Study of salt reduction in snacks: evaluation of consumers' acceptance and preference

Estudo sobre a redução do sal em snacks: avaliação da aceitação e preferência dos consumidores

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Abstract

Excessive salt consumption is a public health problem, that increases the risk of developing several diseases. However, when ingested in adequate amounts, it allows to improve the organoleptic characteristics of foods.

This study aims to: i) evaluate the effect of salt and Natural Flavour (NF) quantity on the acceptance and preference of chickpea-based snacks; ii) assess the impact of the consumption frequency of salty snacks on the preference of salt and NF formulations.

Sensory Analysis allowed to evaluate and interpret the consumers' results. The study collects information from 22 healthy members of an untrained sensory panel. They tasted 6 chickpea snacks, all of them with different amounts of salt and NF. Acceptance and preference were assessed through an Affective Test with a 9-point hedonic scale (for taste, aroma, texture and final appreciation), and with the choice of the preferred and least preferred snack.

In general, the acceptance was positive, however the results suggest that there were no significant differences in the parameters evaluated. It's concluded that it's possible to reduce the amount of salt and NF in these snacks, without affecting their acceptance. Quasi significant association was found between the preference and changes in the formulation (p=0.053), and the snack with less salt content and less NF was considered the preferred one. The frequency of consumption of salty snacks had no impact on the selection of the preferred formulation.

Keywords: salty snacks; sensory analysis; acceptance; preference.

Resumo

O consumo excessivo de sal constitui um problema de saúde pública, que aumenta o risco de desenvolver diversas doenças. Contudo, quando ingerido em quantidades adequadas, permite melhorar as características organoléticas dos alimentos.

O presente estudo pretende: i) estudar o efeito da quantidade de sal e de aroma natural (AN) na aceitação e preferência de *snacks* de grão-de-bico; ii) avaliar o impacto da frequência do consumo de *snacks* na preferência das formulações de sal e AN.

A Análise Sensorial permitiu avaliar e interpretar os resultados dos consumidores. O estudo reúne informação de 22 membros saudáveis de um painel sensorial não treinado. Estes provaram 6 *snacks* de grão-de-bico, todos com diferentes quantidades de sal e AN. A aceitação e a preferência foram avaliadas através de um Teste Afetivo com escala hedónica de 9 pontos (para o sabor, aroma, textura e apreciação final), e com a escolha do snack preferido e menos preferido.

De um modo geral a aceitação foi positiva, porém os resultados sugerem que não se verificaram diferenças significativas nos parâmetros avaliados. Concluiu-se que é possível reduzir a quantidade de sal e AN nos *snacks*, sem afetar a sua aceitação. Verificou-se uma associação quase significativa entre a preferência e as mudanças na formulação (p = 0,053), sendo o *snack* com menor teor de sal e menos AN o preferido. A frequência do consumo de *snacks* salgados não teve impacto na seleção da formulação preferida.

Palavras-chave: snacks salgados; análise sensorial; aceitação; preferência.

Acronyms and Abbreviations

BP - Blood Pressure

FCNAUP - Faculty of Nutrition and Food Sciences of University of Porto

FI - Food Industry

H^{NF} – High Natural Flavour

H^{S} – High Salt

L^{NF} – Low Natural Flavour

L^{S} - Low Salt

M^{S} - Medium Salt

NF - Natural Flavour

SP – Sensory Panel

SA – Sensory Analysis

SD – Standard Deviation

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Introduction

Nowadays, there is a wide diversity of research and evidence focusing on salt intake and its effects on human health. The term salt will be used to refer the Sodium Chloride (NaCl) also known as table salt[1]. Whether for the culinary properties of seasoning, or to improve the sensory quality of food, salt is part of daily diet of individuals[2].

