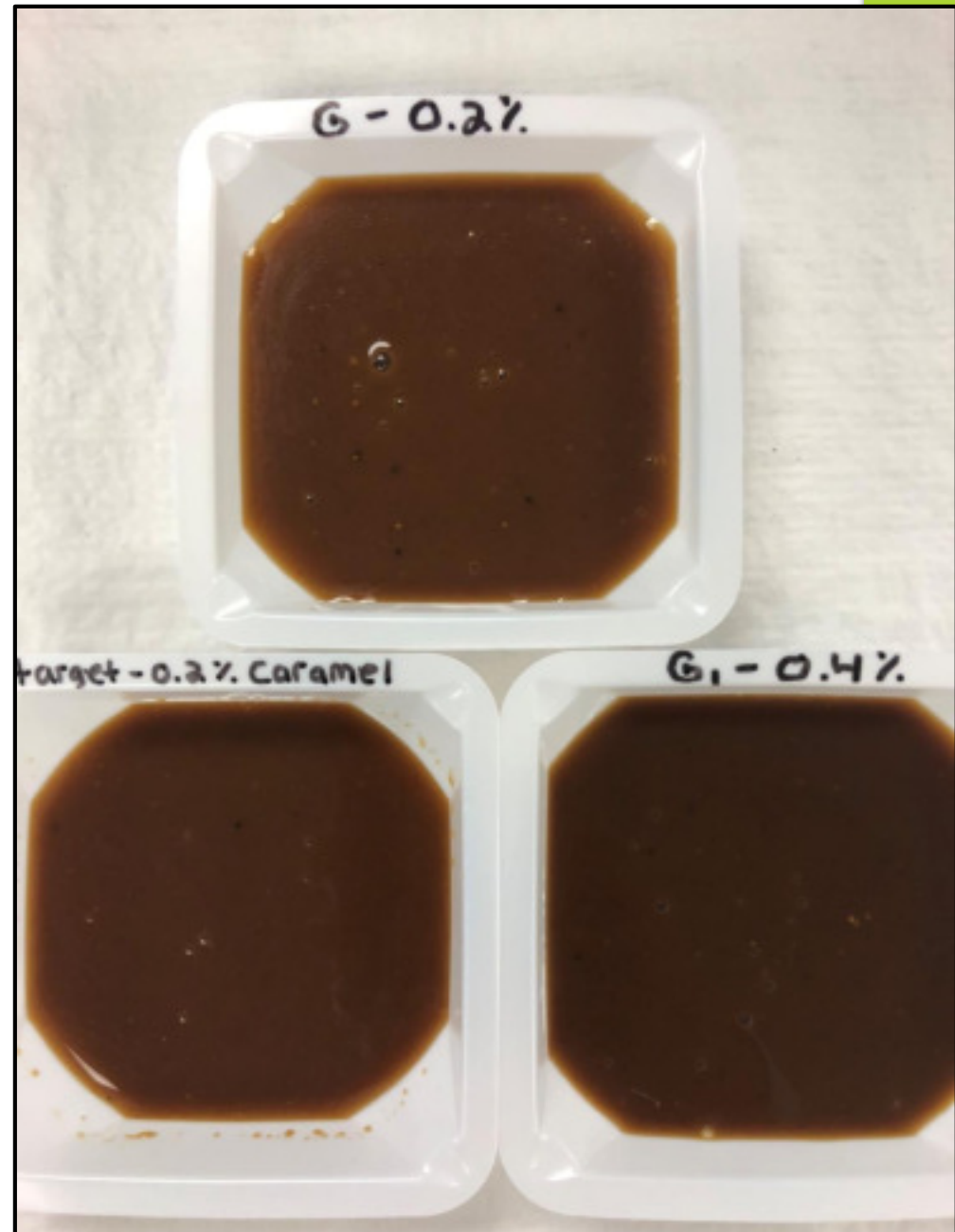
► Caramelized Apple Concentrate - E



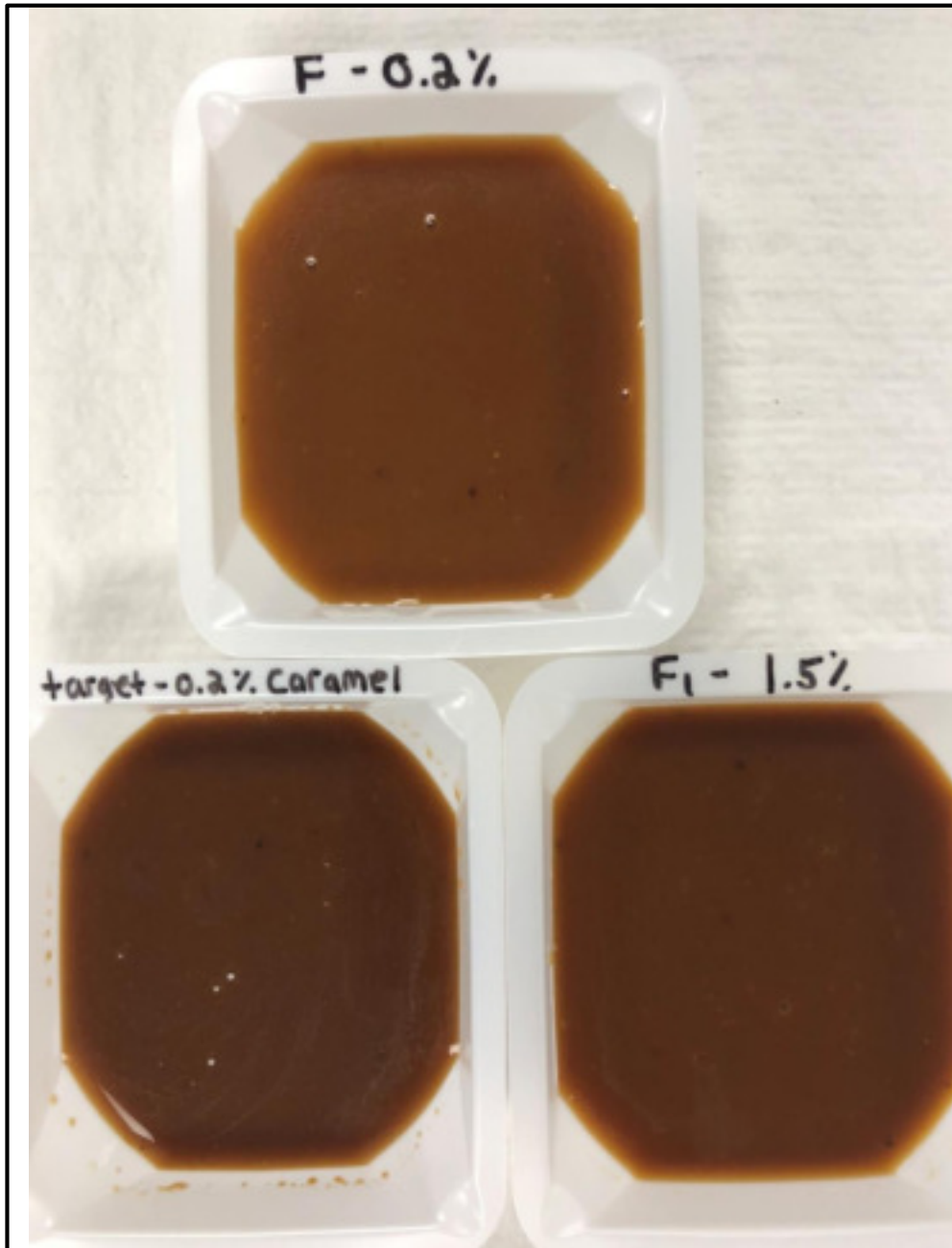
► Roasted Barley Malt - D



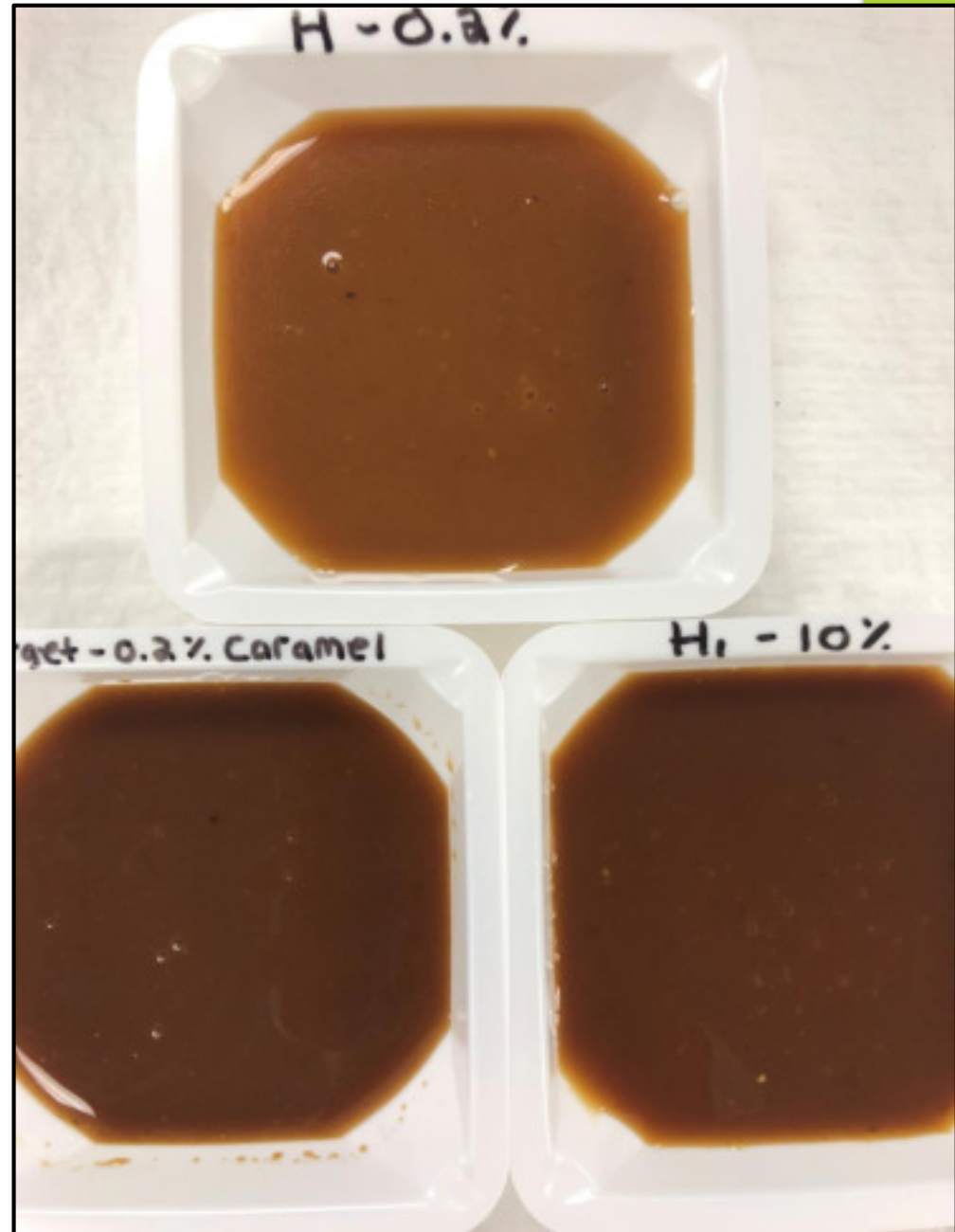
► Roasted Barley Malt - G



► Caramelized Onion Juice - F

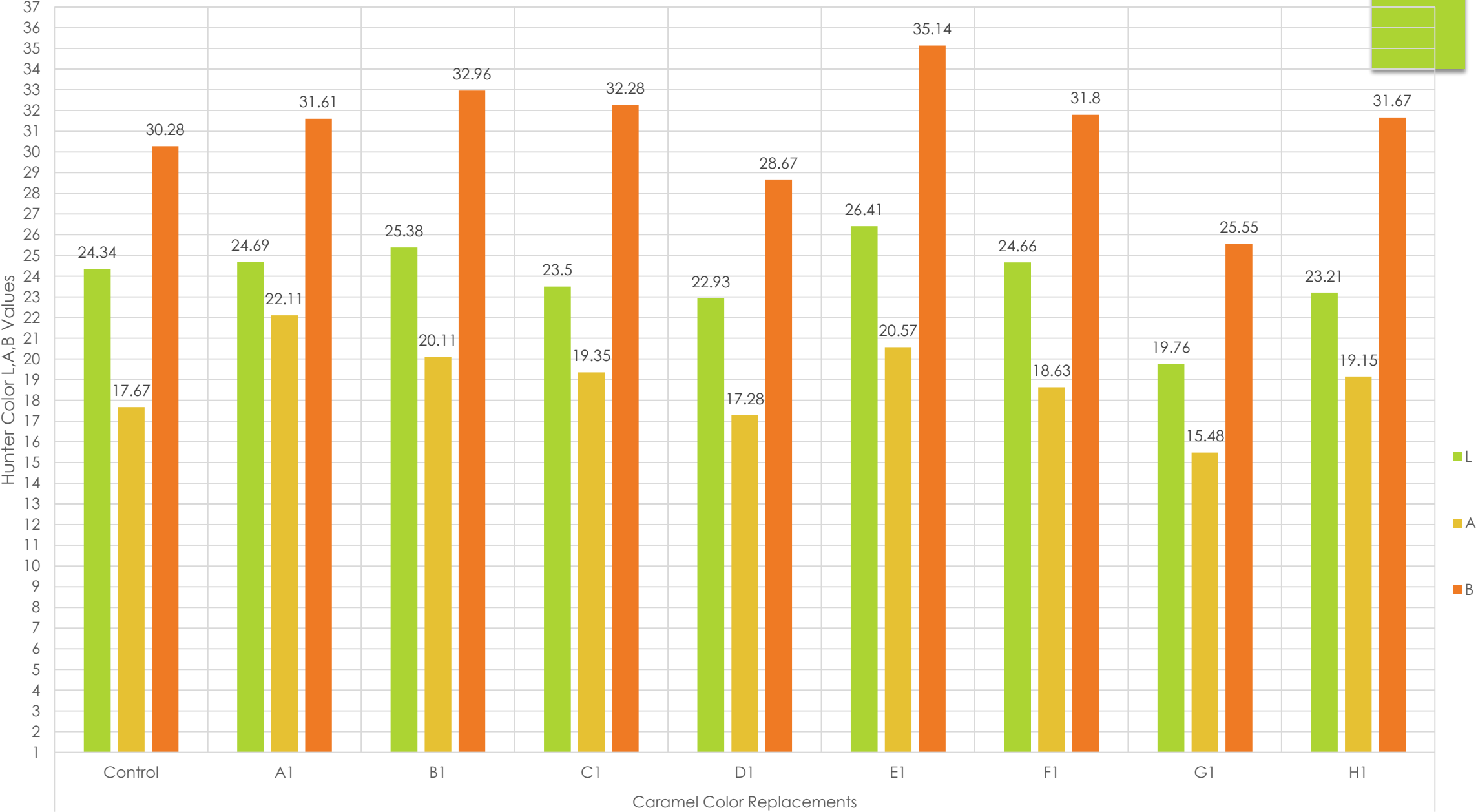


► Prune Juice Concentrate - H



ADS Caramel Color Replacement - Balsamic Vinaigrette			
Product Name	Code #	Use Level (%)	Flavor Comments
Fruit & Vegetable Extract	A	0.2	Similar in flavor
	A1	1	
Fruit Extract	B	0.2	Similar in flavor
	B1	1.5	Slight raisin note, not as bright/sharp
