



# Bean CON24

A Global Dry Bean Conference

Bean Conference

# New Product Development with Bean Ingredients



**Bean**  
**CON24**  
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**Christine Lopes**  
Innova Market Insights



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**Olivia Rhode**  
ADM



# New Product Development with Beans

February 3, 2024

# Today's Presenters:



Christine Lopes  
Innova Market Insights  
Business Development Manager LATAM



Olivia Rhode  
ADM  
NA SG&D Business Development Lead

## Agenda:

- Market Insights
- Product Development with Beans

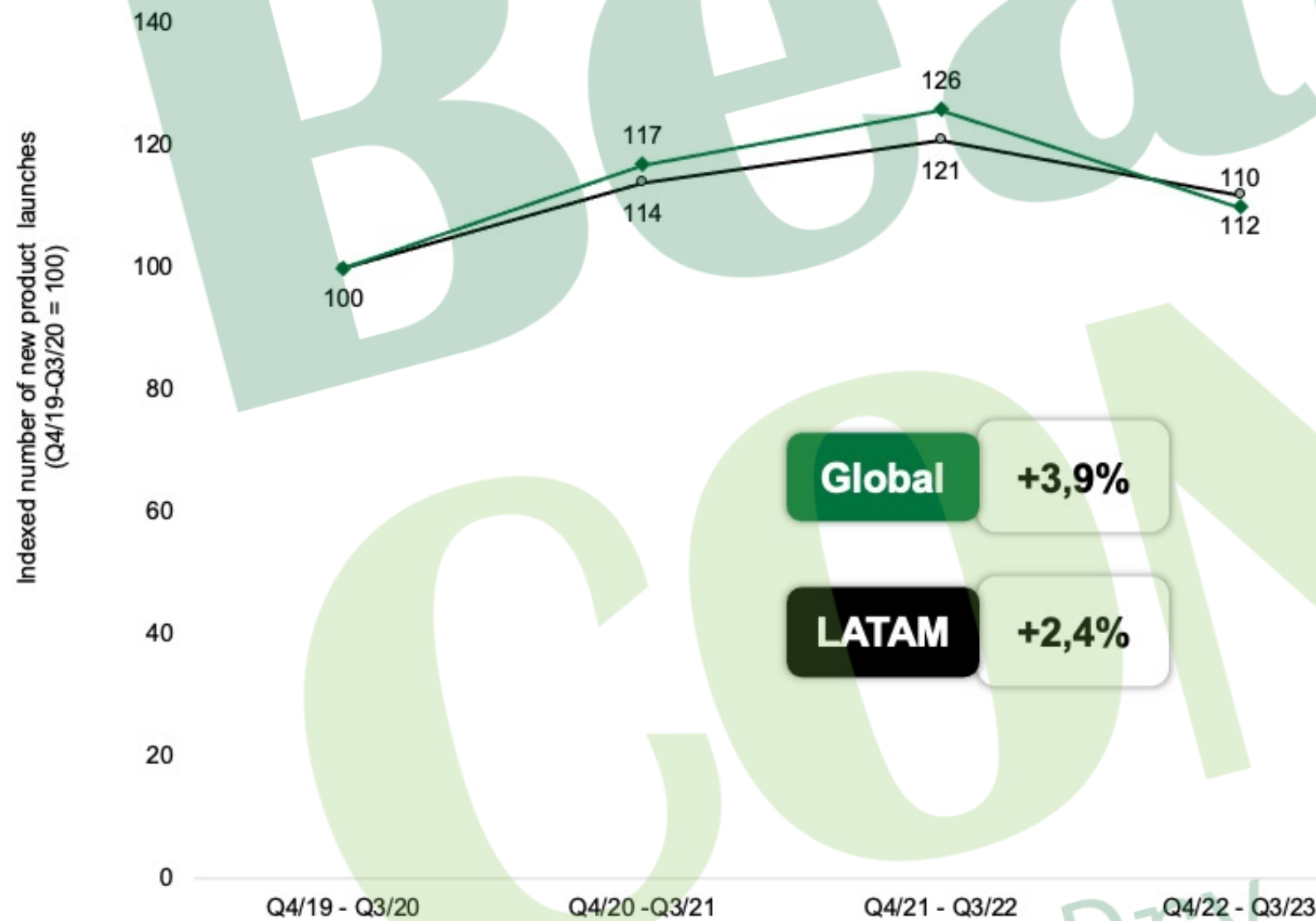


# Market Insights

## Trends in Bean Ingredients

# The use of beans in product innovation is growing globally and in LATAM

New product launches tracked with bean ingredients (Global vs. LATAM)  
(% CAGR Q4/19 – Q3/23)



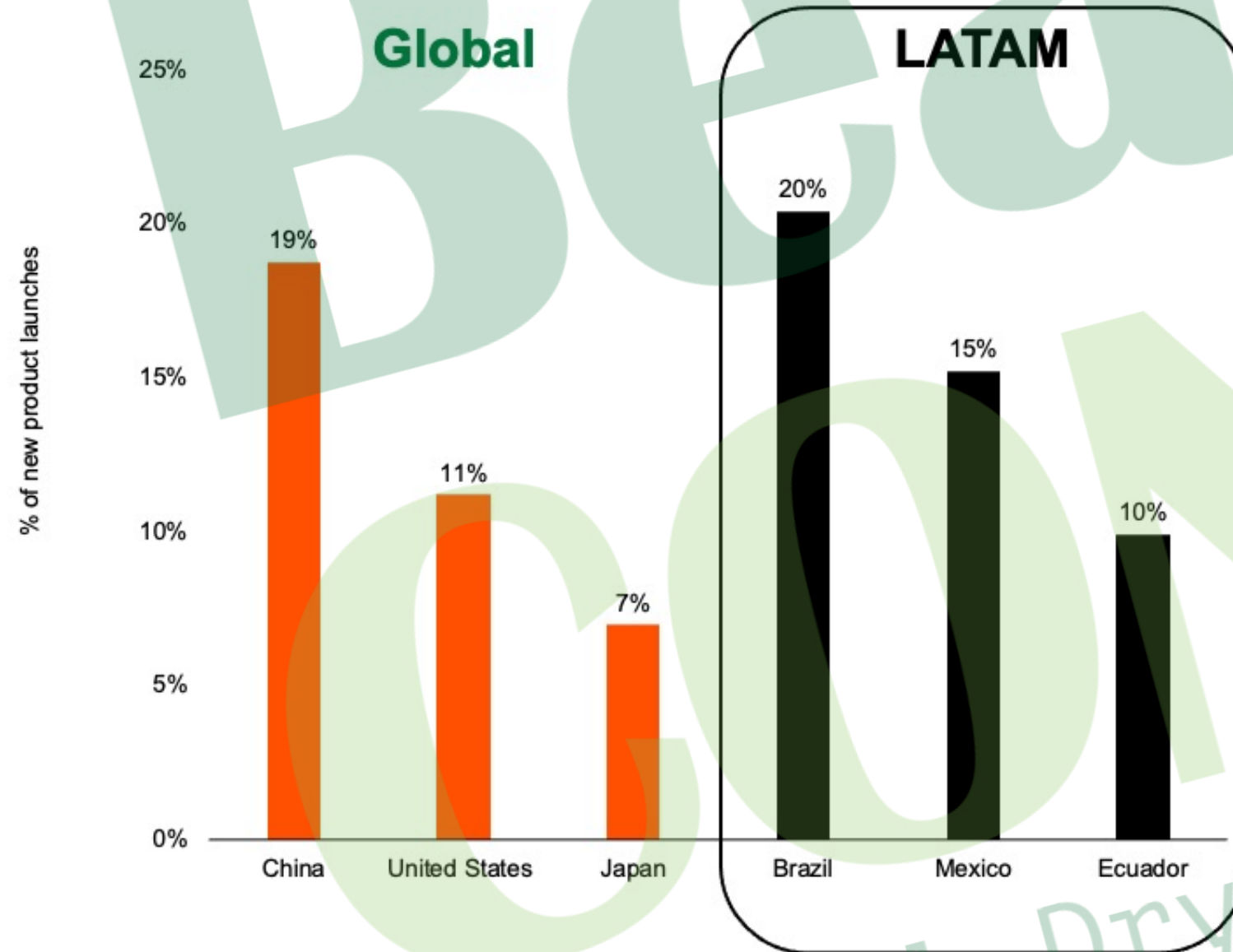
Gut friendly snack. Made from ground navy beans, white rice, peanut oil, tapioca starch, organic cane sugar, brown rice protein, roasted peanuts, and salt.

