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SENSORY ANALYSIS OF SAUSAGE 'FRESCAL' MADE OF LAMB MEAT AND DRIED FRUITS

ANÁLISE SENSORIAL DE LINGUIÇA 'FRESCAL' À BASE DE CARNE DE CORDEIRO E FRUTAS SECAS

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Abstract:The food market is in constant reinvention and understanding the needs of your target audience and the trends of agribusiness is as important as knowing how to harmonize ingredients and flavors. The 'frescal'sausage for barbecue is one of the most appreciated meats in Brazil and its combination with dried fruits can add flavor to the final product. Thus, the present work aimed to evaluate the acceptance of a differentiated product based on 'frescal'lamb meat and dried fruits with a total of four formulations. The products were tested by an untrained panel, totaling 150 participants for each of the formulations. The results showed better acceptance by two products, both containing dried figs, but in different concentrations. For both analyzed formulations, the preference is indicated for males, who presented higher scores for most of the evaluated items. Age group analysis showed better acceptance within the range of 31 to 35 years. The majority of the sensory panel would buy the products monthly (45.20 and 53.80%, respectively), being the barbecue occasion the most suitable.Once the profile of potential consumers was delimited, the insertion in the market represents potential benefits for aggregation of value for meat processing and for the small sheep producers.

Keywords: Sheep farming. Embedded food. Dried figs. Dried apricots

Resumo: *O mercado de alimentos está em constante reinvenção e entender as necessidades de seu público-alvo e as tendências do agronegócio é tão importante quanto saber conciliar ingredientes e sabores. A linguiça 'frescal' para preparo em churrasqueira é uma das carnes mais apreciadas pelo povo brasileiro e sua combinação com frutas secas pode agregar sabor ao produto final. Dessa forma, o presente trabalho visou avaliar a aceitação de um produto embutido diferenciado à base de carne'frescal' de cordeiro e frutas secas em um total de quatro receitas. Os produtos foram avaliados por um painel sensorial sem treinamento, totalizando 150 provadores para cada uma das formulações. Os resultados revelaram melhor aceite por duas receitas, ambas contendo figos secos, porém em diferentes concentrações. Nota-se que para ambas as receitas analisadas, a preferência é indicada para o sexo masculino, que apresentou maiores pontuações para a maioria dos quesitos avaliados. As análises por idade demonstraram maior aceitação dentro do intervalo dos 31 aos 35 anos. A maioria do painel sensorial compraria os produtos mensalmente (45,20 e 53,80%, respectivamente), sendo a ocasião de churrasco a mais propícia.Uma vez delimitado o perfil dos potenciais consumidores, a inserção no mercado representa potenciais benefícios na agregação de valor do processamento de produtos cárneos e para os pequenos produtores de ovinos.*

Palavras-chave: *Ovinocultura. Alimentos embutidos. Figos secos. Damascos secos.*

1 Introduction

The dynamics of food market is in constant change: new formulations and products are offered daily to consumers, who will define the acceptance of the goodsbut turned to be more demanding over the years(VITAL et al., 2018). The success of new products depends on several market factors and variables. That is the reason why understanding the needs of your target audience and the agribusiness trends are just as important as knowing how to

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harmonize ingredients and flavors.

Lamb meat has become more common in Brazilian meals and especially in barbecues. In order to keep up with market demand, sheep farming has considerable numbers in the country: a total of 13,789,345 heads and 525,882sheepfarms according to data collected in2017 (IBGE, 2017). Many ranchers, in special small producers, are migrating from cattle breeding to sheep farming, since it requires smaller physical resources and can generate greater profitability (HERMUCHE et al., 2013).

Another trend in agribusiness is the production of fruits for dehydration, such as apricots and figs. The increase in demand for these foods is often greater than the national supply, especially for apricots, which require a temperate climate for cultivation (DE MARCO; IANNONE, 2017). The osmotic dehydration of fruits is an important shelf life increasing technique, since the main cause of perishability is high water content (YADAV; SINGH, 2012). The process preserves fruit nutritional properties, concentrates sugar and results in more refinedflavors, usually preferred by consumers.