Fruit Extract	C	0.2	Similar in flavor
	C1	1.5	Noticeable stone fruit/prune flavor
Roasted Barley Malt	D	0.2	Similar in flavor
	D1	0.6	
Caramelized Apple Concentrate	E	0.2	Similar in flavor
	E1	1.5	
Caramelized Onion Juice	F	0.2	Hints of onion
	F1	1.5	Very strong caramelized onion
Roasted Barley Malt	G	0.2	Slight malt notes
	G1	0.4	Slight malt notes, not as sweet/bright
Prune Juice Concentrate	H	0.2	Similar in flavor
	H1	10	Very strong prune flavor

ADS - Caramel Color Replacement Hunter Color L,A,B values



Caramel Color Replacement – BBQ Sauce

Generic BBQ Formula

Ingredient	Gram	%
Water	249.30	24.93%
Tomato Paste, 31% Solids	145.10	14.51%
Distilled Vinegar, 200 Grain	65.00	6.50%
Granulated Sugar	72.98	7.30%
High Fructose Corn Syrup 42DE	350.00	35.00%
Molasses	47.02	4.70%
Salt	32.00	3.20%
Flavor, Natural Smoke	2.90	0.29%
Modified Corn Starch, Novation 2300	15.00	1.50%
Onion Powder	6.00	0.60%
Garlic Powder	5.00	0.50%
Mustard Flour	7.50	0.75%
Celery Seed, Ground	0.50	0.05%
Pepper, Black [Butcher Grind / 8 Mesh]	0.20	0.02%
Xanthan Gum	1.50	0.15%
Total	1000.00	100.00%



