Sustainable Agrifood Production Research Centre

Exploring consumer perceptions regarding rice-based product with a low glycemic index to support new product development

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INTRODUCTION

Studies have shown that health is operating as an important individual food choice criterion. To satisfy this consumer concern, many of the new food innovations have been targeted at the promotion of good health, especially for staple foods, such as rice. This is particularly relevant for Portugal, since Portugal is the first rice-consuming country in the 27 EU member states (FAO, 2018). Additionally, several studies have linked rice consumption to the diabetes and obesity (Saneei et al., 2017). All these factors reinforcing the need to design a rice healthy alternative, like a low glycemic index (GI) rice product. The aim of this exploratory study was to explore consumers' knowledge and perceptions regarding the concept of such rice-based products. The findings will support the development of innovative rice products with low GI under scope of the ArrozBig research project.

MATERIAL AND METHODS

- **Face-to-face interviews** were carried out with consumers responsible for household purchasing and preparation of rice for meals and audio-recorded.
- **Participants:** Twenty-four individuals were selected by a quota sampling, according to sex, age group, education level and rice consume frequency and type:
  - G1-Higher frequency of rice consumption: consumption of at least 5 times / week.
  - G2-The lower frequency of rice consumption: consumption of rice up to 1 time / week.
  - G3- Frequent consumers of brown rice: at least 2 times / week.
- A **semi-structured interview guide of open-ended questions** was developed taking into consideration the following topics: i) knowledge of GI concept; ii) knowledge towards commercially available low GI products; iii) consumption determinants of products based on rice with low GI.
- Participants were asked to provide a report on their two main meals (lunch and dinner) during the latest week, to validate the consumption frequency.
- **Content analysis**: Interviews were anonymously transcribed verbatim, and a thematic analysis was performed, considering a hybrid approach, in the sense that combines a deductive and inductive data-driven analysis (Fereday, 2006).
- The transcripts of the interviews were entered into a qualitative data analysis software NVivo 12 Pro (QSR International, 2018).

RESULTS

- Table 1. Interviewers characterization, overall and by consumer segment (n=24)

Socio-demographics	G1 (n=8)	G2 (n=8)	G3 (n=8)	Total n (%)
Sex				
Female	4	5	4	13 (54.1%)
Male	4	3	4	11 (45.9%)
Age group				
[18; 35[	3	2	3	8 (33.3%)
[35; 55[	3	4	3	10 (41.7%)
≥55	2	2	2	6 (25.0%)
Education level				
No higher education	5	6	6	17 (70.8%)
Higher education	3	2	2	7 (29.2%)

✓ Inductive approach gave rise to another broad theme (culinary practices) that was not expressive and to the remaining topics that have adjusted as sub-themes of the initial themes.

✓ The concern about rice "calories" is transversal to all interviewees, although the IG concept is unknown to part of respondents (38%). The majority claimed that they "never thought about the GI of rice". However, they negatively perceived the carbohydrate content referring to be high in rice.

(P2) *"To have few hydrates. Not having high levels of carbohydrates (…) in rice I have never thought (GI), I'm honest, but we are careful with other types of food."* (Female, [35-55[, no higher education, G3)

(P6) *"Calories, carbohydrates, that's what I mean ... avoiding carbohydrates, rice and potatoes."*(Female, [35-55 [, higher education, G2)

(P7) *"I don't think about it. We will think in another foods like marmalades, jams. Not for rice."* (Female, [35-55 [, higher education, G1)

✓ In order to obtain healthier dishes, some women reported that they add vegetables and pulses.