The 'frescal'sausage has high acceptability in the market (GOUVÊA et al., 2017) and is well appreciated for barbecue by the Brazilian people, bringing also a meaning of tradition.Considering that the use of dried fruits can bring refinement and market value to food, the present work studied the acceptance of a differentiated product based on lamb meat and dried fruits following four different formulations. In addition, the possible introduction of the final product in the market tends to expand the generating income for the small sheep producers.

2 Materials and Methods

The experimental work was performed in the Gastronomy laboratory at the University Center Filadélfia Campus Canadá, located in the city of Londrina, Paraná State, Brazil. The ingredients were purchased in local stores.

2.1 Sausage formulations

For the preparation of 'frescal' sausage, ground and refrigerated lamb meat (shank) at 5ºC was used. Four types of sausage were prepared, according to Table 1. The dimensions of each sausage were 55cm in length and 3.5cm in diameter, with the mass of the final product being approximately 450g per piece.

Formulations 1 and 2 refer to sausage with different proportions of dried figs, while Formulations 3 and 4 to sausage with different proportions of dried apricots. The proportion of lamb meat also varies depending on the formulation, while the other ingredients remained constant. The sausage was prepared according to the following procedure: removal of excess nerves from meat, grinding, addition of fat, salt, antioxidants,dried fruits and spices, mixing of ingredients, rest in cooling chambers for color formation (6h)and finally, inlay of the sausage.

Table 1 – Composition of the four formulations*

	Formulation			
	I	**II**	**III**	**IV**
Lamb meat	82.23	86.23	82.23	88.23
Dried figs	8.00	4.00	-	-
Dried apricots	-	-	8.00	4.00
Crushed ice	6.00	6.00	6.00	6.00
Salt	2.00	2.00	2.00	2.00
Antioxidant	0.25	0.25	0.25	0.25
Dried mint	0.25	0.25	0.25	0.25
Cinnamon powder	0.25	0.25	0.25	0.25
Garlic powder	0.10	0.10	0.10	0.10
Monosodium glutamate	0.10	0.10	0.10	0.10
Oregano	0.10	0.10	0.10	0.10
Green condiment	0.10	0.10	0.10	0.10
Cardamom	0.10	0.10	0.10	0.10
White pepper	0.02	0.02	0.02	0.02

*Values presented in % (w/w)

Subsequently to the preparation, the sausages were stored under refrigeration at 11˚C, until the moment of preparing the samples for sensory analysis.

2.2 Sensory analysis

The sausages were cooked in a pan with 25 ml of water and 10 ml of soy oil, at 180°C until the temperature of the geometric centre of the samples reached 71°C. Subsequently, they were sliced (2.5 cm high and 4.5 in diameter), coded and delivered in a plastic plate, under good lighting and ventilation conditions, accompanied to cream cracker-type biscuits in order to be used between the tastings to remove the aftertaste. The sensory evaluation was conducted by an untrained panel, briefly instructed on the analysis procedures. The panel was composed of students and collaborators (professors and technicians) from the University Center Filadélfia, totaling 150 panellists, who evaluated the four formulations.

The parameters evaluated for each sample were color, softness, juiciness, flavor and global acceptance. Each parameter received a score varying from 1 to 5, being: (1) "I really disliked", (2) "I disliked", (3) "Indifferent", (4) "I liked" and (5) "I really liked".

In addition to the level of acceptance for the aforementioned parameters, the sensory panel was asked about the possible frequency of product purchase - weekly, monthly, once every two months, once every four months or would not buy - as well as preferred occasion for the consumption of the product - day-to-day, weekend, barbecue, others or would not buy.

2.3 Statistical analysis

The individual score results of the sensory panel (color, softness, juiciness, flavor and global acceptance) were interpreted through the analysis of variance (ANOVA) and Tukey's test, at 5% significance level, using the software Statistica 7.0(StatSoftInc®, USA).

3 Results and Discussion

The results of the sensory analysis are presented in Table 2, based on the mean values

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provided by the panel. There was no significant difference for the parameters color, softness or juiciness, therefore, the different concentrations of dried fruits influenced only the perception of flavor and the global acceptance of the sensory panel.

