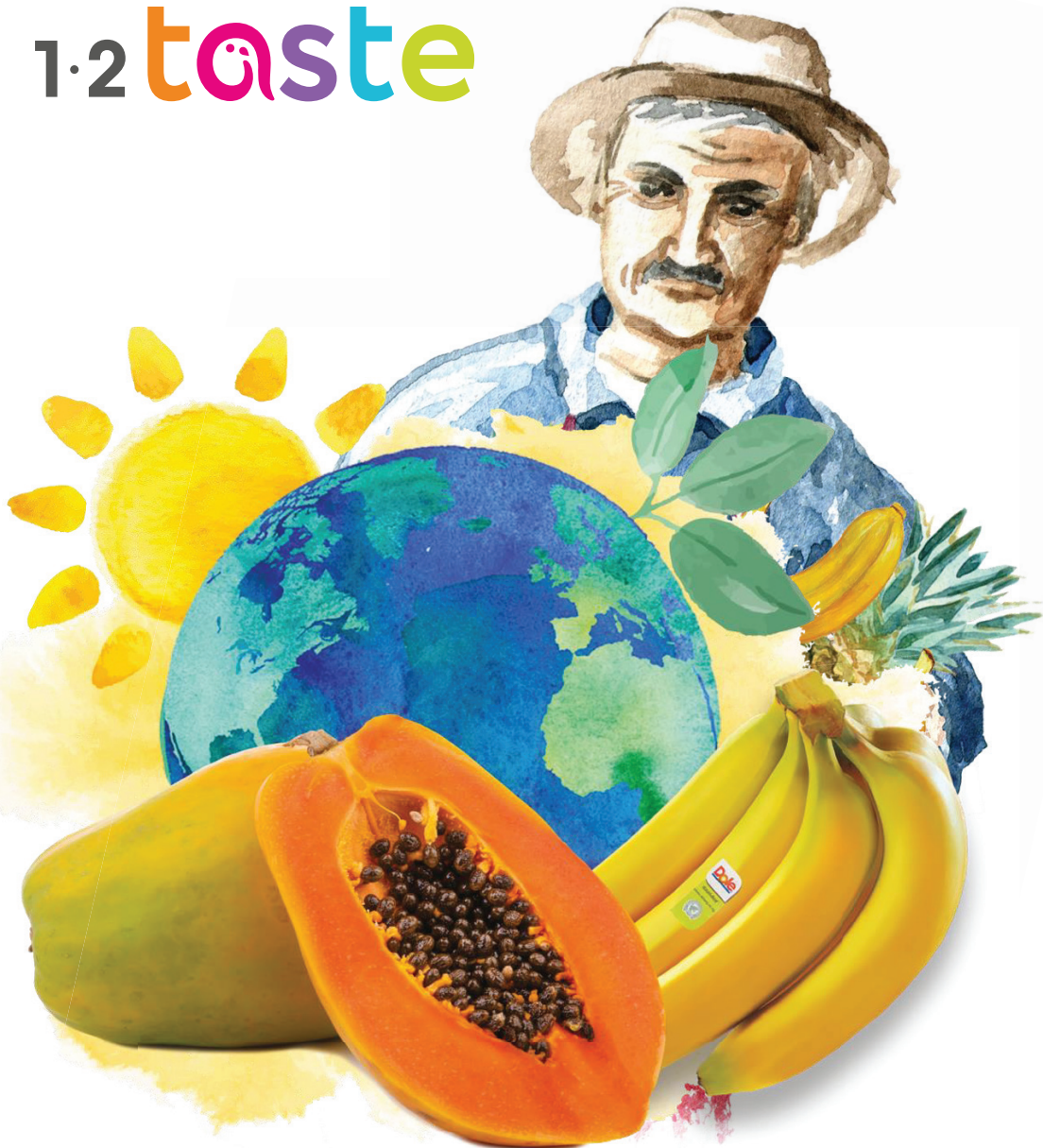


1·2taste



Application of **DSI Green Banana Powder**  
in Fruit Preparation  
& Yogurt as a Case Study!

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# OBJECTIVE

## Fermentation, Yogurt with Green Banana Powder



To understand the binding and stabilizing properties of DSI Green Banana Powder in comparison to a Leading native starch – Novation 3300 by Ingredion in Fruit Preparation.