Salt is the major source of sodium (Na^+) in the diet[3] and despite the advantage of the electrolytes, Na^+ and Cl^-, in our body - participating in the performance of vital functions[1] - when excessive salt is consumed, there is an increased risk of certain disorders[3]. One of the main effects is the raise in blood pressure (BP), which consequently leads to an increased risk of developing cardiovascular diseases[3-5]. In addition to this well-studied effect, there are also other clinical outcomes when exceeding the recommended amount of salt by World Health Organization (<5g per day, for adults[6]), such as kidney disease[5, 7], osteoporosis[8], dementia[9] and obesity[10]. Comparatively with this recommendation, European countries are characterized by diets with high intake levels of salt[11] and, specifically, in Portugal daily consumption is, approximately, 10,7 g of salt per capita[12].

Some studies show that there is an association between the consumption of salty products and a consequent adaptation/preference for salty food, especially when it occurs at a young age[13-15]. Thus, the gradual reduction of sodium content in diets results in a change of salt perception[16] and, consequently, a change in dietary options (with lower salt content)[17, 18]. This topic is somewhat controversial in the current literature and it should be subjected to further

research. Therefore, and taking into account the aforementioned information, the current evidence clearly indicates that a decrease in salt consumption is related to a reduction in BP and can include various health benefits[3, 11, 19]. On the other hand, salt is a great ingredient that affects the sensory properties by interacting with foods giving them texture, taste, among other organoleptic characteristics[20]. Hence, it can be relevant to take advantage of these qualities while adopting approaches to reduce their content, considering that reducing salt intake is an essential public health target[19].

Through Food Marketing (and in this case, responsible marketing[21]), Food Companies can play a leading role in consumers' eating habits as well as influencing their daily choices[22], so when well applied it can have a positive impact. Apart from the communication and marketing, Food Industry (FI) can create healthy, convenient and tasty products, considering the consumers' expectations and demands[23, 24]. Therefore, innovation, parallel to its various definitions, can be involved in different areas of the FI, as desired[25]. Through innovation it is feasible to reformulate a product, improving it in a way to satisfy the nutritional, individual and community needs[26]. In other words, the key to success for both food companies and consumers' health is the balance between the sensorial quality of the product and its nutritional quality.

Currently, there is a large variety of strategies that allow the reduction of salt content in foods, without changing the perception as well as consumer acceptance, such as: salt replacement, mostly with Potassium Chloride (KCl),[27, 28] salt replacement with mineral salts[29], the use of natural enhancers/flavours like herbs[30] or yeast extract[31] (to boost the salty taste), and the most evident and easiest alternative is the reduction of salt content in some extent[28, 32].

Sensory Analysis (SA) can help companies in the food sector in a large range of activities, including, for example, product development or the improvement and reformulation of products[33]. SA can be useful in several contexts and it can be defined as a "scientific discipline used to invoke, measure, analyse and interpret the reactions of foods that are perceived by senses of sight, ear, smell, taste and touch", according to the Institute of Food Technology[33]. Due to the importance of products' sensory characteristics and their impact on consumers' daily choices, SA emerges as a key tool for FI sector.

Objectives

Hence, this study aims to: i) evaluate the effect of salt and Natural Flavour (NF) – yeast extract - quantity on the acceptance and preference of chickpea snacks; ii) assess the impact of the consumption frequency of salty snacks on the preference of salt and NF formulations. For this purpose, SA was used as a tool to develop the study.

Materials and Methods

- **Participants**

This research collected data from twenty-two healthy students of the Faculty of Nutrition and Food Sciences of University of Porto' (FCNAUP) Sensory Panel (SP). The seventy-three members of the SP received an invitation by email and according to their availability, they applied to participate in this study using doodle.com platform. Of these seventy-three members, twenty-six registered their availability to participate in the SA and, of that total, four missed the test. Forty-seven did not respond.

No exclusion criteria was applied, and the research was conducted in accordance with the Helsinki Declaration.

- **Food Samples**

Six different formulations of a chickpea-based snacks, obtained from Snood Foods Lda, were used as samples in this study. The snacks were prepared with chickpea flour (61%), rice flour, olive oil, salt, natural fiber and NF.

a) Samples Preparation

All the samples have similar formulation except on salt and NF quantity. To provide different samples with different percentages of salt and NF, six formulations were prepared according to Table I. This corresponds to three levels of salt concentrations (1,0%, 0,8% and 0,6%) and two of NF (0,25% and 0,20%). To simplify the reading, the samples were denominated with the following abbreviations: High Salt + High NF (H^S/H^{NF}), High Salt + Low NF (H^S/L^{NF}), Medium Salt + High NF (M^S/H^{NF}), Medium Salt + Low NF (M^S/L^{NF}), Low Salt + High NF (L^S/H^{NF}), Low Salt + Low NF (L^S/L^{NF}).