Table 2 - Results of the sensory analysis of the four sausage samples

	Formulation			
	I	**II**	**III**	**IV**
Color	3.4±0.6*[a]	3.8±0.5[a]	4.0±0.3[a]	3.4±0.4[a]
Softness	3.8±0.5[a]	4.0±0.3[a]	4.0±0.3[a]	3.0±0.7[a]
Juiciness	3.6±0.6[a]	3.8±0.5[a]	4.0±0.3[a]	3.2±0.5[a]
Flavor	4.4±0.4[a]	4.0±0.3[a]	2.0±0.3[b]	3.4±0.4[a]
Global acceptance	3.8±0.3[ab]	4.6±0.4[a]	3.2±0.3[b]	3.2±0.5[b]

*Mean values (± standard deviations) followed by different letters in same line are significantly different at 5% level on Tukey's test

The parameter color is considered the first determining factor for purchase, despite its non-relation totaste or others sensory values. Meat color is influenced by the quantity and chemical status of myoglobin, its main pigment. Dark meat tends to be rejected by the consumers since it is associated with lack of freshness (VAZ; RESTLE, 2005).Meat from younger animals present lighter color compared to older animals.

A less intense color was observed in the meat of lambs slaughtered with 12kg, compared to the meat of the animals slaughtered with 24 and 36kg of live weight. These results are explained by the younger age and the type of feeding, since the animals slaughtered with 12kg were still in the breastfeeding phase, thus presenting lower myoglobin concentrations than those fed with grain and forage (BERIAIN et al., 2000)

Differently from color, the softness and the juiciness are evaluated during the tasting of the meat and exert great influence on the continuity of product purchase by the consumer. In addition, there is a positive relationship between the price of cuts and their relative softness (IGARASI et al., 2008). The juiciness depends on the sensation of moisture in the first masticatory movements, that is, the release of liquids by the meat. This factor is influenced by the loss of liquid from the carcass after slaughter and during meat storage (VAZ et al., 2007).

Formulation III obtained the lowest result for the flavor parameter, inferring less predilection for apricot by the sensory panel in comparison to figs. Lower apricot concentrations, referring to formulation IV, pleased the panel more, possibly due to the less sweet flavor compared to formulation III.

The flavor is a complex and personal attribute defined as a mixed experience, influenced by olfactory, gustatory and tactile sensations during tasting. Some characteristics must be taken into consideration, as the flavor perception - the time to be perceived by the taster – and the residual flavor that remains in the mouth (TEIXEIRA, 2009).

Global acceptance was greater for formulations I and II, highlighting the preference for the combination of lamb meat and dried figs. Since these formulations received the highest scores in terms of taste and global acceptance, they were also assessed for preference based on gender (Figure 1) and age group (Figure 2) of the sensory panel. It is noted that for both analyzed formulations, the preference is indicated for the male gender, which presented greater scores for most of the evaluated items.

For both formulationsI and II, the only parameter that received the best score for women was juiciness, indicating that even though the presence of dried fruits may have positively influenced the flavor and texture, it may have negatively influenced the juiciness for men's perception.
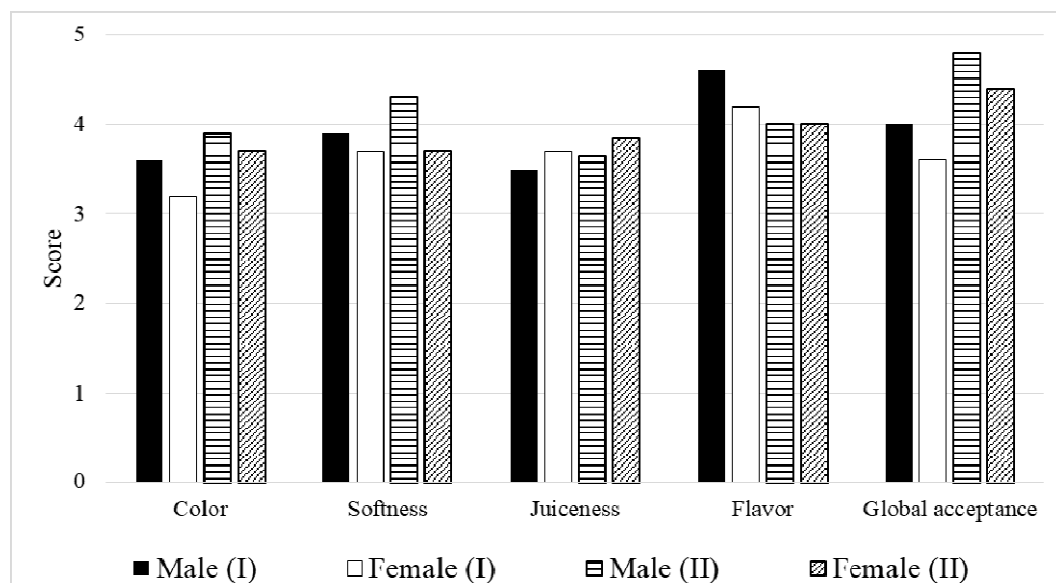
Figure 1. Evaluation of formulations (I) and (II) based on gender