# DSI Product – Green Banana Powder

## Green Banana Powder



### Green Banana Powder Nutrition Facts:

#### Nutrition Facts

Amount	Per 100g
Calories	325kcal
Total Fat	1.1g
Sodium	4.41g
Total Carbohydrates	81.96g
Total Starch	66.3%
Resistant Starch	37.1%
Dietary Fiber	7.6g
Sugars	0.7g
Protein	4.33g
Iron	12.7mg
Magnesium	77.8mg
Potassium	1690mg

\*Amount slightly varies according to different product batch

Data updated as of August 2022

**Cautionary Note:** The nutrition facts is based on preliminary result and should be regarded as a guide only. Further testing will be conducted, and the team will provide updates accordingly.

### Green Banana Powder Key Benefits\* :



Low in fat



Improve Gut Health



Mineral Enrichment



Gluten Free



Help with diabetics



Low GI



Prebiotic



Thickening

\*Based on existing literature



# Process flow of a Fruit Preparation



Weight out the ingredients and prepare the following slurries:

1. Pectin Slurry using Hot water and Pectin on a high sheer mixture ( 1: 5 ratio of Pectin to Hot water ).
2. Starch Slurry in cold water ensuring no lump formation (1:2 ratio of Starch to Cold Water).



Make a sugar syrup using water, sugar and citric acid



Add the pectin slurry to the Hot Sugar Syrup base.



Add the thawed fruit puree into this and ensure the contents are mixed well



To this add the Starch slurry and mix well ensuring no lumps.



Heat and bring this to a boil and maintain the temperature at 95°C for 5 -8 mins. and ensure the starch is activated ( can noted with a slight bubbling of the starch)



Adjust the water as per the output to standardise the brix, acidity and pH.

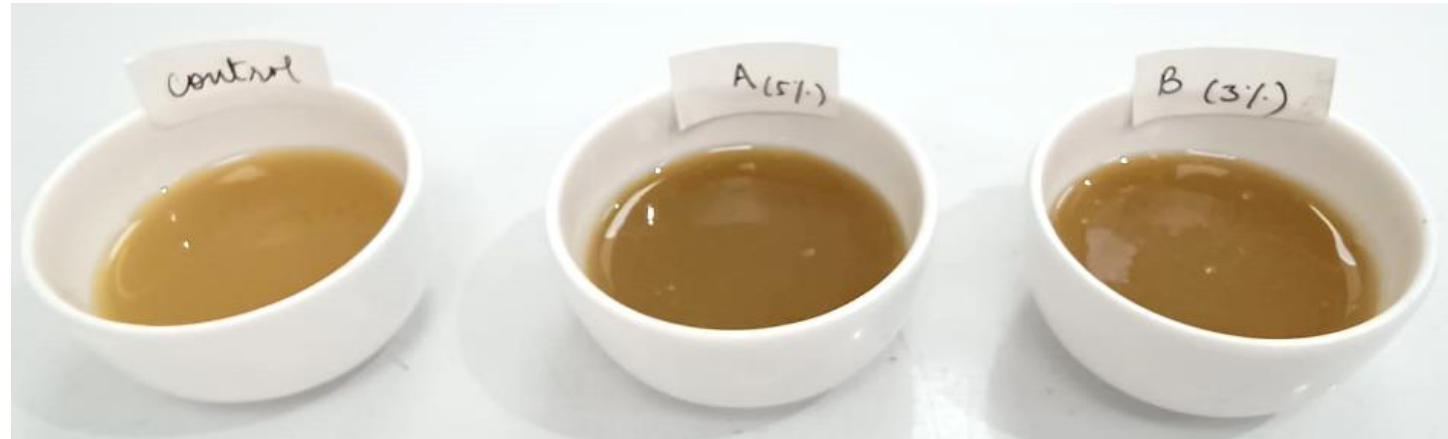


# Design of experiments AND CONCLUSION



## Positioning GBP as a possible replacement for Modified Starch

Ingredients	Control	TEST A 5% Dosage (100% replacement of Novation)	TEST B 3% Dosage (100% replacement of Novation, reduced dosage)
Sugar	40	40	40
Water	28.55	28.55	28.55
Pectin	1	1	1
Fruit Pulp	25	25	25
Citric Acid	0.45	0.45	0.45
Novation 3300 Modified Starch	5		
DSI GBP	0	5	3