Table I – Snacks' formulations, per 100g.

Formulations	Salt (%)	NF (%)
H^S/H^{NF}	1,0	0,25
H^S/L^{NF}	1,0	0,20
M^S/H^{NF}	0,8	0,25
M^S/L^{NF}	0,8	0,20
L^S/H^{NF}	0,6	0,25
L^S/L^{NF}	0,6	0,20

The snacks were all produced at the same time, two weeks prior to testing, and were stored in plastic bags, inside of a paper box sealed with adhesive tape.

- **Sensory Analysis**

The SA was conducted at FCNAUP and the data was collected from 14th to 17th of December 2020. The tests were distributed over the different days, preferably in the late morning or in the late afternoon, to avoid interferences with the feeding schedule. Experimental design was established according to a General Guidance of a Portuguese Norm Project designated: "Pr NP 4394:2000. Análise Sensorial Metodologia Guia Geral. IPQ, Lisboa.".

The sensory evaluation consisted in filling a questionnaire so that the participants tasted and rated the six snacks. This information is explained below in this section, point d).

a) Sensory Analysis' Installations

The sensory analysis had place in the Sensory Analysis Lab, at FCNAUP, with a controlled ambience, divided in twelve individual illuminated cabins. Each cabin provided taps with water, so that the tasters could drink any time they needed.

The tasters were asked to remain in silence during the analysis, so that they could have their own evaluation.

Due to coronavirus SARS-COV-2, the room was limited to four people each time.

b) Sensory Analysis' Materials

In each cabin a questionnaire was provided, together with six plastic plates and a plastic cup.

c) Test Method in Sensory Analysis

To properly implement a SA it is necessary to perform an adequate experimental design and to choose the test method most suitable to the

objectives[33]. As the main objectives of this research were to evaluate how well were products accepted and which snacks were preferred, the Affective Test was selected. According to the literature, this method is the most accurate for this specific study as it measures the consumer acceptance[33]. Corresponding to this test method the members of the SP don't need to be trained[33]. A nine-point hedonic Scale[34] was used to classify the acceptance' levels (Annex A).

d) Sensory Evaluation

The participants didn't have any information about the snacks, neither know what the study was about. The only information provided was that it was necessary to develop sensory tests to create a research study, with the aim of developing new formulations of legumes-based snacks.

The tasting moment was divided in two parts, to distribute the six samples (3 + 3) in order to provide a more accessible and adequate assessment. As aforementioned, every individual tasted the six samples, in a random order between the tasters, and each snack was identified with a random code. To register and identify the results, the samples were tasted from left to right.

The tasters had to respond to a questionnaire (Annex B) that was divided in three segments:

◦ In the first part, to evaluate the acceptance and the preference, participants tasted and rated 3 snacks, using a nine-point hedonic scale, ranging from 1 (dislike extremely) to 9 (like extremely) for the taste, aroma, texture, and the final appreciation of the samples. Next, from these three samples they had to choose one as preferred and other as least preferred. At the end of the first part, they were requested to drink some water, as a palate cleanser, and make a five

minutes' pause, before starting the next part. Palate cleanser was used to help in the elimination of residual materials from previous samples[33].

◦ The procedure was repeated in the second part but with other 3 snacks.

◦ Finally, in the third part, sociodemographic characteristics were collected for each participant, namely, sex, age, and the consumption frequency of salty snacks.

e) Statistical Analysis

Data was analysed using the software IBM® SPSS® Statistics (version 27.0) for Windows and Microsoft Excel 2016.

Mean, Standard Deviation (SD) and absolute/relative frequencies were calculated to support the descriptive statistics – sex, age and consumption frequency of salty snacks.