Costa Rica, May 2023

Sources: Innova Database; Meat, Dairy & Alternative Protein Survey 2023 (Average of Mexico and Brazil)

# Brazil is the top LATAM country for bean innovations, but Ecuador is showing high growth

Top countries as a % of food and beverage launches with bean ingredients (Global vs. LATAM) (%share Q4/18-Q3/23)



**Ecuador is the fastest-growing LATAM country, with a CAGR of +33% (CAGR, Q4/18-Q3/23)\***



Chili and lemon-flavored mix of peanuts, beans, corn and chickpea.

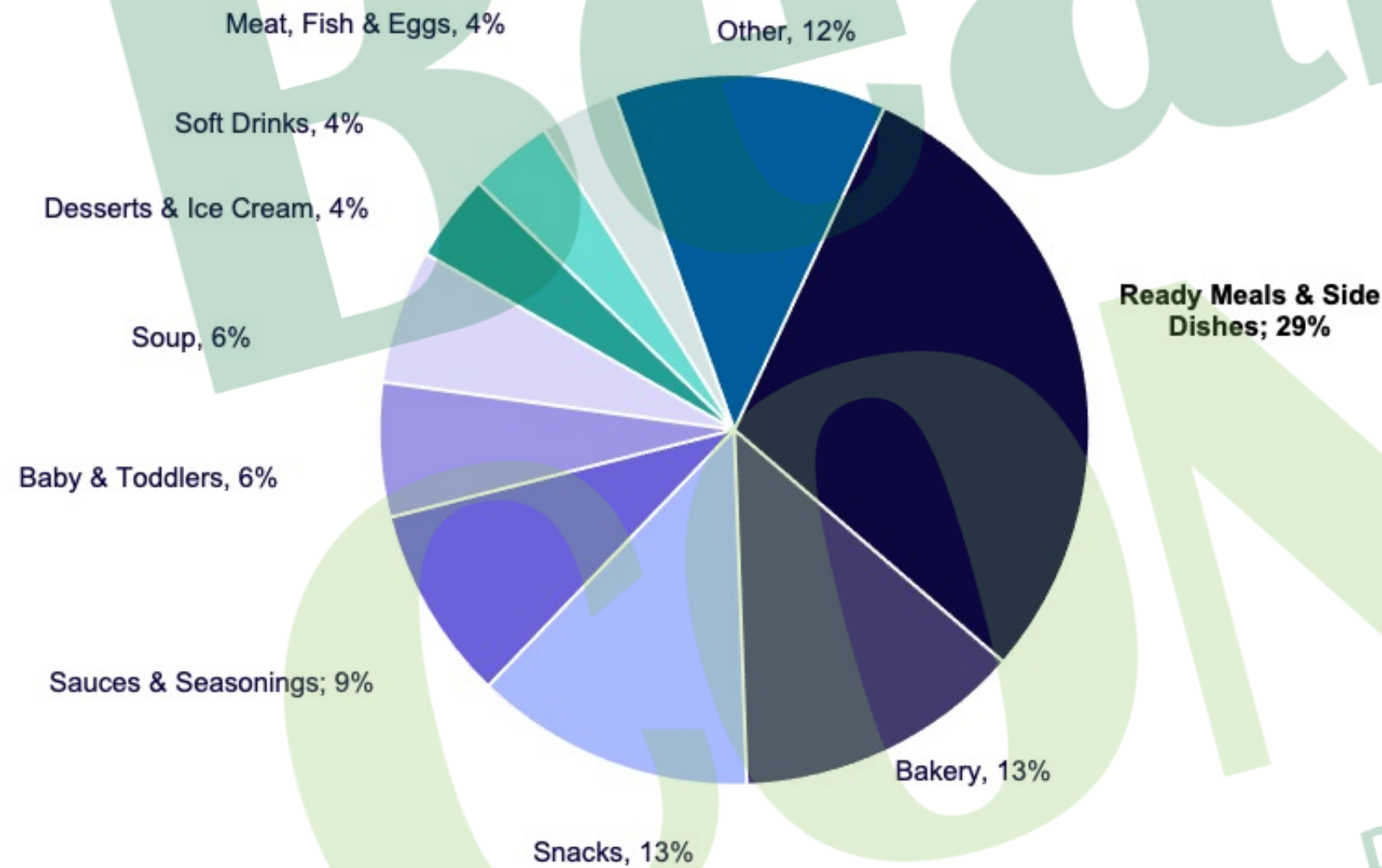
Ecuador, Nov 2023

Source: Innova Database

Note: \*growing from a small base

# Ready meals & side dishes lead as top categories using beans

Top categories as a % of food and beverage launches tracked with bean ingredients (Global, Q4/18 – Q3/23)



In LATAM, beans are largely applied in ready meals & side dishes, snacks, and soups



Brazil, Mar 2023

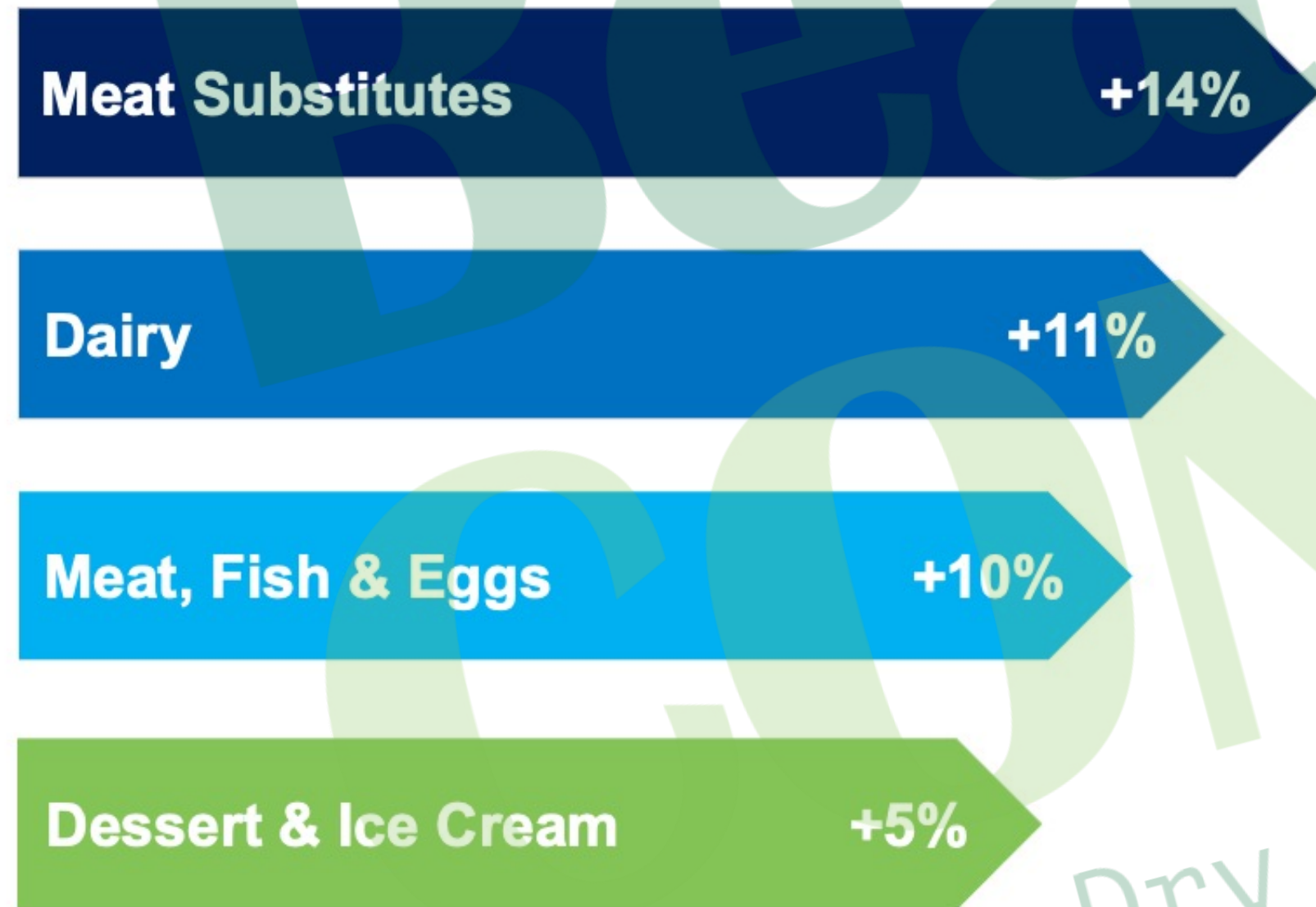


Nicaragua, Nov 2023



# In LATAM, bean-based innovations for baby & toddlers are growing the fastest

Fastest-growing categories as a % of food and beverage launches tracked with bean ingredients  
(Global, CAGR Q4/18 – Q3/23, 12 months year ending in Q3/23)



+41%

**Baby & Toddlers**  
(LATAM, CAGR Q4/18-Q3/23)\*

Homemade caseirinho rice, **black beans**, meat and vegetables meal for **babies from 8 months onwards.**



Brazil, Aug 2023

Source: Innova Database

Note: \*growing from a small base

# Fava and red bean are gaining ground among fastest-growing beans tracked in LATAM

Top bean ingredients Global and LATAM (Q4/18-Q3/23)



## Fastest-growing bean ingredients (Global)

- White Kidney Bean Extract: **+93%**
- Turkish Gram: **+57%**

## Fastest-growing bean ingredients (LATAM)\*

- Fava Bean: **+53%**
- Red Bean: **+9%**

Plant based grated cheddar flavor made from water, vegetable oil, modified potato starch, **vegetable protein (fava bean)**, [...]