Generic BBQ Formula [Target]

Ingredient	Gram	%
Water	247.30	24.73%
Tomato Paste, 31% Solids	145.10	14.51%
Distilled Vinegar, 200 Grain	65.00	6.50%
Granulated Sugar	72.98	7.30%
High Fructose Corn Syrup 42DE	350.00	35.00%
Molasses	47.02	4.70%
Salt	32.00	3.20%
Flavor, Natural Smoke	2.90	0.29%
Modified Corn Starch, Novation 2300	15.00	1.50%
Onion Powder	6.00	0.60%
Garlic Powder	5.00	0.50%
Mustard Flour	7.50	0.75%
Celery Seed, Ground	0.50	0.05%
Pepper, Black [Butcher Grind / 8 Mesh]	0.20	0.02%
Xanthan Gum	1.50	0.15%
Caramel Color	2.00	0.20%
Total	1000.00	100.00%



Caramel Color Replacement – BBQ Sauce

GENERIC BARBECUE SAUCE

BBQ SAUCE

Ingredient	% per Batch
Water	24.261
Tomato Paste, 30% solids	15
Distilled Vinegar, 20%	6.5
Brown Sugar	8
HFCS	35
Dark Molasses	4
Salt	3.2
Liquid Smoke Flavoring	0.289
Food Starch Modified	1.5
Onion Powder	0.6
Garlic Powder	0.5
Mustard Flour	0.75
Ground Celery	0.05
Ground Black Pepper-Butcher	0.02
Xanthan Gum	0.15

Method:

- Under vigorous or high shear agitation; add xanthan gum to water.
- Add food starch-modified and disperse well.
- Add all liquids together under sufficient agitation to cut molasses and de-agglomerate and disperse tomato paste.
- Add brown sugar.
- Add spices.
- Mix well.
- Heat to 180°F and hold for 15 minutes with sufficient agitation to eliminate any burn-on.

Analytical

pH	Acid	Brix	Salt	Bostwick	SG
3.54	1.6	48	3.2%	9 at 30 sec	1.12139

A: 'Fruit & Vegetable Extract - A'

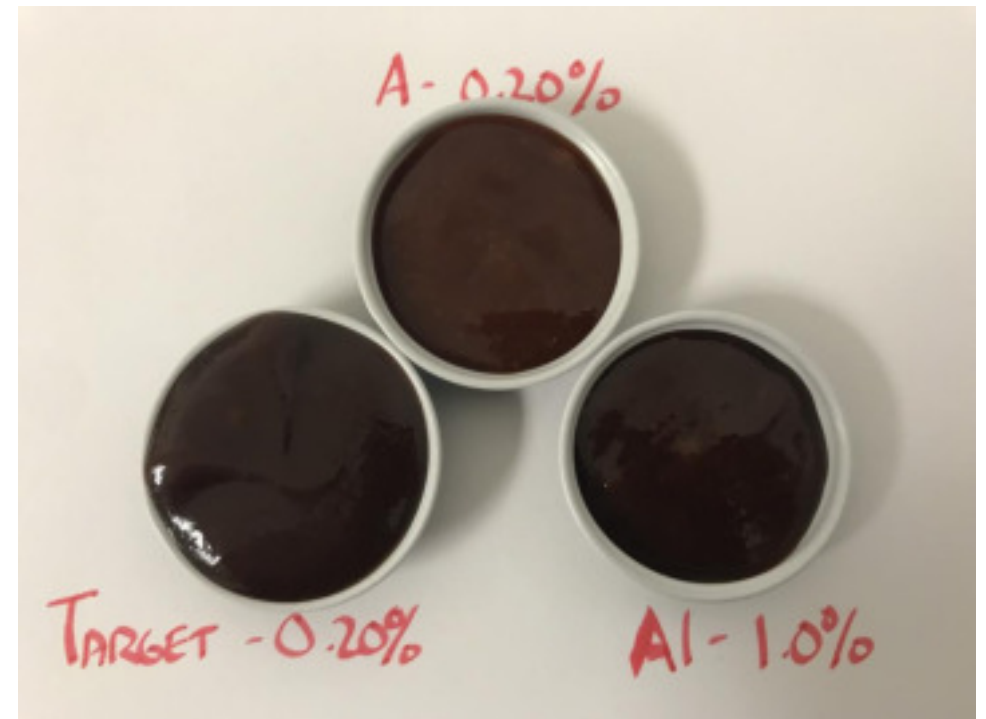
Target: ADS BBQ Sauce; 0.20% Caramel Color

A: ADS BBQ Sauce, 0.20% 'Fruit & Vegetable Extract - A'

Flavor Profile: Similar

A1: ADS BBQ Sauce, 1.0% 'Fruit & Vegetable Extract - A'

Flavor Profile: Similar



B: 'Fruit Extract B'

