

Introducing Bambara Groundnut to the European market: sensory evaluation of a Bambara Groundnut beverage

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Introduction:

Bambara Groundnut (BGN), an underutilized African legume, can contribute to food system sustainability due to its genetic diversity, nitrogen-fixing capacity, drought tolerance, and nutritional value. Relatively little attention has been given to BGN added-value processing and product development globally, and in the EU it is a novel commodity. The startup WhatIF Foods (WF) developed a plant-based milk alternative to valorise and create a market for BGN.

Objective:

Understand whether a BGN beverage is an effective medium to introduce BGN to new consumers in a context where it is unknown.

A Portugal-based sensory evaluation was conducted to investigate the product liking and perception compared to market available milk alternatives. This was complemented by a broader online survey investigating consumer response to different BGN product options



BGN; from plant to plant-based beverage. a) Partner farmer BGN field. b) BGN seeds after harvest. c) BGN plant-based beverage (WhatIF Foods™).

Materials and methods

Focus groups

- Two consumer groups: university setting (n=6) and local organic store clientele (n=8)



Challenges being faced as consumers

Attitude towards legumes

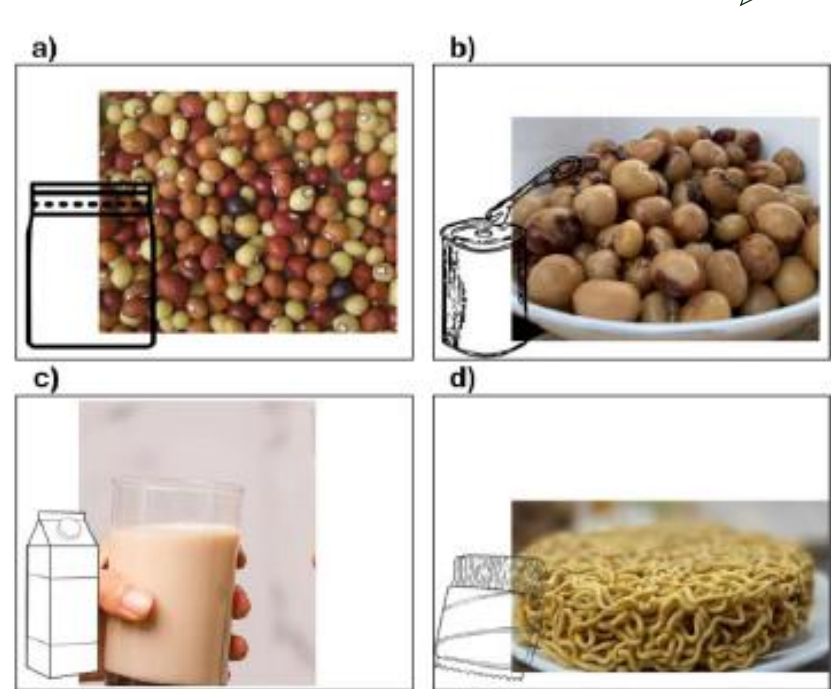
Plant-based beverage vs dairy perceptions

Response to different Bambara products:

- Dry bean
- Canned
- Beverage
- Noodles

Sensory descriptions for Bambara beverage

Descriptive terms for check-all-that-apply questions (CATA)



Sensory and perception evaluation (Portugal based, n=54)

- Novelty impact investigated through 2 sequential sensory evaluations: first on three coded beverage samples, second with labelled samples and nutritional information cards

- Demographics
- Dairy vs plant-based beverage consumption patterns. Perception of plant-based beverages ('check-all-that-apply' (CATA))
- Bambara, soy, almond:
 - a) Coded sensory evaluation
 - b) Labelled sensory evaluation
- Bambara beverage general perception: CATA
- Degree of importance of factors in influencing willingness to consume



Online survey (international, n=148)

- BGN product type investigated with consumers in contexts where BGN is unknown.