(P1) *"…I cook rice with vegetables, pulse, it's healthier, and it's more vegetables than rice, It's more beans than rice, it's more peas than rice..."* (female, ≥55, no high education, G3)

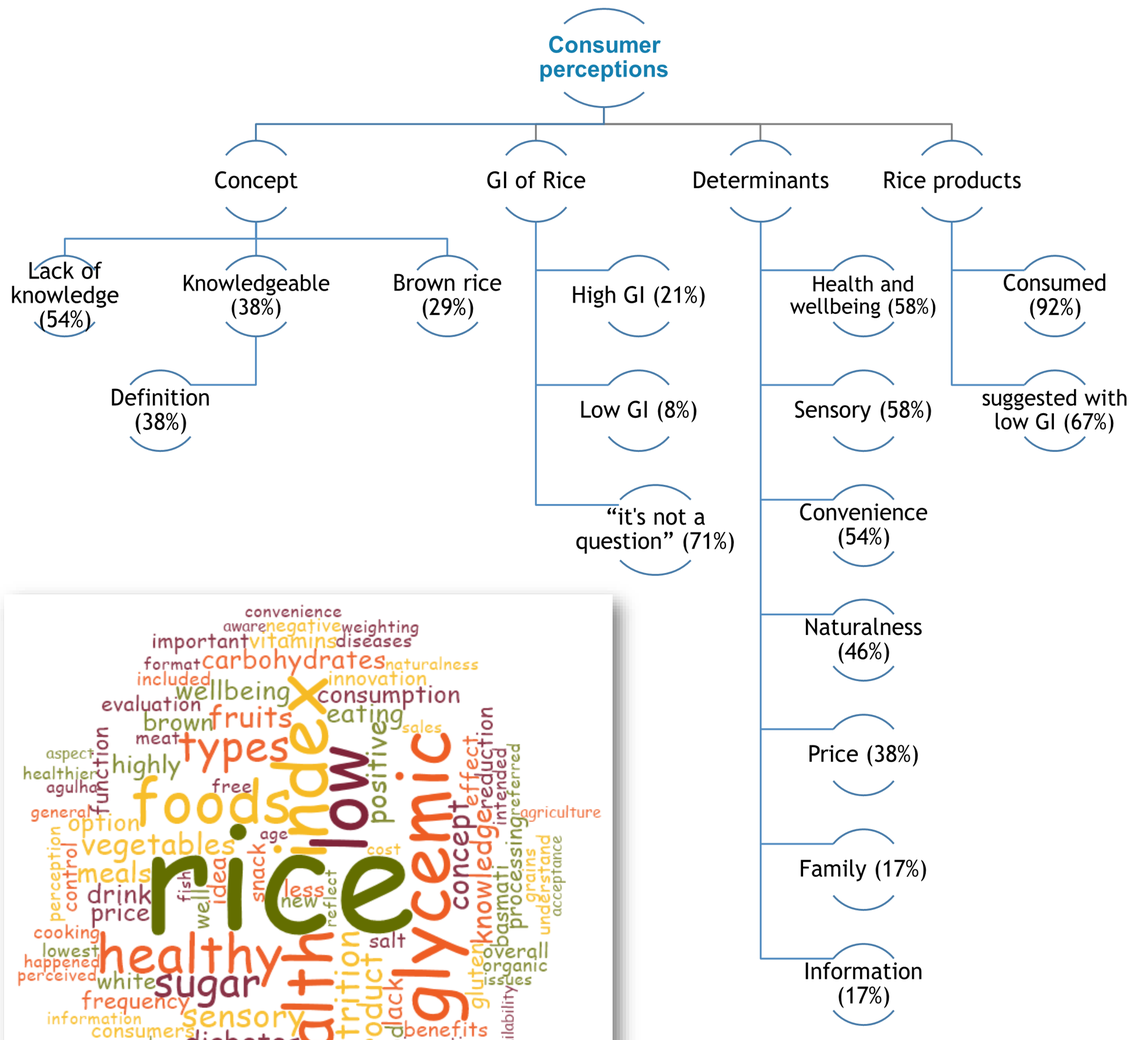

Figure 1. Coding scheme: themes and sub-themes organized in the four broad themes, with the percentage of cases