Mexico, May 2023

Source: Innova Database

Note: \*growing from a small base; CAGR (Q4/22 vs. Q3/23)

# No additives/preservatives and protein as top claims; Focus on gluten-free claims in LATAM vs. vegan claims globally

## Global

- 1 No additives/preservatives
- 2 High/source of protein
- 3 Vegan

“Plant based. High in protein. Suitable for vegetarians and vegans.”



UK, Sep 2023

## LATAM

- 1 Gluten free
- 2 No additives/preservatives
- 3 High/source of protein

“Without preservatives. 100% natural. Gluten free.”



Argentina, Aug 2023

# Andean lupine: bringing back ancestral ingredients via sustainable practices



“What would you like most to see brand/companies doing to help environmental/social causes?”  
(Average of Brazil and Mexico, 2023)

- 1 Nature protection
- 2 Sustainable packaging
- 3 Improving waste management

+6%

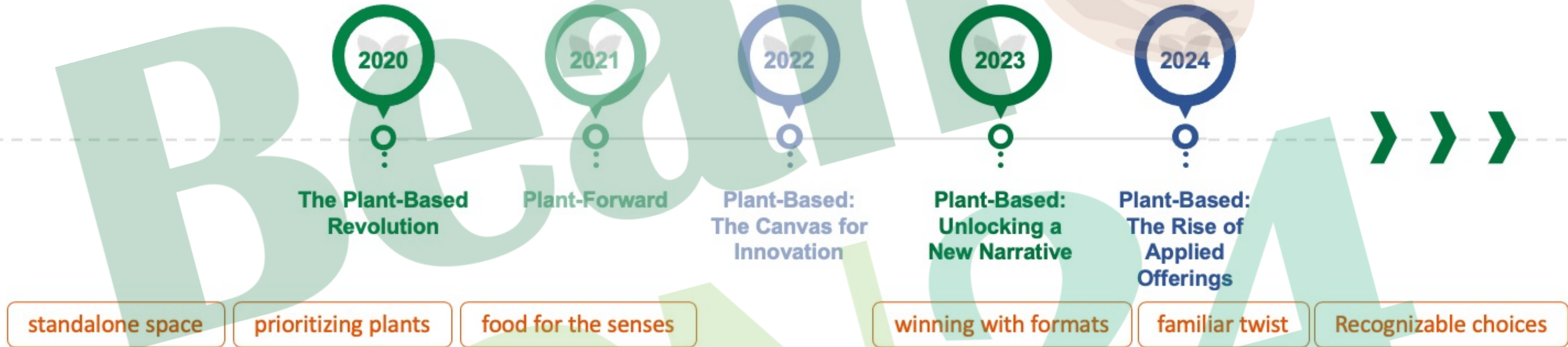
average annual growth in food and beverage launches containing bean ingredients with an **ethical claim\***  
(LATAM, CAGR Q4/18-Q3/23)



Rescuing the **Andean Lupine** to guarantee quality superfoods with high nutritional value and a **focus on sustainability.**

Ecuador, Sept 2023

# Plant-based: Keeping up with a dynamic market



**TREND #4**

**PLANT-BASED:  
UNLOCKING A  
NEW NARRATIVE**

**Trend #4**

**Plant-based:  
The rise of  
applied offerings**

# What is pushing plant-based innovation forward?



Why would you consider 100% plant-based alternatives?  
Top 3 responses  
(Latin America, 2024)

62%

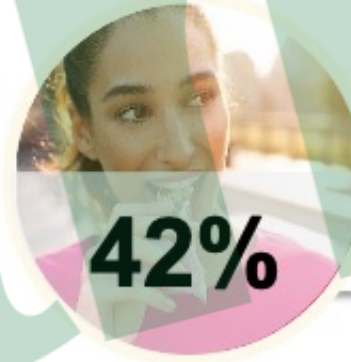
It is healthier

49%

It brings variety in my diet

38%

It is better for the environment/planet



42% of LATAM respondents usually consume legumes when replacing meat



Mexico, Jul 2023

WE ARE DELIKE, WE WERE BORN TO DO YOU GOOD, THROUGH NATURAL FOODS, WITH INGREDIENTS THAT THE EARTH GIVES US, WITHOUT HARMING THE ENVIRONMENT.

## Key takeaways

- **Ready meals & side dishes** lead as top categories using beans both globally and in LATAM. **Baby & toddlers** grows the fastest for bean-based innovations in LATAM.
- **Gluten-free** as top claims in LATAM followed by **no additives/preservatives** and **protein claims**.
- **Beans, green beans, black beans** and **fava beans** are the top bean ingredients (globally and in LATAM) with **fava beans growing the fastest in LATAM**.
- **Health** and **diet variety** take up top consumption reason for plant-based; **beans** may help push forward this trend along with its **sustainability attributes**





# Product Development with Beans

- Functionality that matters
- Discussion on finished products and how they were built







# Pulse Nutrition: Put the BETTER in “Better-for-You”

*Provide a nutrient composition in favor for over all wellbeing*

Per 100g flour ingredient	Corn	White Rice	Whole Wheat	Navy Beans	Black Beans	Chickpeas	
	<a href="#">USDA Link</a>	<a href="#">USDA Link</a>	<a href="#">USDA Link</a>	ADM	<a href="#">USDA Link</a>	<a href="#">USDA Link</a>	
<b>Protein<sup>1</sup> (g)</b>	6	7	15	<b>22</b>	<b>23</b>	<b>22</b>	↑ Higher
<b>Fat<sup>1</sup> (g)</b>	2	1	3	2	0	7	
<b>Carbohydrates<sup>1</sup> (g)</b>	81	80	71	<b>61</b>	<b>63</b>	<b>58</b>	↓ Lower
<b>Fiber<sup>1</sup> (g)</b>	4	1	11	<b>10</b>	<b>14</b>	<b>11</b>	↑ Higher
<b>PDCAAS<sup>2</sup></b>	0.42	0.50	0.43	<b>0.67</b>	<b>0.53</b>	<b>0.52</b>	

<sup>1</sup> Proximate data from the USDA National Nutrient Database

<sup>2</sup> Corn: Agricultural Utilization Research Institute ([auri.org](http://auri.org))  
 Rice, wheat, navy bean, black bean, chickpea: Pulse Canada 2018.  
 Quinoa: Joyce B., et al., British Journal of Nutrition (2012), 108, S183–S211.

✓ Beans offer more protein & fiber, and less carbohydrates than whole grains and typical flours



# Nutrient-dense source of sustained energy

**360 Kcal**

## 100% Corn Puff

<b>Protein</b>	<b>7 g</b>
<b>Fat</b>	<b>2 g</b>
<b>Fiber</b>	<b>4 g</b>
<b>Carbs</b>	<b>79 g</b>
<b>Calcium</b>	<b>3 mg</b>