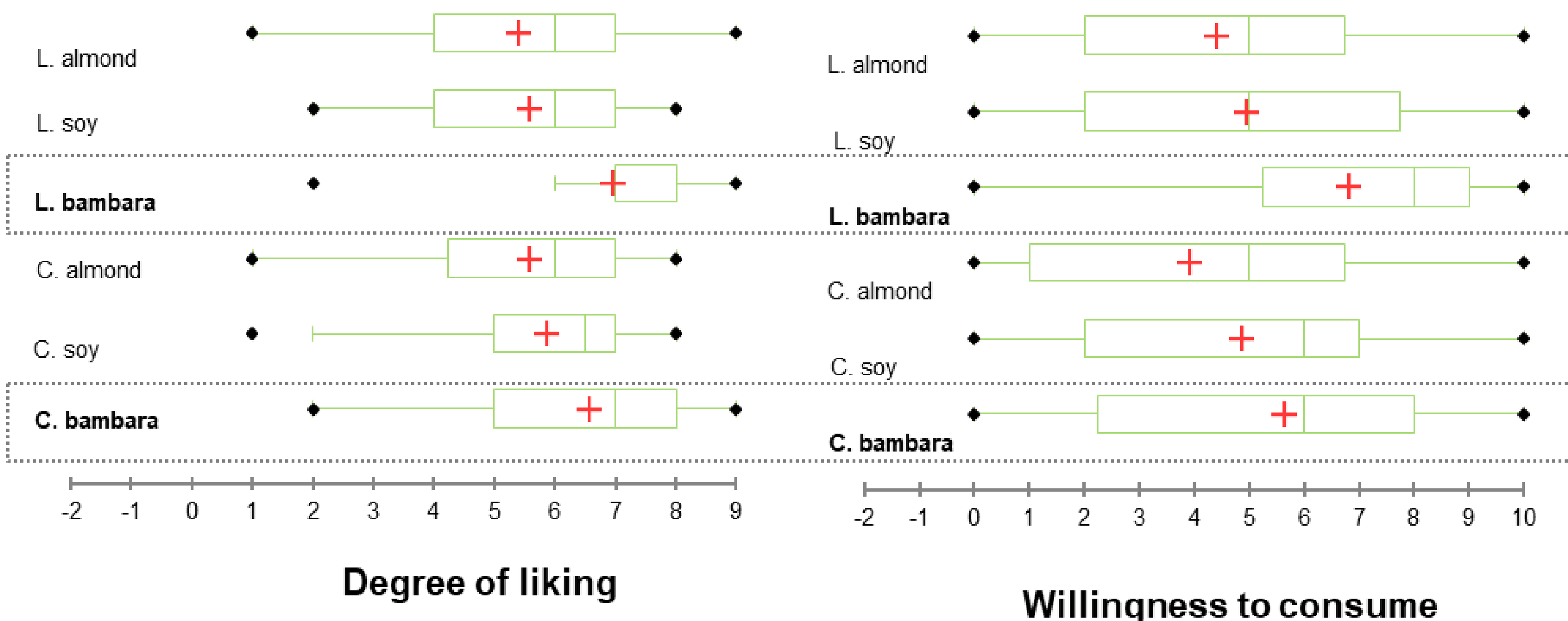
- Demographics
- Legume consumption patterns and perceptions
- Product most willing to consume → Why (CATA)
- Product least willing to consume → Why (CATA)
- How important are different factors in influencing the choice to try