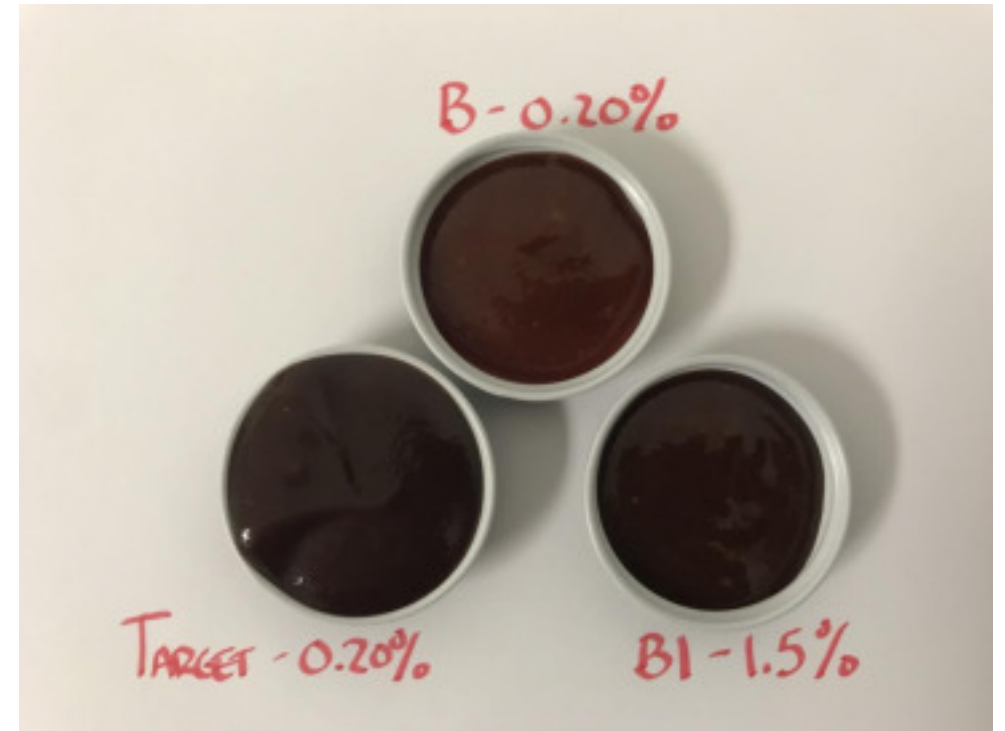
Target: ADS BBQ Sauce; 0.20% Caramel Color

B: ADS BBQ Sauce, 0.20% 'Fruit & Vegetable Extract B'

Flavor Profile: Similar

B1: ADS BBQ Sauce, 1.5% 'Fruit & Vegetable Extract B'

Flavor Profile: Minor caramel / burnt note; less sweet



C: 'Fruit Extract C'

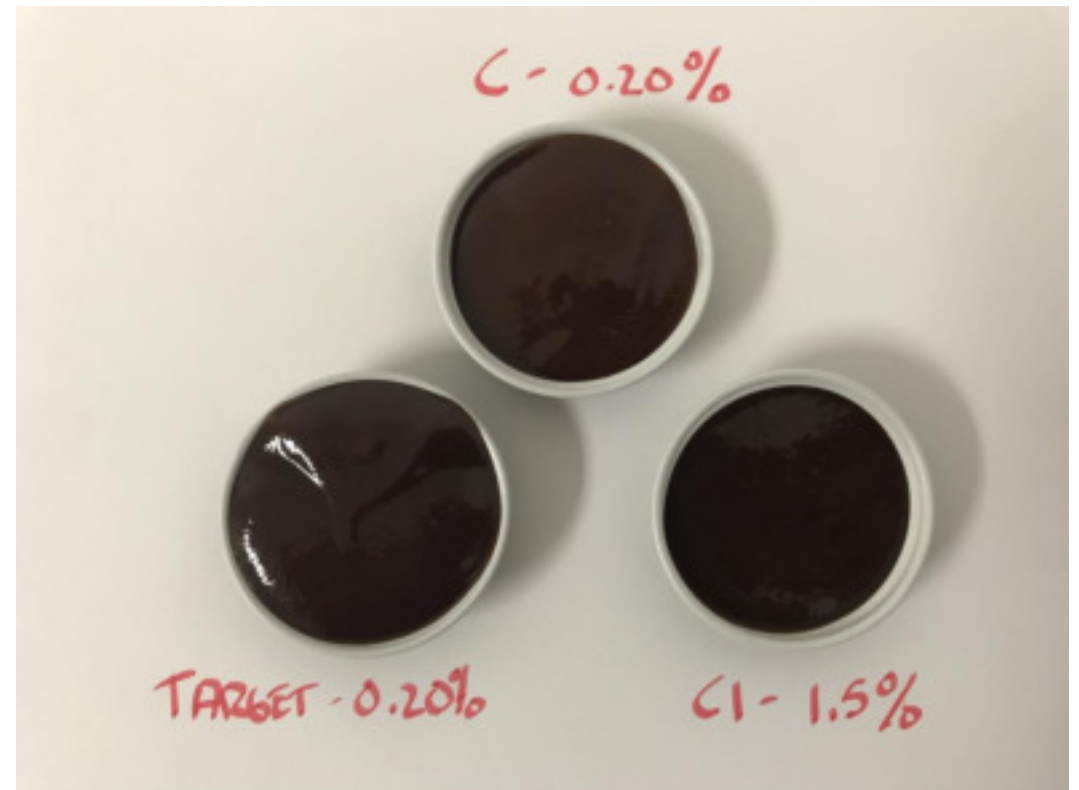
Target: ADS BBQ Sauce; 0.20% Caramel Color

C: ADS BBQ Sauce, 0.20% 'Fruit & Vegetable Extract C'

Flavor Profile: Similar

C1: ADS BBQ Sauce, 1.5% 'Fruit & Vegetable Extract C'

Flavor Profile: Strong prune flavor / tart note



D: 'Roasted Barely Malt '