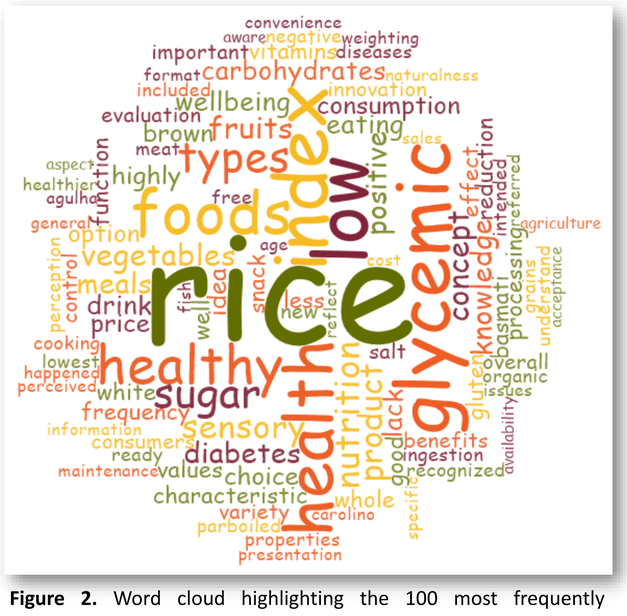

Figure 2. Word cloud highlighting the 100 most frequently mentioned words in the interview.

Table 2. Evaluation of the Glycemic Index concept knowledge, regarding participants characteristics.

	Sex (%)		Education level (%)		Age group (%)			Consumer group (%)		
	F (n= 13)	M (n=11)	without High Ed. (n=17)	High Ed. (n=7)	[18-35[(n=8)	[35-55[(n=10)	≥55 (n=6)	G1 (n=8)	G2 (n=8)	G3 (n=8)
With knowledge	69.2	36.4	52.9	57.1	62.5	50.0	50.0	37.5	62.5	62.5
Lack of knowledge	23.1	54.5	47.1	14.3	37.5	40.0	33.3	37.5	37.5	37.5
Referencing to brown rice	23.1	36.4	23.5	42.9	37.5	20.0	33.3	25	25	37.5

Table 3. Consumption determinants of rice products with low GI, regarding sociodemographic characteristics of the participants.

	Sex (%)		Education level (%)		Age group (%)			Consumer group (%)		
Determinants	F (n= 13)	M (n=11)	without High Ed. (n=17)	High Ed. (n=7)	[18-35[(n=8)	[35-55[(n=10)	≥55 (n=6)	G1 (n=8)	G2 (n=8)	G3 (n=8)
Health and wellbeing	53.8	63.6	52.9	71.4	50.0	70.0	50.0	62.5	62.5	50.0
Sensory	61.5	54.5	52.9	71.4	50.0	70.0	50.0	62.5	37.5	75.0
Convenience	69.2	36.4	52.9	57.1	62.5	50.0	50.0	50.0	62.5	62.5
Naturalness	38.5	54.5	47.1	42.9	50.0	30.0	66.7	50.0	25.0	62.5
Price	53.8	18.2	35.3	42.9	25.0	60.0	16.7	37.5	37.5	37.5
Family	30.8	0.0	17.6	14.3	12.5	10.0	33.3	25.0	12.5	12.5
Information	15.4	18.2	11.8	28.6	25.0	20.0	0.0	12.5	25.0	12.5

✓ When asking consumers about food products based on rice, they essentially reported experience with puffed rice snacks and expressed particular interest in consuming drinks, meals and desserts based on rice with low GI. They stressed that they would consume it for health and well-being reasons, but the price and taste would influence their choices. Some respondents reinforce the need for additional knowledge about the product.

CONCLUSIONS

While healthiness perceptions relating to low GI products may vary between sex and age group, the main factor influencing perceived healthiness and intention to buy a product with health claim is personal relevance. This characteristic seems to be directly linked to rice consumption frequencies and the choice of brown rice.

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Acknowledgments: This research was supported by FCT Doctoral Grant No. SFRH/BD/146895/2019. Authors also acknowledge financial support from National Funds from FCT, within the scope of UIDB/05748/2020 and UIDP/05748/2020.

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