Results and discussion

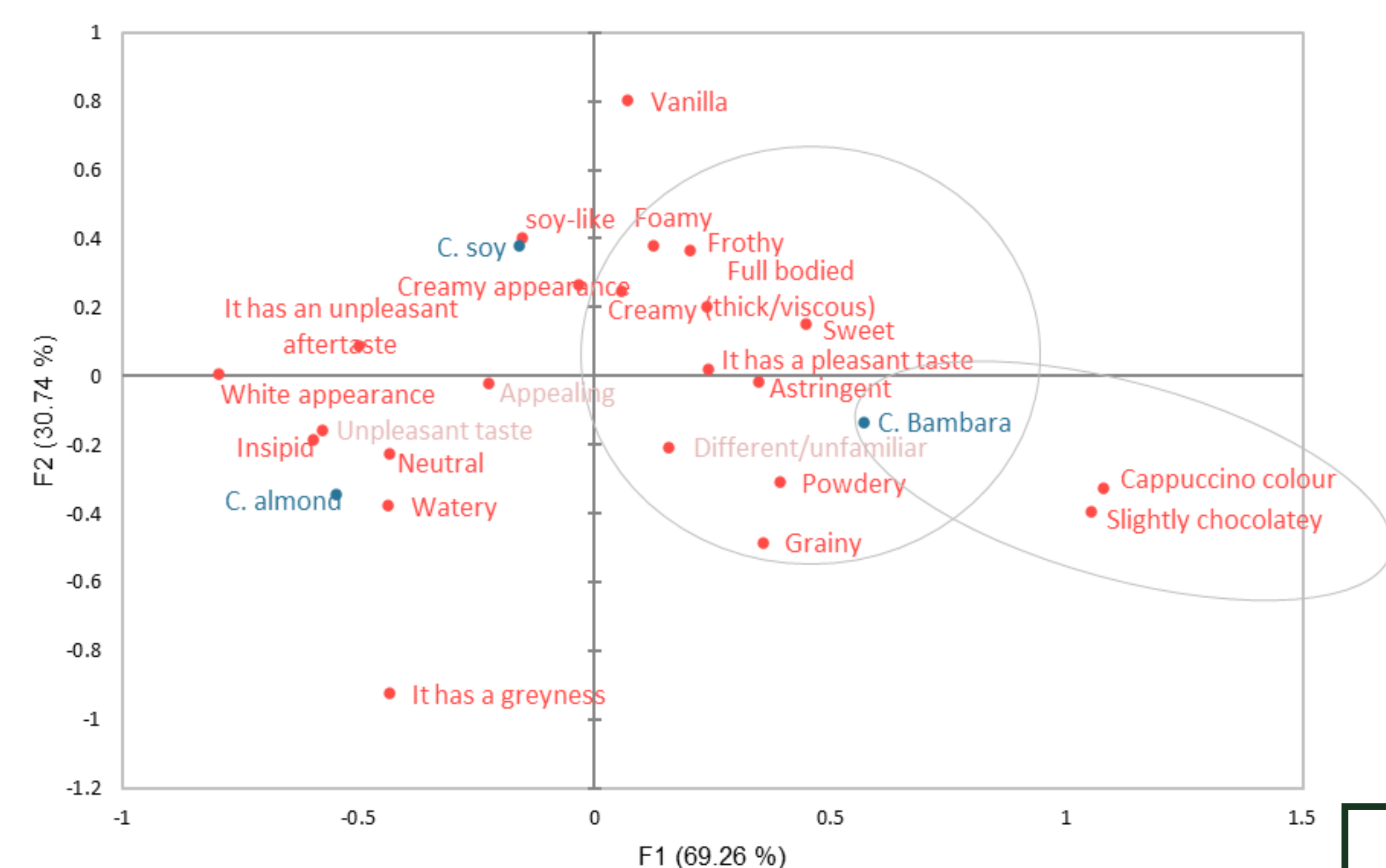
The BGN beverage was significantly preferred over the soy and almond samples with liking and WTC increasing after information was given

C: coded and blind tasted

L: labelled and tasted after information



The BGN beverage was characterised as being **creamy, pleasant tasting, and sweet** (despite no sugar inclusion). Astringency, graininess, and powderiness are also strongly associated but do not have an influence on degree of liking, unlike insipidity and wateriness which do.