### Comparison with Novation series 3300

**1. Novation - 5%**  
(recommended Dosage)

**2. GBP with:**

a) 5% (100% replacement of  
Novation) – Achieved with  
GBP

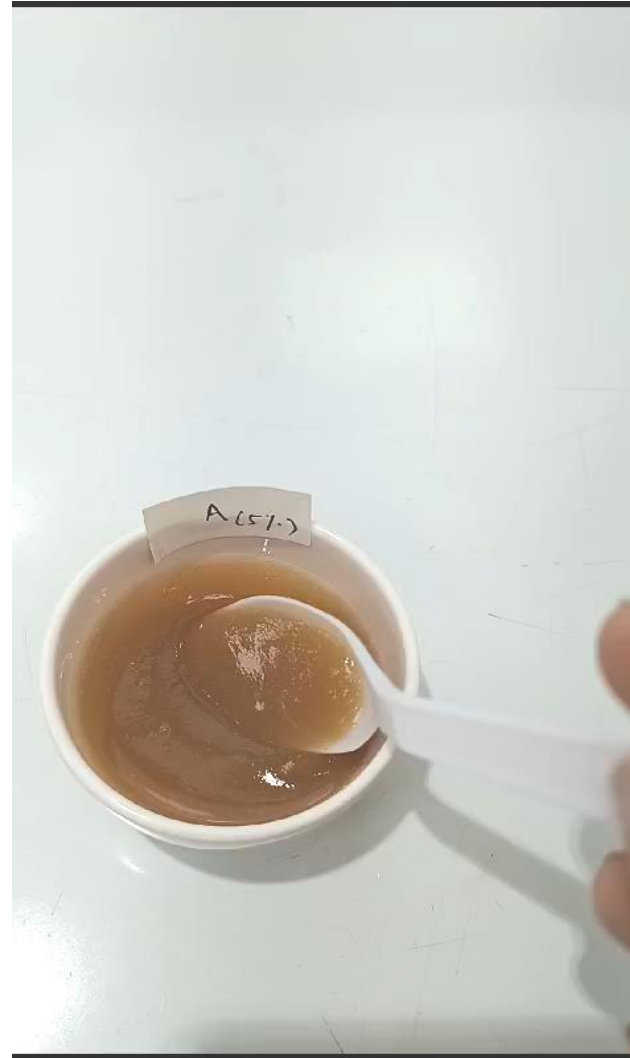
b) 3%(100% replacement of  
Novation, reduced dosage) –  
Consistency was slightly thinner  
in comparison to 5%.

# Design of experiments AND CONCLUSION

Positioning GBP as a possible replacement for Modified Starch



Control sample with Novation 3300



Sample A with 5% GBP



Sample B with 3% GBP

# Fruit Prep – Nutrition



DSI In-house application, as fruit solution



## Formulation:

	Control	Green Banana Powder (GBP)	
		5%	10%
Sugar	40	40	39
Water	28.55	28.55	26.55
Pectin	1	1	1
Fruit Pulp	25	25	23
Citric Acid	0.45	0.45	0.45
Novation 3300	5	0	0
GBP	0	5	10
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

## Nutrition Profiling:

	Control	Green Banana Powder (GBP)		
		5%	10%	
Protein (g)	0.53	0.83	1.07	↑
Fat (g)	0.31	0.30	0.28	↓
Sugar (g)	72.33	71.95	66.26	↓
Dietary Fiber (g)	2.06	2.65	3.01	↑
Sodium (mg)	9.28	3.4	3.13	↓
Magnesium (mg)	4.79	11.65	17.21	↑
Potassium (mg)	80.45	218.3	332.03	↑
Iron (mg)	0.2	0.26	0.33	↑

### Key Takeaways:

- In line with clinical trial done by Abdalla, Abdelmoneim & Ahmed, Zienab, our in-house GBP yogurt application shows an **increase in protein, fiber, iron and minerals while a lower fat content.**
- From sensory perspective, participant detected an **increase of viscosity** with increase added of green banana powder.
- Depending on formulation, the recommendation dosage for GBP is 2.5 – 5% for yogurt application.