**370 Kcal**

## 50% Corn/50% Navy Bean Puff

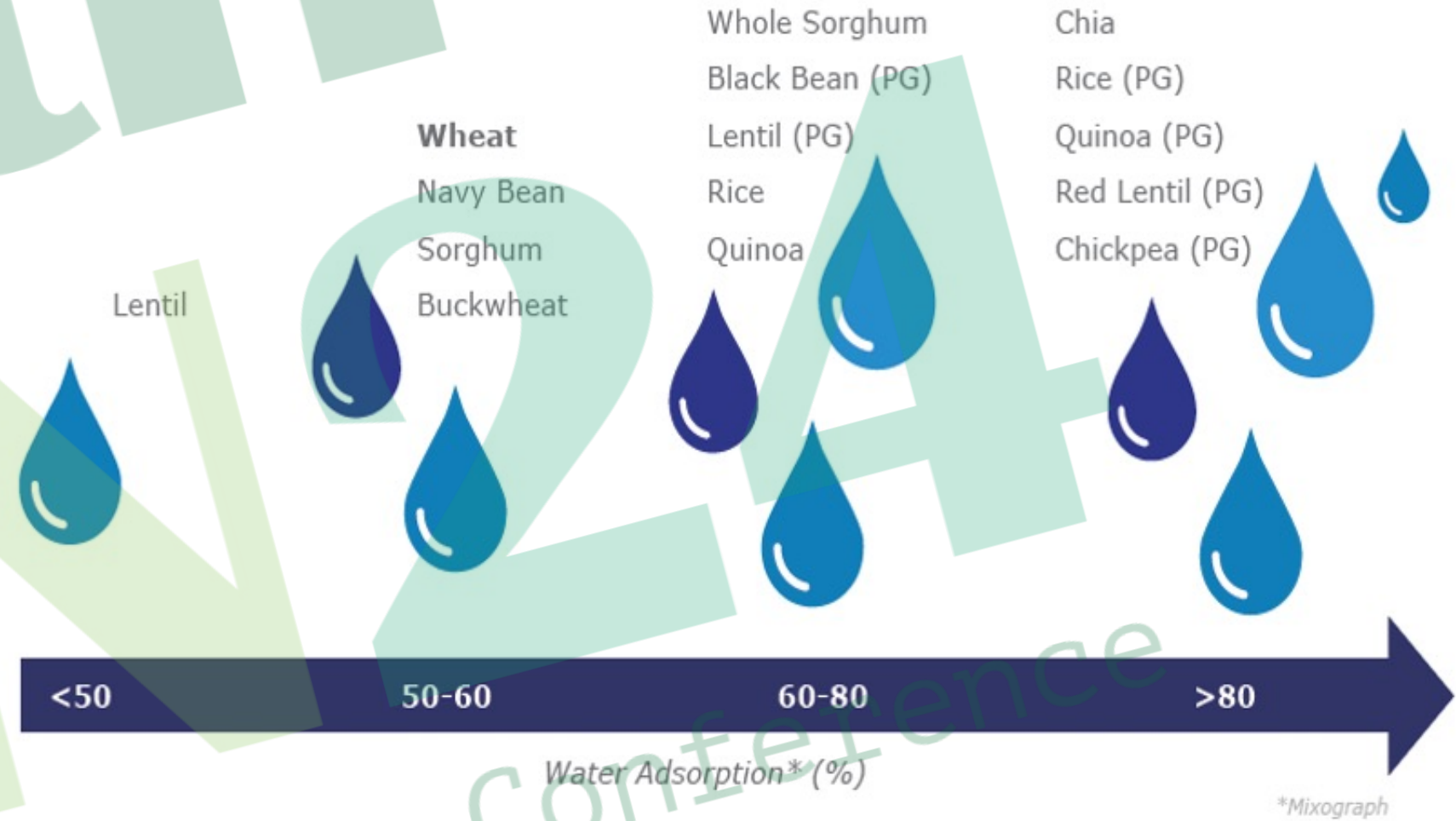
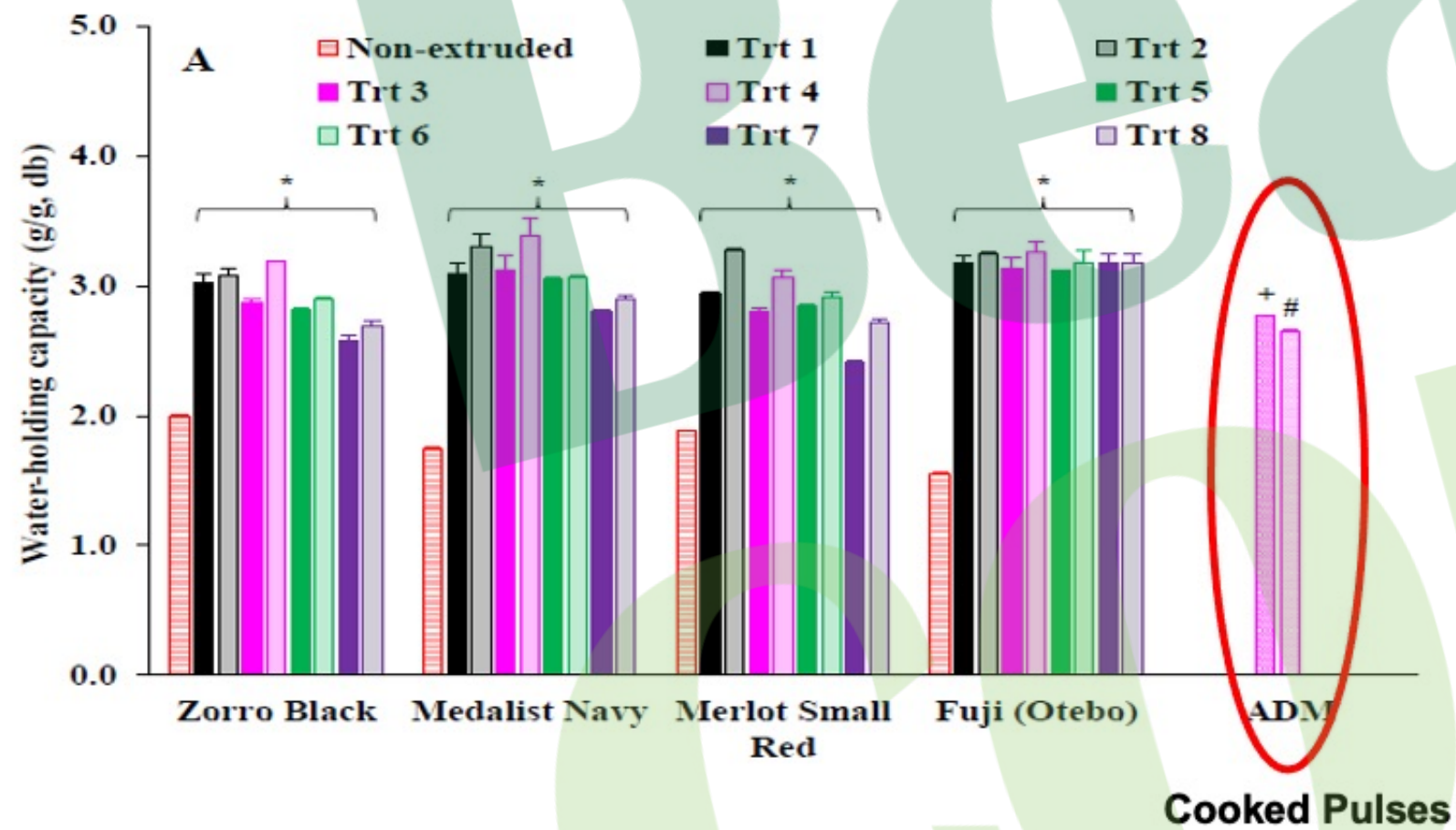
<b>Protein</b>	<b>15 g</b>
<b>Fat</b>	<b>2 g</b>
<b>Fiber</b>	<b>16 g</b>
<b>Carbs</b>	<b>72 g</b>
<b>Calcium</b>	<b>136 mg</b>

\*(Data per 100 g product)