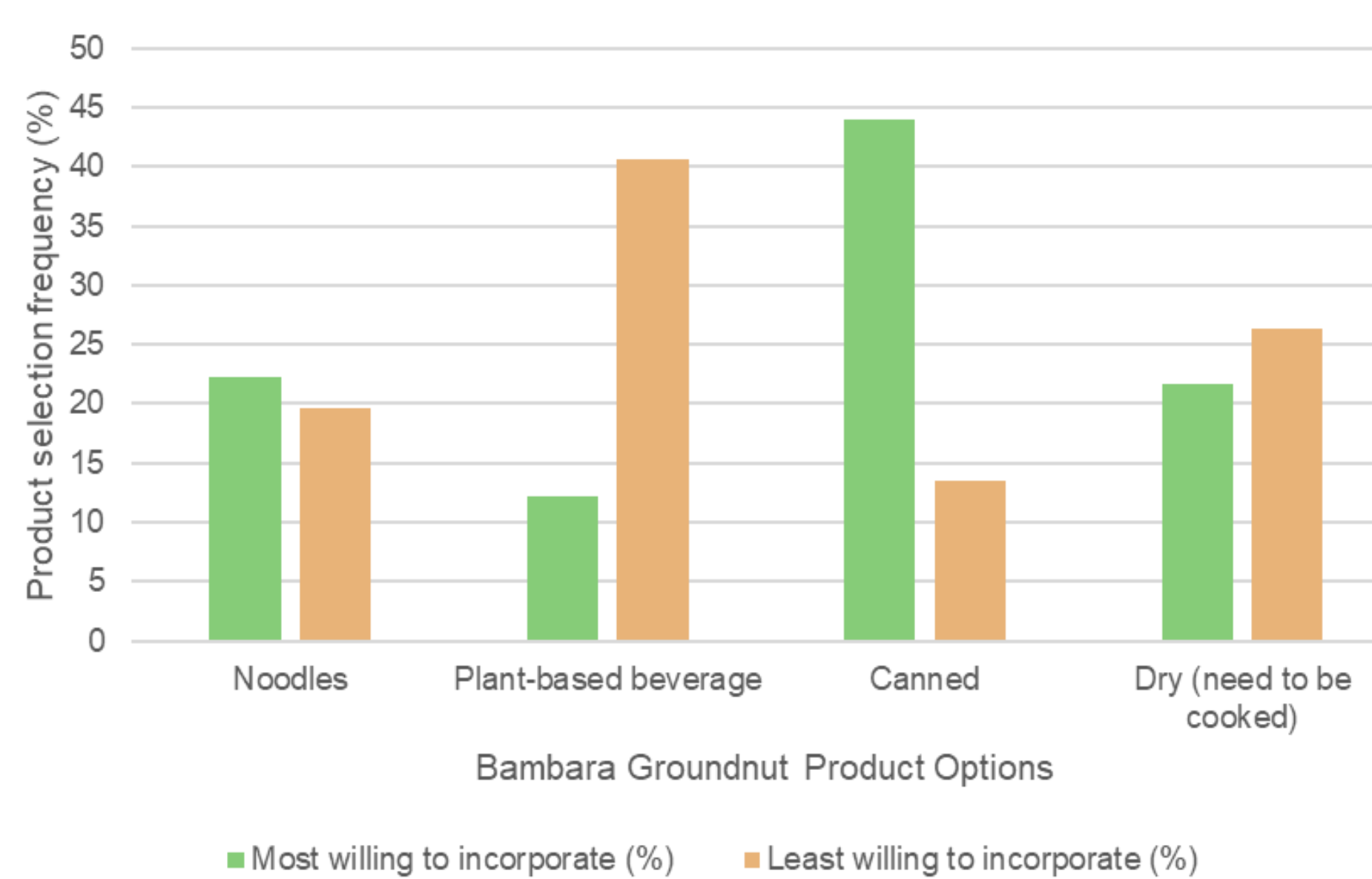


After information, the BGN beverage was regarded as being substantial, a **good breakfast/snack choice, and good for the environment**. The snack phrase became a discriminating factor for the BGN beverage after labelling.



Consumers experience was counterintuitive to what they learned about the product.

How is it grown?
Surprisingly good
Would not imagine it comes from a bean
Snack drink not milk replacement
Environmental impact?
Easy way to eat more beans
Expected a bad taste



Between the 4 product options presented in the online survey, consumers would be **least willing to incorporate the BGN beverage into their diets**. The statements "I don't think it will be tasty" and "I don't use this type of product" were most cited as the reasons why.

Conclusions

The biggest hurdle for market entry will be overcoming consumer expectation

- The beverage is liked by consumers who are unfamiliar with Bambara Groundnut.
- There is a need to overcome negative expectations.
- The consumer lead BGN beverage sensory characterization can be used to build positive product expectations.
- The beverage may achieve better market penetration if distributed as an independent snack-drink, not milk alternative.
- Further study is needed on the sensory acceptance of other BGN products to assess whether expectation and product familiarity (e.g. canned beans) align with product experience.

Acknowledgments

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