# How can this Fruit Preparation be used...

## Possible Applications



Yogurts

Dosage 2.5% to 5%



Jams

Dosage 8% to 12%



Bakery Fillings

Dosage 2% to 6%





# Market Opportunity

Yogurt Made With Green Banana Powder



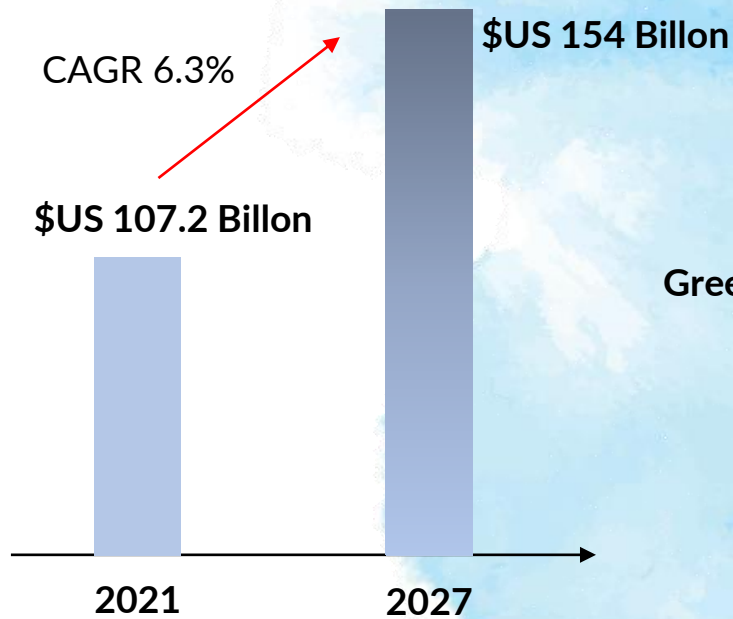
# “Case Study for Yogurt Application”

# Market Outlook

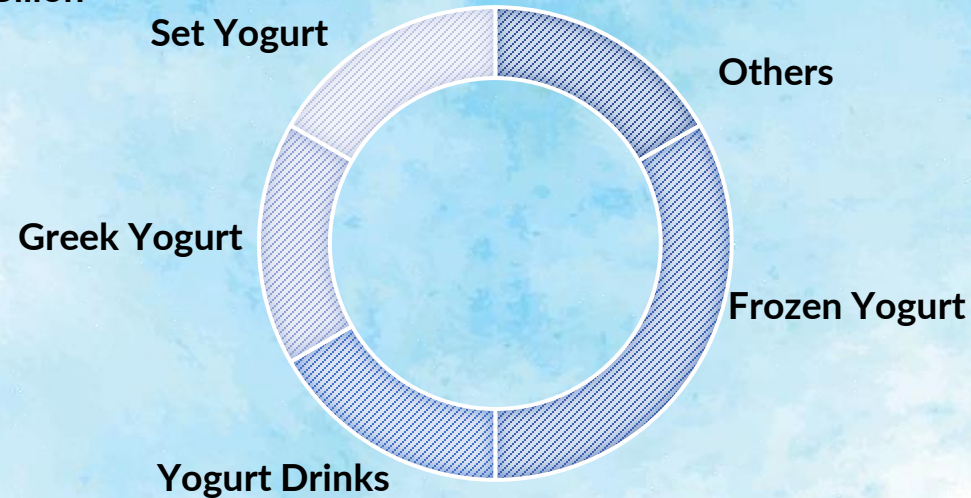


As of 2021, the global yogurt market reaches US\$ 107.2 Billion. By 2027, it is expected to reach US\$ 154 Billion, exhibiting a CAGR of 6.3%