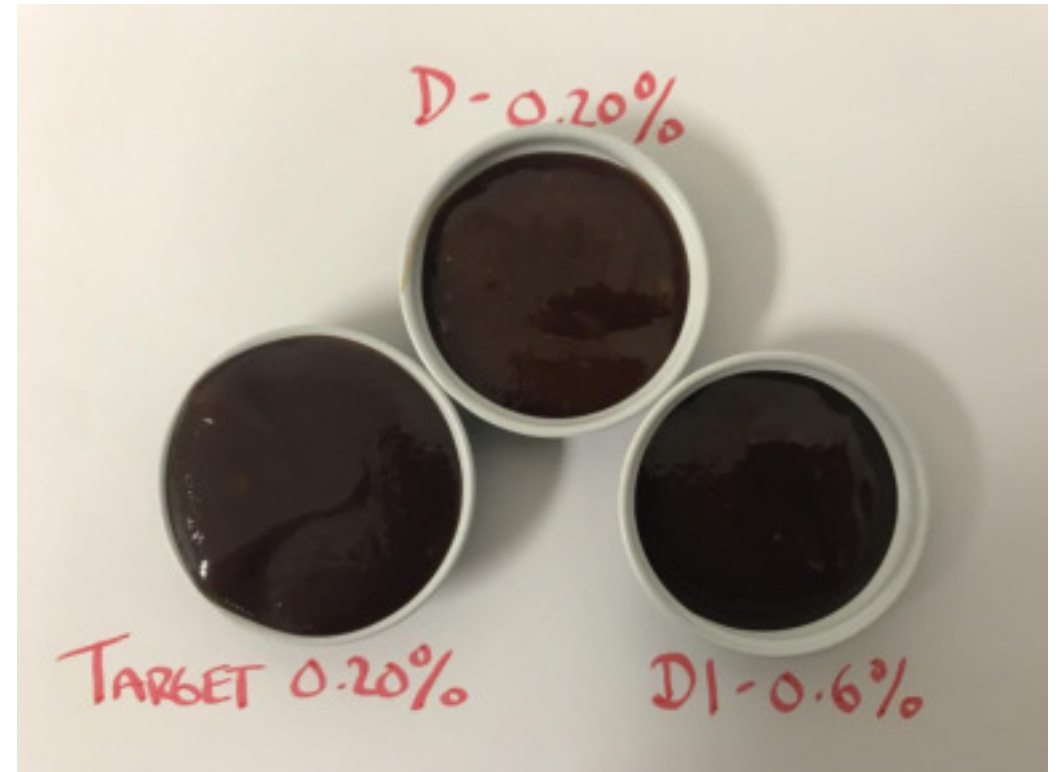
Target: ADS BBQ Sauce; 0.20% Caramel Color

D: ADS BBQ Sauce, 0.20% 'Roasted Barley Malt'

Flavor Profile: No mentionable deviation.

D1: ADS BBQ Sauce, 0.60% 'Roasted Barley Malt'

Flavor Profile: No mentionable deviation.



E: 'Caramelized Apple Juice Concentrate'

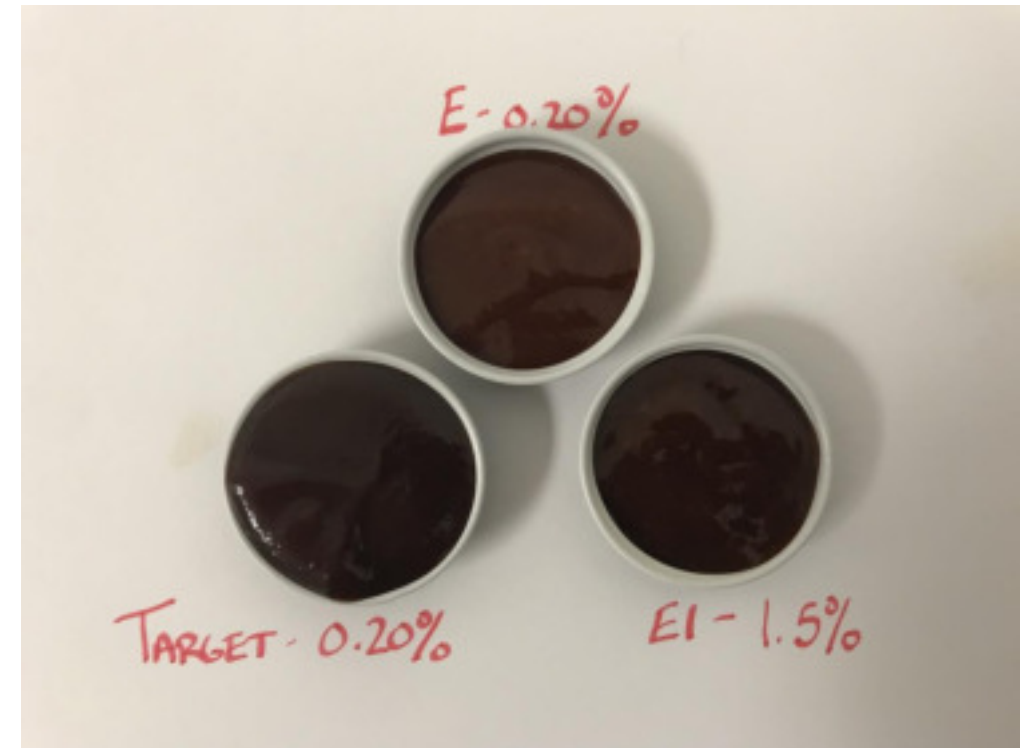
Target: ADS BBQ Sauce; 0.20% Caramel Color

E: ADS BBQ Sauce, 0.20% 'Caramelized Apple Juice Concentrate'

Flavor Profile: No mentionable deviation.

E1: ADS BBQ Sauce, 1.5% 'Caramelized Apple Juice Concentrate'

Flavor Profile: No mentionable deviation.