# Bean Functionality: Water Binding Capacity

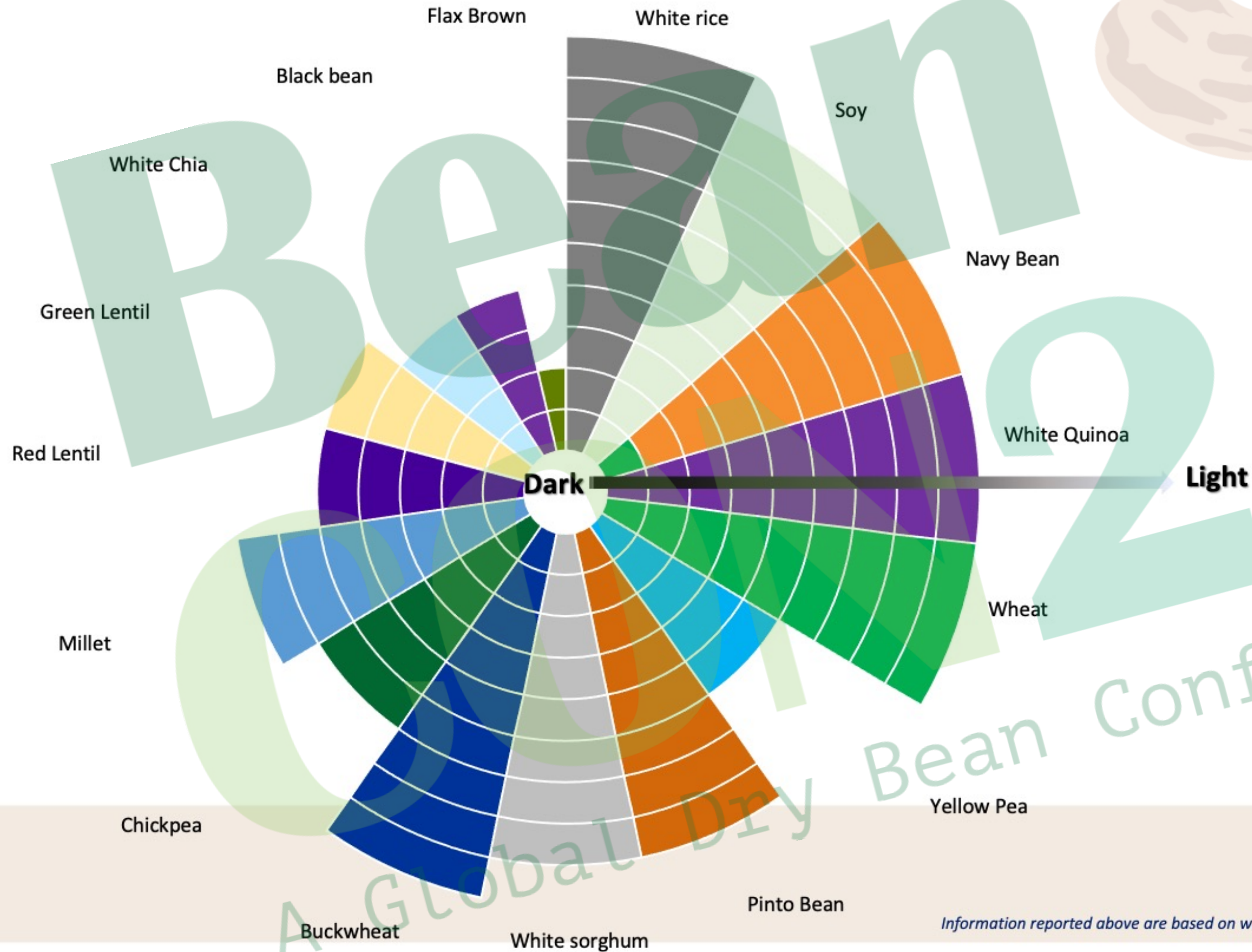


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Ai, Y; et al. (2016) Food Chem. 211: 538-545.



# Colors: Ingredients Matter



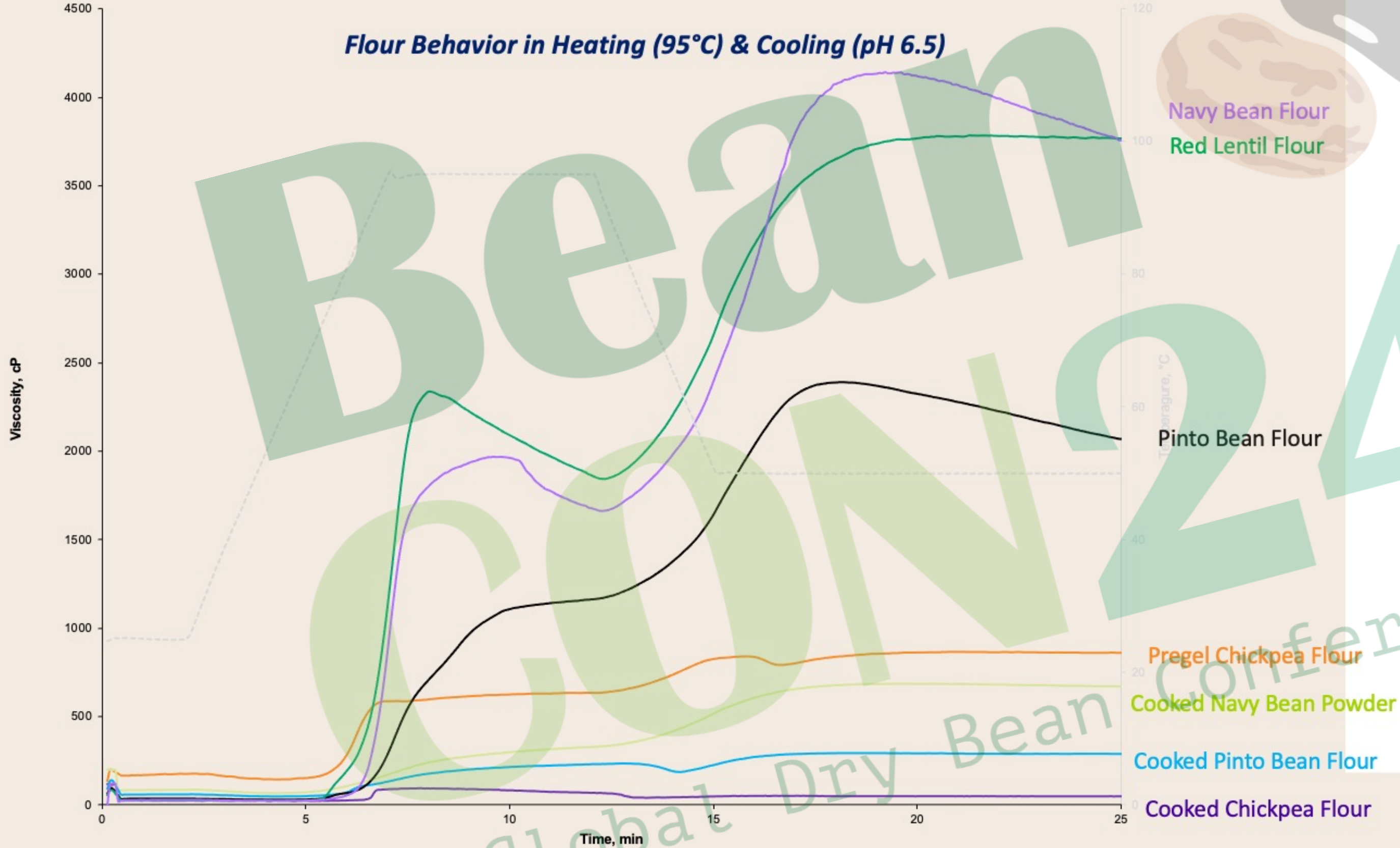
Information reported above are based on whiteness index calculation

Proprietary business information of ADM.



# Bean Functionality: Viscosity

Flour Behavior in Heating (95°C) & Cooling (pH 6.5)





# Types of Resistant Starch in ADM Edible Beans

## RS1

Raw Bean Grits  
Cooked Bean Grits/Meal

*Up to 34% resistant starch\* +  
Significant SDS content*

Intact food matrix protects RS  
Less "processed" option

\*Luhovyy BL, et al. CFW 2017



## RS2

Raw Bean Flour  
(High resistant starch  
wheat flour)