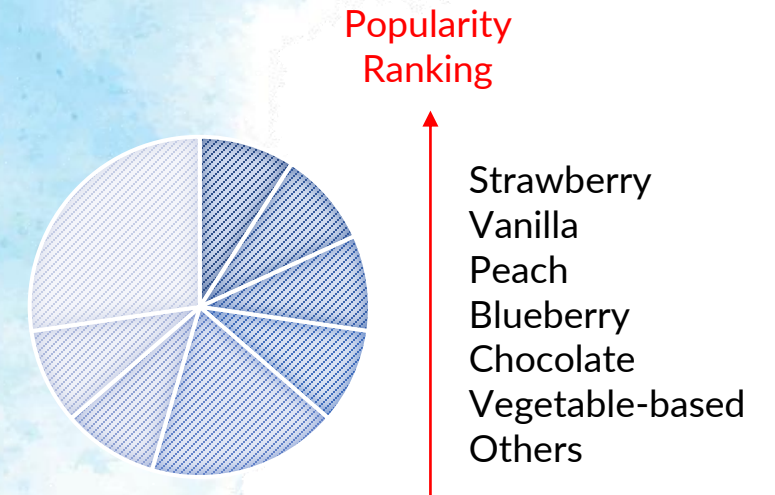
## Forecast Growth



## Key Market Segmentation - Types



## Key Market Segmentation - Flavors



Flavor is a major driver in yogurt choice

# Market Outlook – Current Trends



1

## Dessert Flavors

Many indulge small treats daily. Yogurts in dessert flavor (specialty yogurts) are becoming more popular.

2

## Health is key

Many yogurts in the marketplace now offers some type of health benefit. Also, functional ingredients like green banana powder is added to increase the overall nutrition value.

3

## Clean Label

Simple, clean-label ingredients - using fewer ingredients and high nutritional value.

4

## Vegan Yogurt

Non-dairy alternatives offer great potential for future innovation, and plant-based yogurt is gaining popularity steadily.

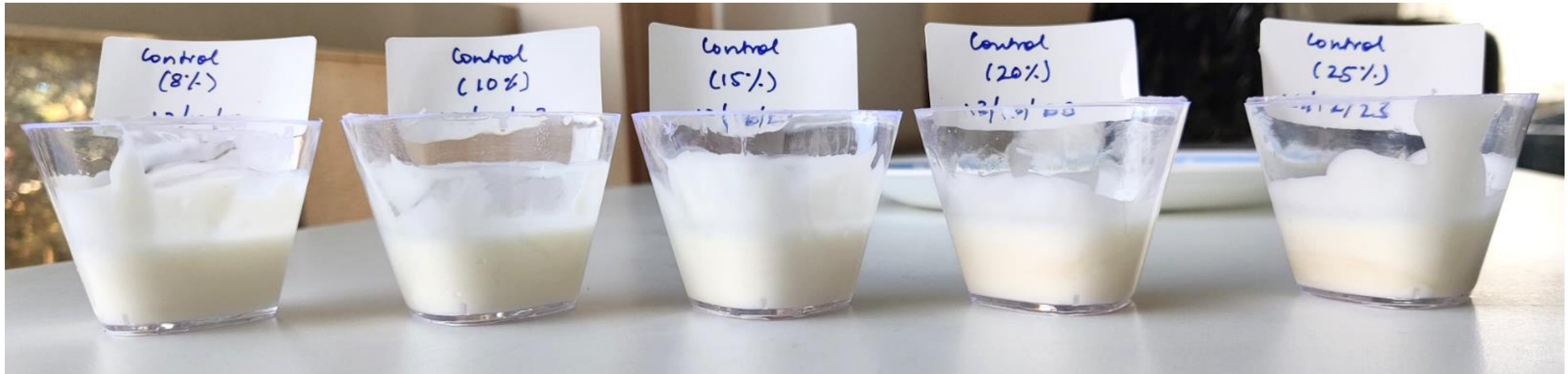


\*For visual representation only, not DSI customers

# Fruit Preparation in yoghurt application using GBP



## Control with Modified Starch



Fruit Preparation made using Native Starch Novation 3300 (derived from Tapioca) at 5% – Application in yoghurt at various concentrations of Fruit Preparations.

### Key Observations:

1. The texture of the yoghurt was firm with various dosages of fruit preparations.
2. Overall acceptability of dosage of fruit preparation is 15%.
3. No notable change in the texture/Colour of yoghurt with increased dosage of fruit preparation, however the consistency becomes slightly thicker at 20 & 25% dosage.
4. There was no notable syneresis in fruit preparation or the yoghurt application on an hourly basis. ( \*noted for 8 hours)

# Fruit Preparation in yoghurt application using GBP

Using GBP



Fruit Preparation made using Green Banana Powder at 5% – Application in yoghurt at various concentrations of Fruit Preparations.

## Key Observations:

1. Out of all the dosages and Overall sensorial score – 15% dosage of fruit preparation in yoghurt was preferable.
2. There was no notable syneresis in fruit preparation or the yoghurt application in hourly basis ( \*noted for 8 hours)



1.2 **taste**

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