To analyse the acceptance, mean and standard deviation were applied to each parameter of the hedonic scale.

McNemar's test was used to evaluate the differences at the proportion of individuals who answered "Like moderately", "Like very much" or "Like extremely", on the "final appreciation" parameter.

To determine and compare the snacks' preference, relative frequency, Friedman test (indicated for paired samples) and mean rank were all used.

Spearman's Rho was calculated to define if there was an association between the consumption frequency of salty snacks and the choice of the preferred snack.

$p < 0.05$ determined statistical significance, and the confidence level used was 95%.

Results

- **Participants**

The results obtained from the socio-demographic questionnaire (Table II) indicate that the majority of the participants were female and, on average, the ages were farther away from the mean. In the same table there's the information about the absolute frequency of the consumption frequency of salty snacks.

Table II - Characteristics of the participants

Characteristics	Values
n	22
Sex: absolute (relative frequency)	Female: 19 (86%); Male: 3 (14%)
Age (years)	28 ± 10[a]
Consumption frequency of salty snacks (absolute frequency)	Rarely: 5; Once a month: 2; 2-3 times/month: 5; 1-3 times/week: 8; 4-6 times/week: 1; Daily: 1 More than 1/day: 0

[a.] Mean ± Standard Deviation.

- **Sensory Analysis**

a) Acceptance

Friedman test, a nonparametric test, was used to analyse if the differences on the hedonic scale were significantly different between the formulations of the snack (Table III). No significant differences were observed on taste, aroma, texture or final appreciation.

Table III - Friedman Test – Sensory parameters' *p* values

Parameters	*p* values
Taste	0,900
Aroma	0.623
Texture	0,695
Final Appreciation	0,598

The results related to the acceptance of the snacks are presented in Table IV. Although there were no significance differences on the sensorial acceptance between samples, the appreciation was generally positive, being texture the most accepted attribute and aroma the least accepted attribute.

Table IV - Hedonic Scale results (Mean ± Standard deviation).

	Mean[a] ± Standard deviation			
Samples	**Taste**	**Aroma**	**Texture**	**Final Assessment**
H^S/H^{NF}	6,50 ± 1,058	5,77 ± 1,152	7,32 ± 1,086	6,55 ± 1,057
H^S/L^{NF}	6,77 ± 1,193	5,91 ± 1,065	7,50 ± 0,913	6,91 ± 1,065
M^S/H^{NF}	6,45 ± 1,299	5,91 ± 1,109	7,50 ± 0,964	6,55 ± 1,143
M^S/L^{NF}	6,55 ± 1,224	5,73 ± 1,241	7,36 ± 1,093	6,59 ± 1,098
L^S/H^{NF}	6,73 ± 1,279	5,86 ± 0,990	7,59 ± 0,796	6,86 ± 1,125
L^S/L^{NF}	6,86 ± 1,037	6,00 ± 1,272	7,32 ± 1,171	6,82 ± 1,140

[a]The final ratings correspond to the rounding of the average obtained – values above ≥ *x*,50, acquire the following designation. E.g.- 6,50 corresponds to 7, "Like Moderately".

On the "final appreciation" parameter, no significant differences were observed on the proportion of individuals who answered, 7, 8 or 9, between the 2 levels of NF, for any of the amounts of salt [0,60%, 0,80% and 1,00% (p = 0,375, p = 0,453 and p = 0,388, respectively)] (Figure I).