*Up to ~30% resistant starch +  
Significant SDS content*

Better taste & texture for snacks



## RS3

Cooked Bean  
Grits/Meal/Flour

*Up to 17% resistant starch +  
SDS*

Links to RS origins in food



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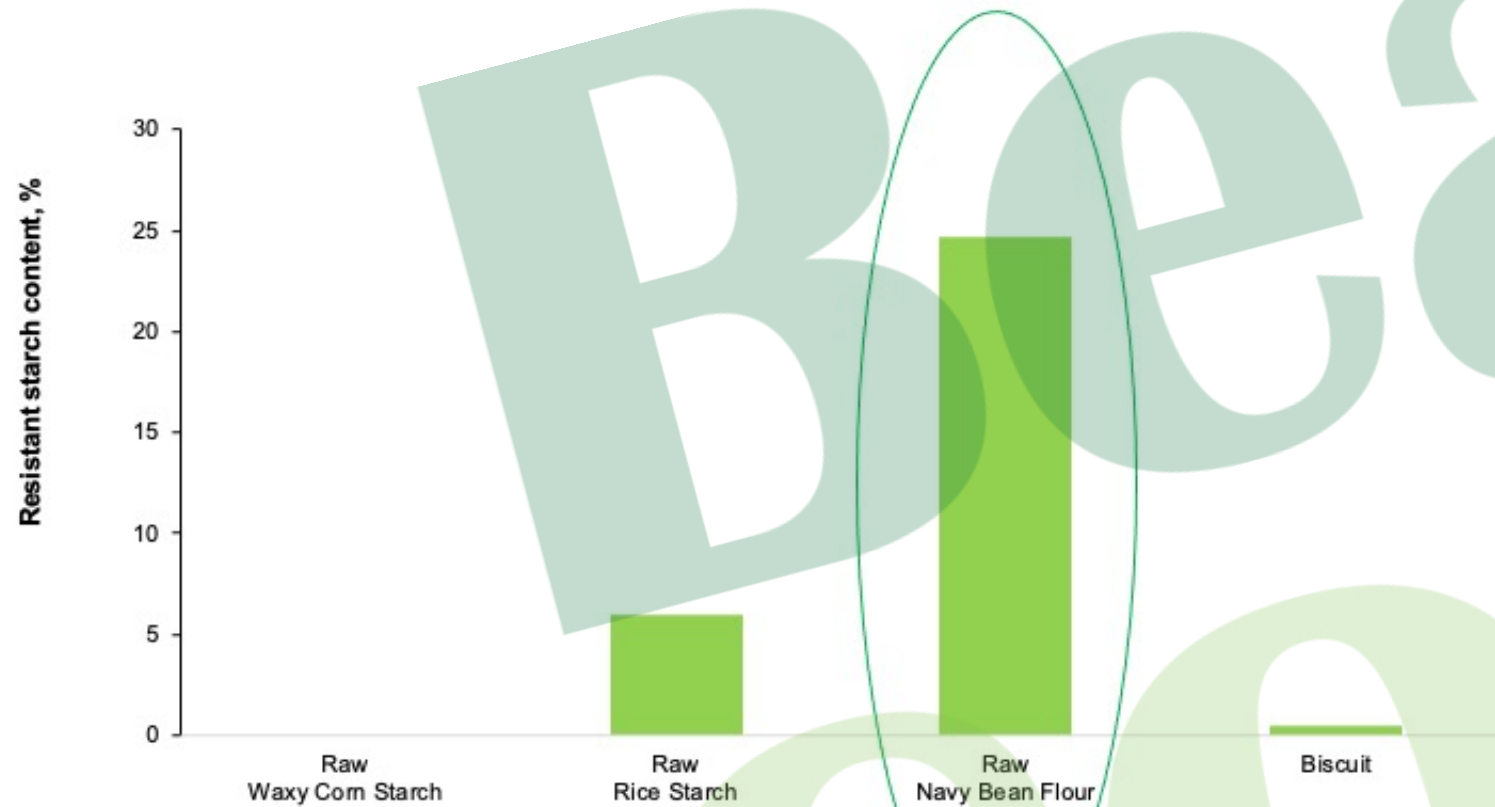
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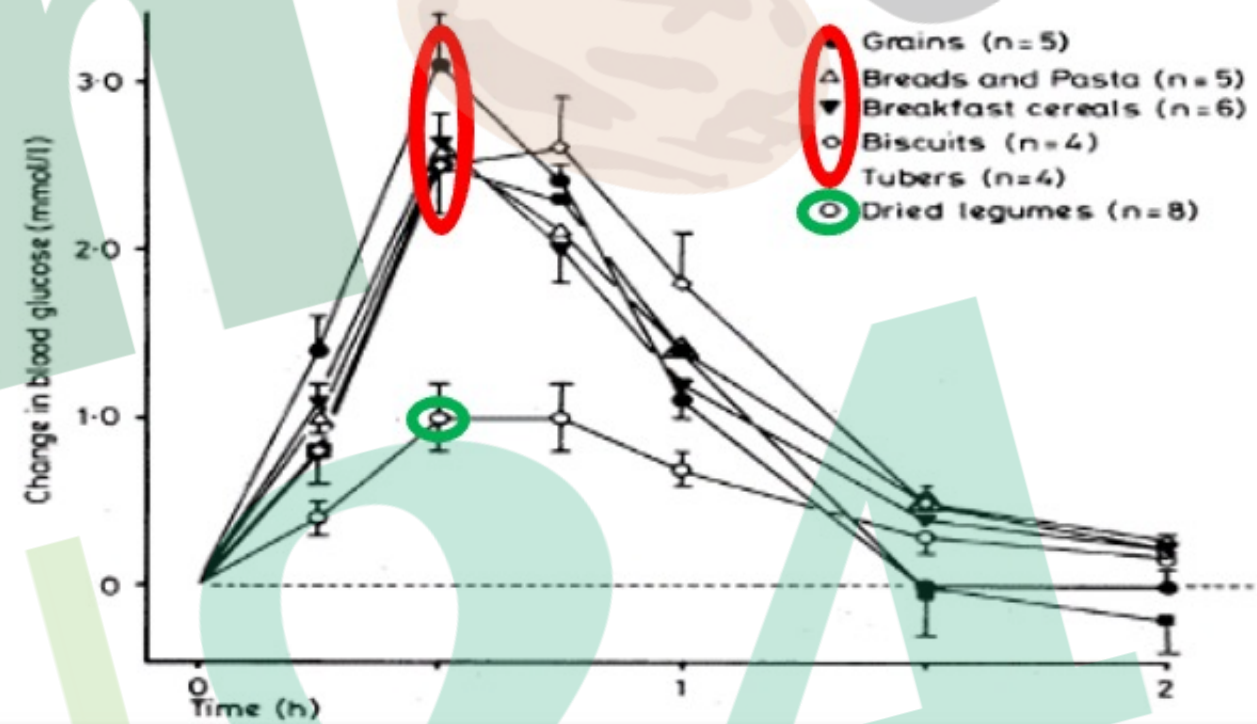


# Pulse Starch Digestibility: Not All Carbs Are Created Equal

Resistant starch & Total SCFA produced by pulse starches were significantly higher than normal corn starch, which is associated with healthy metabolism and gut health benefits



**Fig. 1.** Resistant starch content in corn, rice & navy bean flour (Englyst method).



**Fig. 2.** Change in blood glucose concentration after eating 50-g Carb in human (15 men, 10 women; 110±3% ideal body weight).

Dietary group	Acetic acid	Propionic acid	Butyric acid	Total SCFA	pH
	(μmol/g content)				
CS	31.77±2.21	3.49±5.44	1.90±0.79 <sup>b</sup>	37.16±7.55 <sup>b</sup>	7.01±0.08 <sup>a</sup>
AS	31.92±1.03	6.52±3.41	7.78±2.55 <sup>a</sup>	46.22±4.34 <sup>a</sup>	6.44±0.16 <sup>bc</sup>
KS	32.46±3.39	4.02±2.13	6.80±3.86 <sup>a</sup>	43.28±3.54 <sup>ab</sup>	6.66±0.16 <sup>b</sup>
TS	33.59±4.74	5.81±2.33	6.68±2.32 <sup>a</sup>	46.08±5.67 <sup>a</sup>	6.30±0.40 <sup>c</sup>

Values are expressed as means±SD for six rats. Means in the same columns bearing different superscript letters are significantly different ( $p < 0.05$ ). See Table 1 for abbreviations.

**CS:** corn starch; **AS:** adzuki starch; **KS:** Kintoki starch <Japanese kidney bean>; **TS:** Tebou starch <white common beans>