F: 'Caramelized Onion Juice Concentrate'

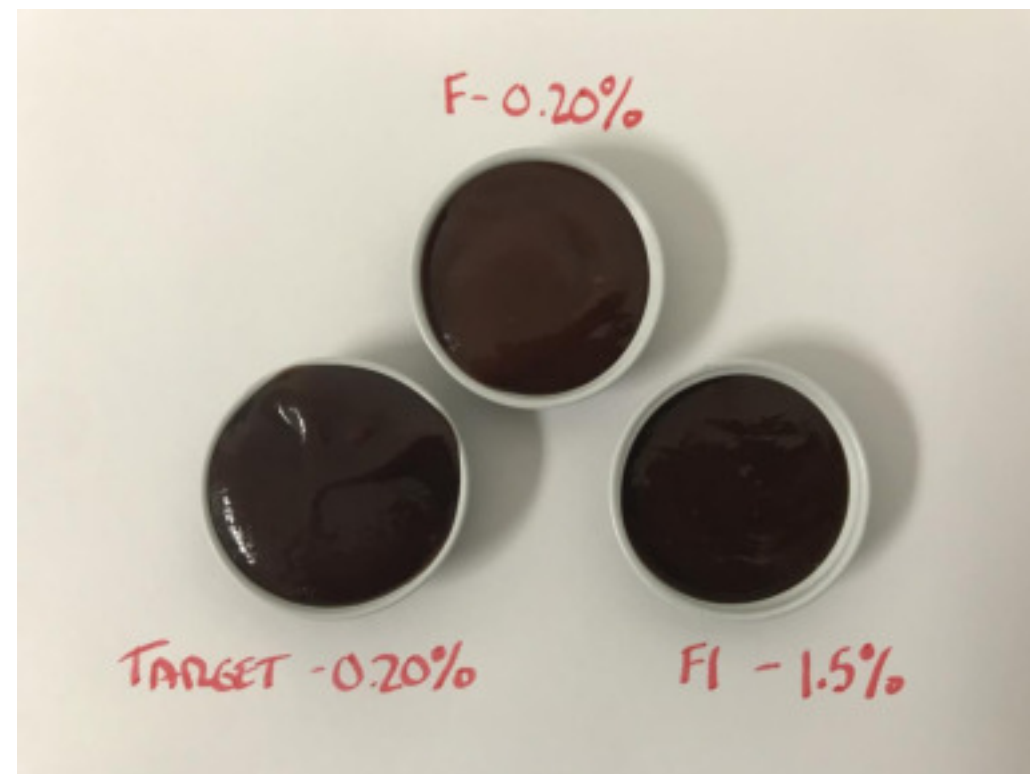
Target: ADS BBQ Sauce; 0.20% Caramel Color

F: ADS BBQ Sauce, 0.20% 'Caramelized Onion Juice Concentrate'

Flavor Profile: Slight onion note.

F1: ADS BBQ Sauce, 1.5% 'Caramelized Onion Juice Concentrate'

Flavor Profile: Strong caramelized onion flavor.



G: 'Roasted Barley Malt'

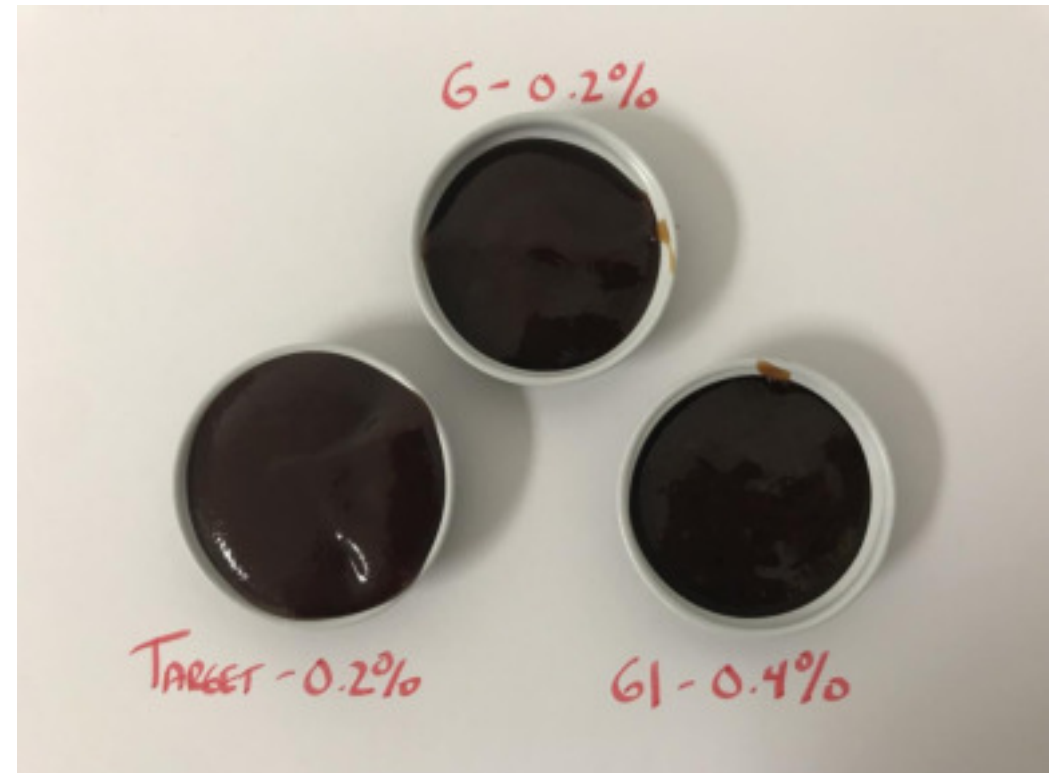
Target: ADS BBQ Sauce; 0.20% Caramel Color

G: ADS BBQ Sauce, 0.20% 'Roasted Barley Malt'

Flavor Profile: Slight malt note.

G1: ADS BBQ Sauce, 0.40% 'Roasted Barley Malt'

Flavor Profile: Malt notes; slightly bitter aftertaste.