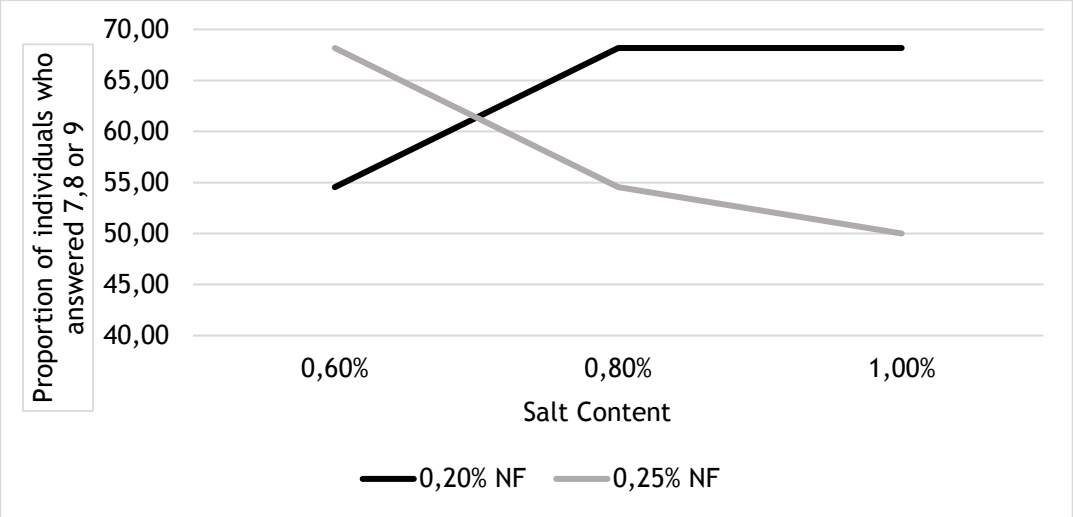

Figure I - "Final Appreciation" values of individuals' proportion that scored 7,8 or 9.

b) Preference

With Table V it's possible to observe the formulation that has the high mean rank (which one is the most preferred by consumers), and the relative frequencies refer to the favourite, neutral and unfavourite snack. The formulations are arranged in descending order, from the most preferred (line 1) to the least preferred (line 6), and the purpose is to facilitate the interpretation. Quasi significant association was found between the preference and changes in the formulation (p=0.053).

Table V - Frequencies and Mean Rank of the Preferences

Samples	Favourite (%)	Unfavourite (%)	Neutral (%)	Mean rank (Friedman: p=0.053)
L^S/L^{NF}	50,0	18,2	31,8	4,14
L^S/H^{NF}	40,9	18,2	40,9	3,95
M^S/L^{NF}	36,4	31,8	31,8	3,59
H^S/L^{NF}	36,4	31,8	31,8	3,59
M^S/H^{NF}	18,2	36,4	45,5	3,14
H^S/H^{NF}	18,2	63,6	18,2	2,59

Friedman's 2-way ANOVA by ranks was applied to compare paired formulations (Table VI). Significant differences on the preference occurred between formulation H^S/H^{NF} with formulations L^S/H^{NF} (p = 0.016) and L^S/L^{NF} (p = 0.006).

Table VI – *p* values of paired formulations

Samples	H^S/H^{NF}	H^S/L^{NF}	M^S/H^{NF}	M^S/L^{NF}	L^S/H^{NF}	L^S/L^{NF}
H^S/H^{NF}	-	0,076[a]	0,334[b]	0,076[c]	**0,016**[d]	**0,006**
H^S/L^{NF}	= a	-	0,420[e]	1,000[f]	0,519[g]	0,334
M^S/H^{NF}	= b	= e	-	0,420[h]	0,147[i]	0,076
M^S/L^{NF}	= c	= f	= h	-	0,519[j]	0,334
L^S/H^{NF}	= d	= g	= i	= j	-	0,747

No association between the consumption frequency of salty snacks and the preference for each formulation was observed (Table VII).

Table VII - Spearman´s rho (n=22) – Correlation between the consumption frequency of salty snacks and the preference of each formulation, in the sensory test.

	H^S/H^{NF}	H^S/L^{NF}	M^S/H^{NF}	M^S/L^{NF}	L^S/H^{NF}	L^S/L^{NF}
Correlation Coefficient	-0,203	0,010	0,217	-0,169	0,304	-0,140
Sig. (2-tailed)	0,364	0,966	0,333	0,451	0,169	0,535

Discussion

For food industries the balance between health and consumers' acceptance is fundamental and should be a primordial point to develop or improve a product. This research investigated how the consumers react to snacks with different salt

and NF quantities without jeopardizing their acceptance. In the present study an untrained SP were requested, which may offer more realistic results.