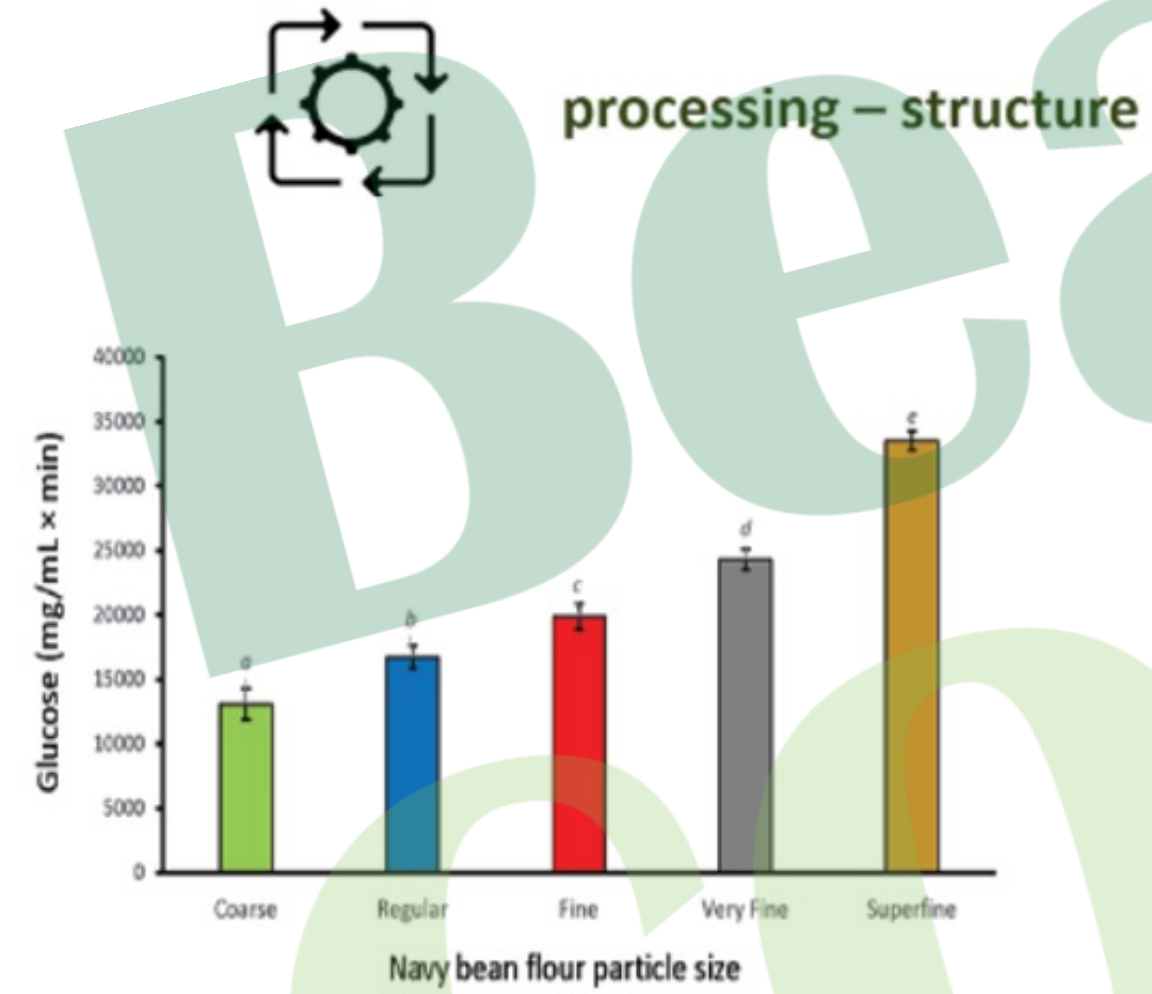
**Table 1.** Cecal SCFA concentrations and pH in rats fed various bean starches for 4 wk.

Jenkins, DJA, et al. (1980) *BMJ*. 281(6240): 578-580; McCrory, MA, et al. (2010) *Adv Nut.* 1: 17-30.  
Han, et al. 2003. *Journal of nutritional science and vitaminology*, 49(4), pp.281-286.

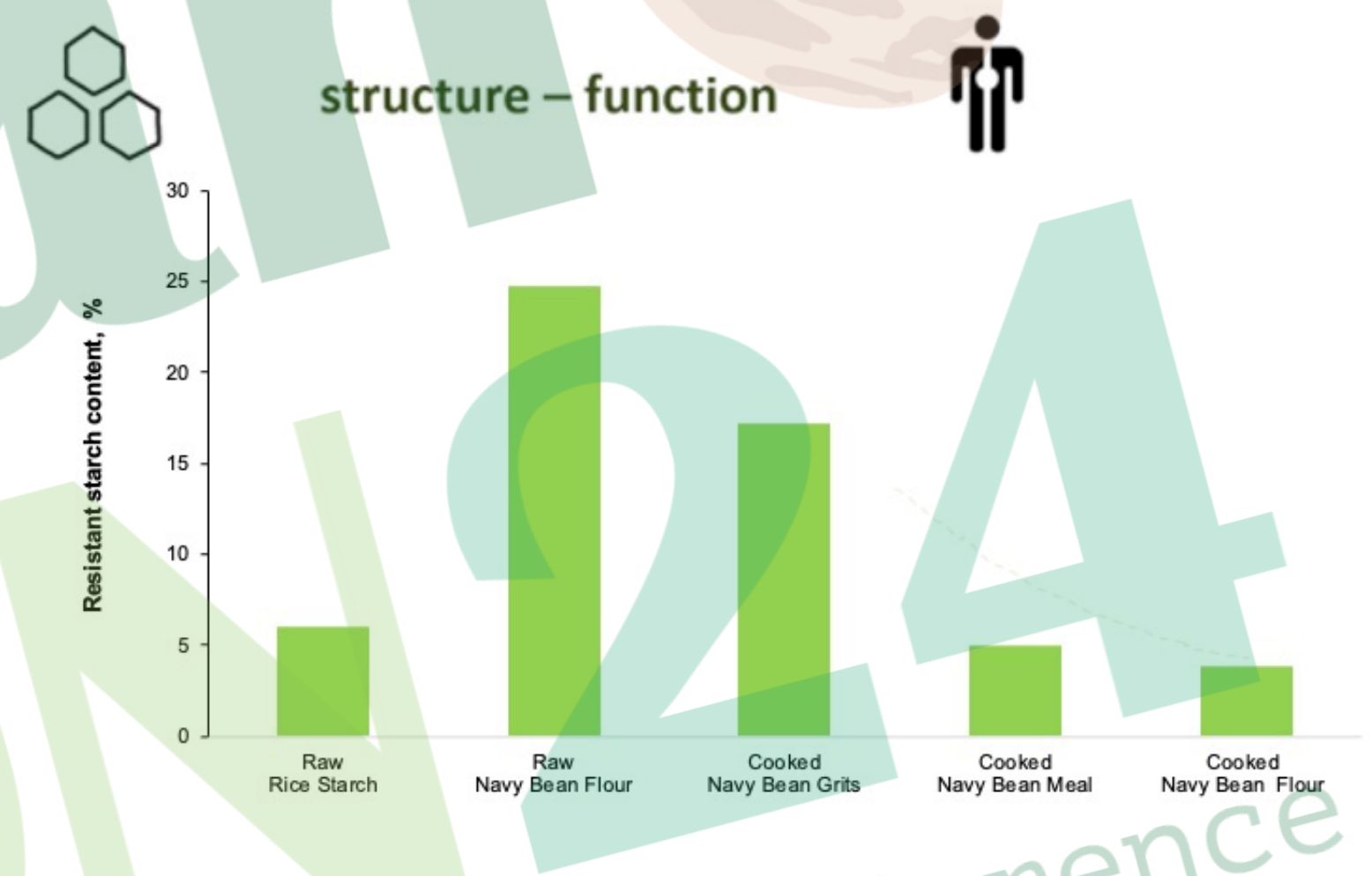


# Pulses Starch Digestibility Format and Processing Matters

*Navy bean products with larger particle sizes were associated with a lower carbohydrate digestion rate*



**Fig. 1.** Glucose release over 180 min after digestion of raw navy bean flours *in vitro*. (Luhovyy et al., 2017)



**Fig. 2.** Resistant starch content in rice & navy bean products (*Englyst method*).

Ingredients	Particle size
Raw Navy Bean Flour	90-95% thru. #100
Cooked Navy Bean Grits	99% thru #6
Cooked Navy Bean Meal	75% thru. #16
Cooked Navy Bean	95% thru. #80

Luhovyy, et al., 2017. *Cereal Foods World*, 62(5), pp.208-213.

Wang, S., et al., *Journal of Agricultural and Food Chemistry*, 65(8), pp.1697-1706.

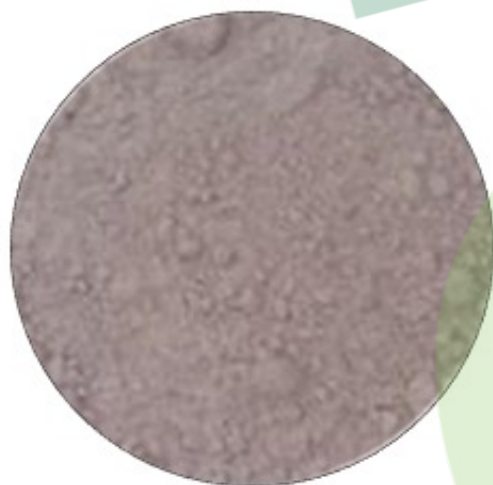


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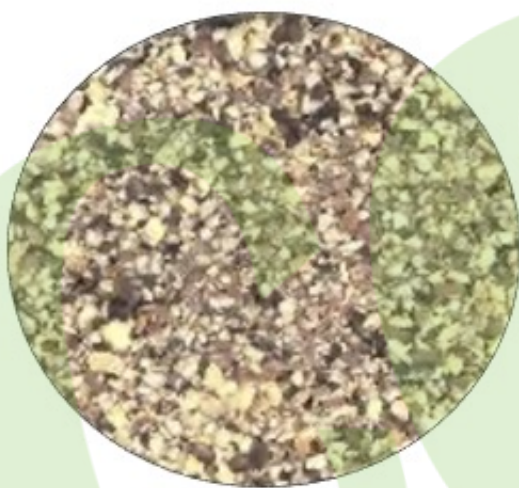