H: 'Prune Juice Concentrate'

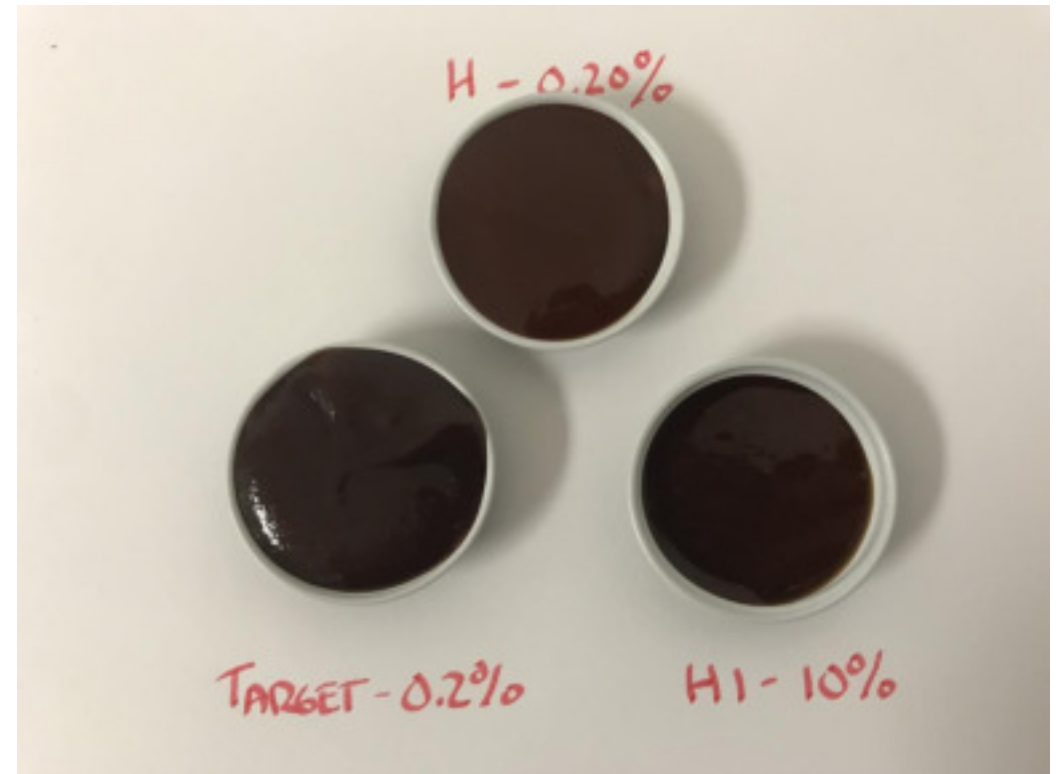
Target: ADS BBQ Sauce; 0.20% Caramel Color

H: ADS BBQ Sauce, 0.20% 'Prune Juice Concentrate'

Flavor Profile: Similar in flavor.

H1: ADS BBQ Sauce, 10.0% 'Prune Juice Concentrate'

Flavor Profile: Strong prune flavor; noticeable tartness.



Sensory Evaluation – Conclusion

Similar Flavor

- Fruit & Vegetable Extract – A
- Roasted Barley Malt – D
- Caramelized Apple Concentrate - E

Similar Color

- Fruit Extract – B
- Fruit Extract – C
- Roasted Barley Malt – D
- Roasted Barley Malt – G
- Caramelized Apple Concentrate – E
- Caramelized Onion Juice - F
- Prune Juice Concentrate - H

Overall Favorite

- Fruit & Vegetable Extract - A
- Roasted Barley Malt - D
- Caramelized Apple Concentrate – E

Regulatory Considerations

Product Name	Recommended Naming	Regulatory Notes
FRUIT AND VEGETABLE JUICE (A)	Fruit and Vegetable Juice (color)	30% sugar which contributes to added sugar line on label
	If ≥10% usage, must declare sulfites	Citric acid and invert sugar may need to be declared if functional in final product. Invert sugar is likely from beet and would therefore be considered Bioengineered.
FRUIT AND VEGETABLE JUICE (B)	Fruit Juice (color)	30% sugar which contributes to added sugar line on label
	If ≥10% usage, must declare sulfites	
FRUIT AND VEGETABLE JUICE (C)	Fruit juice (color)	Sugar would contribute to added sugar line
ROASTED BARLEY MALT (D)	Caramel color	Not GRAS for color, only for flavor. Would need to apply for GRAS for color to call it "Malt Extract"
CARAMELIZED APPLE CONCENTRATE (E)	Fruit Juice (color)	Sugar would contribute to added sugar line
CARAMELIZED ONION JUICE (F)	Vegetable juice (color)	Sugar would contribute to added sugar line
ROASTED BARLEY MALT (G)	Caramel color	Not GRAS for color, only for flavor Would need to apply for GRAS for color to call it "Malt Extract"
PRUNE JUICE CONCENTRATE (H)	Fruit juice (color)	
		Sugar would be considered added sugar

Caramel Color Definition

- ▶ Caramel Color, according to the [Code of Federal Regulations \(21 CFR 73.85\)](#) is the dark-brown liquid or solid resulting from the carefully controlled heat treatment of food grade carbohydrate. Certain food-grade acids, alkalis and salts may be employed to assist the caramelization of the carbohydrate.
- ▶ **Caramel Color I** is prepared by the controlled heat treatment of carbohydrates with alkali or acid.
- ▶ **Caramel Color II** is prepared by the controlled heat treatment of carbohydrates with sulfite-containing compounds.
- ▶ **Caramel Color III** is prepared by the controlled heat treatment of carbohydrates with ammonium compounds.
- ▶ **Caramel Color IV** is prepared by the controlled heat treatment of carbohydrates with ammonium-containing and sulfite-containing compounds.

Fruit and Vegetable Juice –for color

- ▶ The color additives fruit and vegetable juice is prepared either by expressing the juice from mature varieties of fresh, edible fruits and vegetables, or by the water infusion of the dried fruit or vegetable. The color additive may be concentrated or dried. 21CFR (73.250, 73.260)
- ▶ Labeling-Fruit and Vegetable Juice (color)