Regarding the acceptance of the tasted snacks, there were no significant differences between the six samples concerning the four sensory parameters analysed: taste, aroma, texture and final appreciation. This indicates that in each of these characteristics, the hedonic score attributed by tasters was very similar between samples. Despite the non-significant differences, it is possible to interpret the results.

The mean of the hedonic classifications allows to interpret the results in a legible and easy way. In general, a mean liking score of 7 or higher indicates a highly accepted sensory quality[34]. For taste, all the samples were well accepted, obtaining the classification “like moderately”, with the exception of sample M^S/H^{NF} with the categorization “like slightly”. For aroma, there was also a homogenization of the classifications, with all samples classified as “like slightly”. For texture, samples H^S/L^{NF}, M^S/H^{NF} and L^S/H^{NF} obtained “like very much” classification and samples H^S/H^{NF}, M^S/L^{NF} and L^S/L^{NF} “like moderately”. For the final appreciation, all formulas corresponded to the designation “like moderately”. Analysing in detail, formulation L^S/L^{NF}, with both low salt and NF content, stands out for taste and aroma, obtaining the highest score (“like moderately” and “like slightly”, respectively).

Overall, these results are positive as they demonstrate that the reduction in the salt and NF content of the snacks under study did not affect consumers’ acceptance. In studies carried out on other products it appears that the most effective strategy to attenuate the reduction’ acceptance of the salt content is through its gradual reduction over time[35]. As mentioned, there was a good

acceptance of the products, as well as such homogeneous results so, perhaps, a continued reduction may be efficient.

Regarding the snacks' preference, the differences were almost significant (p=0.053) and, according to the average order and relative frequencies, the snack L^S/L^{NF} was considered the most preferred. Thus, it can be said that the consumers of this study tend to prefer snacks with less salt and less NF. On the other hand, the snack H^S/H^{NF} were more frequently elected as the less preferred snack. When comparing all pairwise, it appears that there were significant differences between the most opposite formulations - the snack with H^S/H^{NF} and the snacks with less salt (L^S/L^{NF} and L^S/H^{NF}).

Relatively to the NF impact on salt reduction' acceptance the following was observed: on the final appreciation parameter, although, apparently, for the lowest level of NF (0.20%) there is an increase in the proportion of participants who answered with the highest scores - 7, 8 or 9 – along with the increase in salt content (the opposite occurs on the other NF level - the proportion decreases as the amount of salt increased), after applying McNemar's Test it was found that there is no statistical significance between these proportions of participants. As it turns out, it cannot be said that the two NF levels have opposite effects on the acceptance, and as a result, according to this data, NF does not have an impact on salt reduction' acceptance.

One of the objectives of the study was to verify the impact of consumption frequency of salty snacks on the preference of each formulation. According to the results, it was observed that there is no association between the consumption frequency of salty snacks and each formulation. Even though the correlation isn't

significant, sample L^S/H^{NF} has the lowest *p* value (0,169), and the correlation coefficient is > 0, which means that the more frequent the consumption of salty snacks, the more consumers prefer the snack with this formulation. Salt reduction almost caused an effect on the snacks' preference, especially when it was reduced to 0,6% salt and 0,20% NF.

These results align with several other studies (made with different products) that demonstrated that the reduction content of salt was very well accepted by consumers[27, 28, 32, 36].

As in all studies the present study is no exception and has some limitations that must be considered. The larger the panel of tasters of an affective test, the more variability of individual preferences and, consequently, the more statistical power and test sensitivity[33]. In this study the sample size of tasters was small, which turns out not to be a significant sample of the general population. Therefore, and also assuming that the study was conducted among an adult Portuguese population, the results may not be generalized to other age groups and races, knowing that the populations differ between them. Relatively to sex the sample distribution was not uniform and consisted of more women (19 comparatively with 3 men), what can bias the results.

Further research is necessary to investigate the acceptance and preference for the reduction of salt and/or NF on salty snacks.

Conclusions

In conclusion it is possible to reduce the amount of salt and NF in chickpea-based snacks without affecting consumers' acceptance.