# Snacks – Chips and Extruded Puffs



Cooked Black Bean Powder



Cooked Black Bean Grits



Cooked Navy Bean Powder



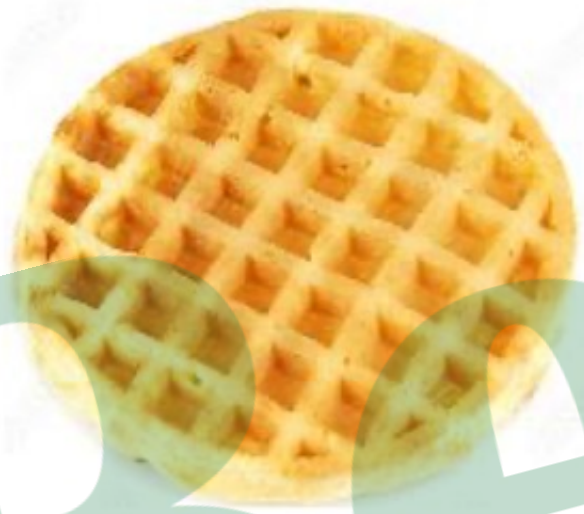
Cooked Navy Bean Meal

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# Bakery – Waffle and Cracker



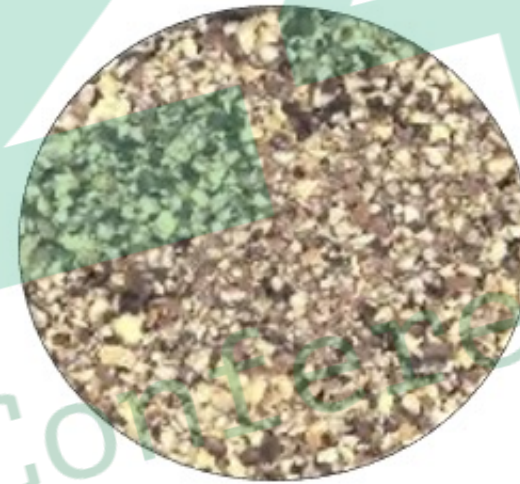
Navy Bean Flour



Cooked Navy Bean Powder



Cooked Black Beans



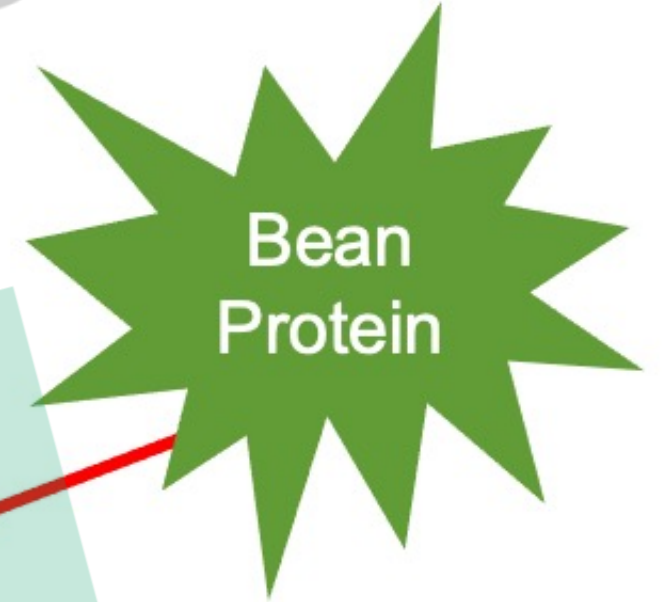
Cooked Black Bean Grits

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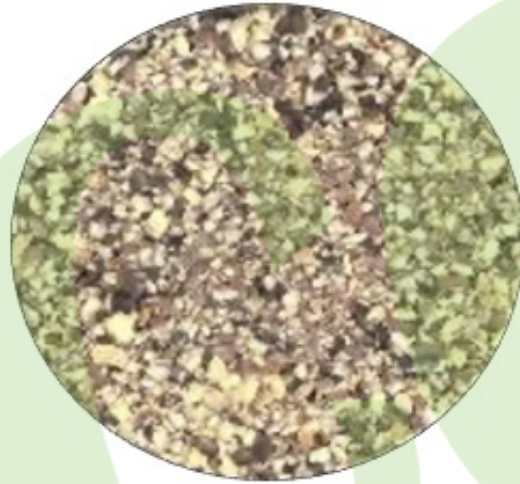
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# Plant Based Meat Alternatives – Burgers and "Chicken"



Cooked Black Beans



Cooked Black Bean Grits

## Innovation Thought Starter:

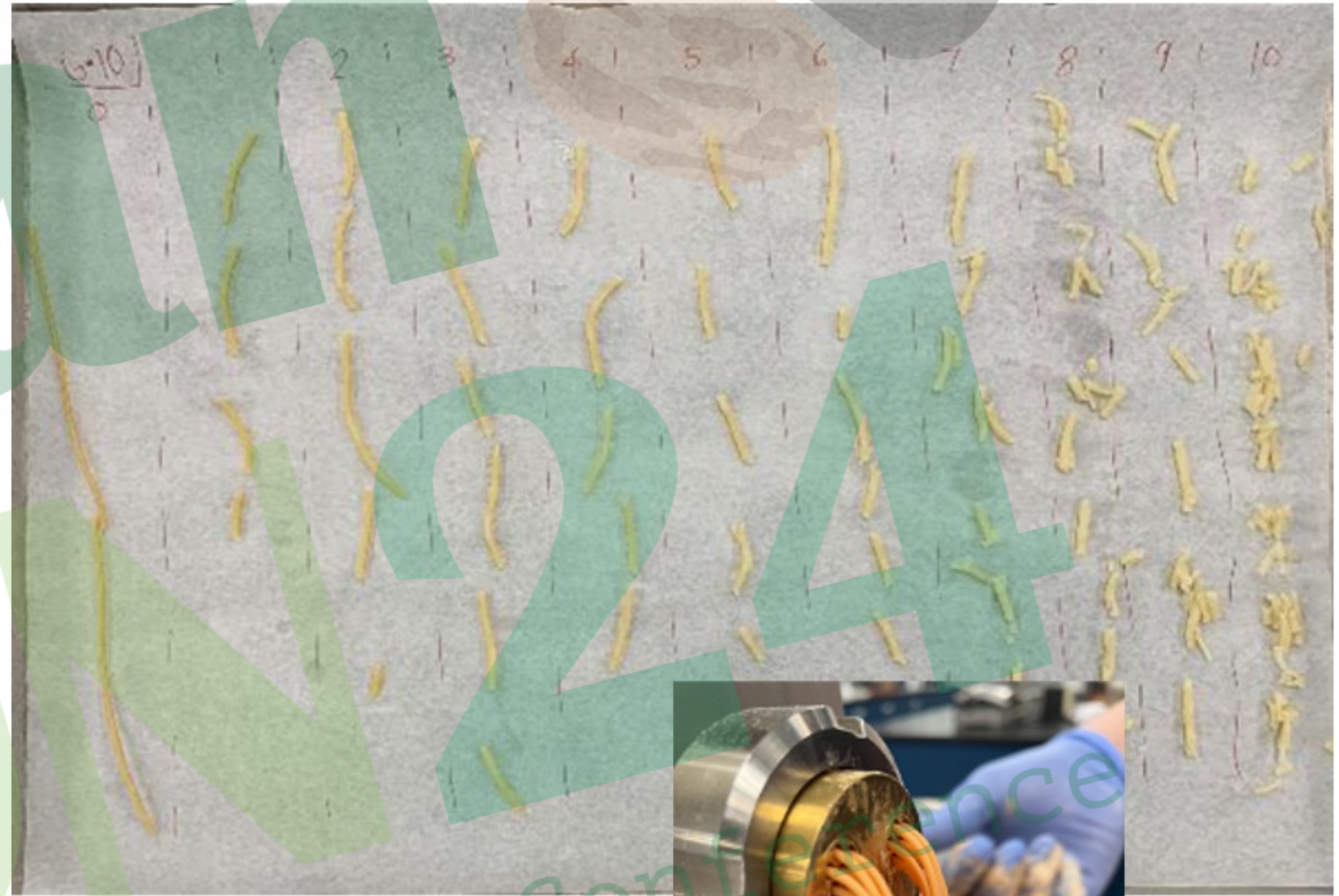
- Bean proteins as concentrates or isolates in various forms including powder and texturized products to mimic meat tissue



# Pasta



G10 1 2 3 4 5 6 7 8 9 10



Navy Bean Flour



Quinoa Flour



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