Although not significant there is, on average, a tendency to prefer the snack with less salt and less NF. Additionally, the difference in preference seems to be

more pronounced when low salt snacks were compared with H^S/H^{NF} snacks. In the current study, NF did not have an impact on salt reduction' acceptance.

It was found that there is no correlation between the consumption frequency of salty snacks and the preference for each formulation.

The lack of significant differences between the acceptance (hedonic scale) in taste, aroma, texture and final appreciation of the different samples can be a result of the lower sample size. However, it also shows the utility of forced tests, like the preference test, where participants have to decide between their preference, although sometimes subtle difference in sensory attributes between the samples are not collected with a hedonic scale. This aspect should be further investigated.

Food Industry must prioritize health and consumers' needs. Applying an incremental innovation by reducing salt' quantity, is a feasible idea, that not only responds to this premise, but also improves the nutritional quality of these chickpea-based snacks.

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Annexes

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Annex A – Hedonic Scale

9-point Hedonic Scale	
9	Like extremely
8	Like very much
7	Like moderately
6	Like slightly
5	Neither like nor dislike
4	Dislike slightly
3	Dislike moderately
2	Dislike very much
1	Dislike extremely

Annex B – SA' Questionnaire

U.PORTO
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UNIVERSIDADE DO PORTO

Teste sensorial de snacks à base de leguminosas

Grupo I - Análise Sensorial – PARTE I

Antes de iniciar a prova, leia, **atentamente**, todas as questões e indicações do Grupo I – Parte I.

Prove as 3 amostras, fazendo uma **pausa** entre cada uma.
Após a prova de cada snack preencha a linha com o código correspondente no quadro da pergunta n. º1.

1. No seguinte quadro, classifique de 1 a 9 (utilize a escala abaixo indicada) o **sabor**, **aroma**, **textura** e a **apreciação final** das amostras.

1. Extremamente desagradável.
2. Muito desagradável.
3. Desagradável.
4. Um pouco desagradável.
5. Indiferente.
6. Agradável, mas pouco.
7. Agradável.
8. Muito agradável.
9. Extremamente agradável.

Amostras	Sabor	Aroma	Textura	Apreciação final
N.º				
N.º				
N.º				

2. Indique o código da amostra que **mais gostou**. É obrigatório que faça uma escolha.

_____

3. Indique o código da amostra que **menos gostou**. É obrigatório que faça uma escolha.

_____

Fim do Grupo I - Parte I.

Por favor, informe a responsável.

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Grupo I - Análise Sensorial – PARTE II

Antes de iniciar a prova, leia, **atentamente**, todas as questões e indicações do Grupo I – Parte II.

Prove as 3 amostras, fazendo uma **pausa** entre cada uma.
Após a prova de cada snack preencha a linha com o código correspondente no quadro da pergunta n. º4.

4. No seguinte quadro, classifique de 1 a 9 (utilize a escala abaixo indicada) o **sabor**, **aroma**, **textura** e a **apreciação final** das amostras.

1. Extremamente desagradável.
2. Muito desagradável.
3. Desagradável.
4. Um pouco desagradável.
5. Indiferente.
6. Agradável, mas pouco.
7. Agradável.
8. Muito agradável.
9. Extremamente agradável.

Amostras	Sabor	Aroma	Textura	Apreciação final
N.º				
N.º				
N.º				

5. Indique o código da amostra que **mais gostou**. É obrigatório que faça uma escolha.

_____

6. Indique o código da amostra que **menos gostou**. É obrigatório que faça uma escolha.

_____

Prossiga, por favor, para o Grupo II.

Obrigada.

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Grupo II – Caracterização sociodemográfica

Preencha os seguintes dados:

1. Sexo: (assinale com um X)

Masculino □ Feminino □

2. Idade: ____ anos

3. Com que frequência costuma consumir snacks salgados? (assinale com um "X")

Raramente	1 vez por mês	2-3 vezes por mês	1-3 vezes por semana	4-6 vezes por semana	Todos os dias	Mais de 1 vez por dia

Fim do questionário,

Muito obrigada pela sua participação!