According to Figure 2, the results regarding the perception of the sensory panel based on the age group showed that the favorable panelliststo the acceptance of the product are within the range of 31 to 35 years old. This is an indicative that the maturing of the taste preferences may have led to the acceptance of different flavors (JAMES; LAING; ORAM, 1997), such as the combination of lamb meat and dried fruits.
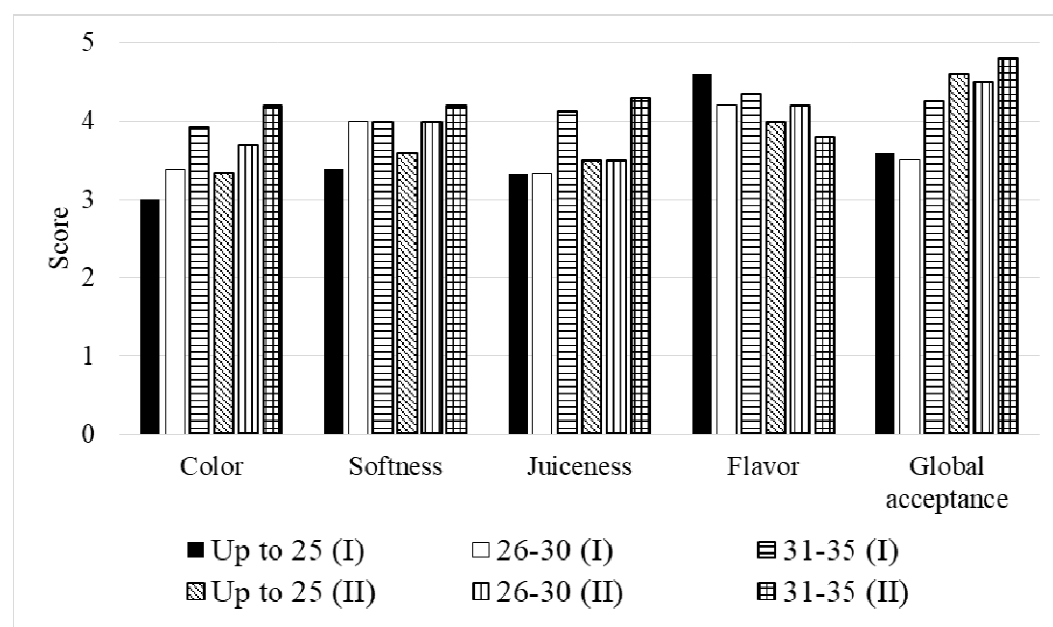

Figure 2. Evaluation of Formulations (I) and (II) based on age group

In addition to global acceptance, the parameter that provided great differentiation by the sensory panel, when taken into account the age group, was the juiciness. In this way, the data analysisreveals that the public that showed greater affinity to the products of formulations I and II are men between 31 and 35 years old. This result represents the potential target audience of the product, when inserted in the market.

The data referring to the frequency of purchase of the products prepared by

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formulations I and II are illustrated by Figure 3. The results show that the majority of the sensory panel would buy the products monthly (45.20 and 53.80%, respectively). The rejection by both revenues did not exceed 10% of the sample group. These results represent a potential tiebreaker among the evaluated products, since formulationII would provide purchases with greater frequency, in addition to less rejection.
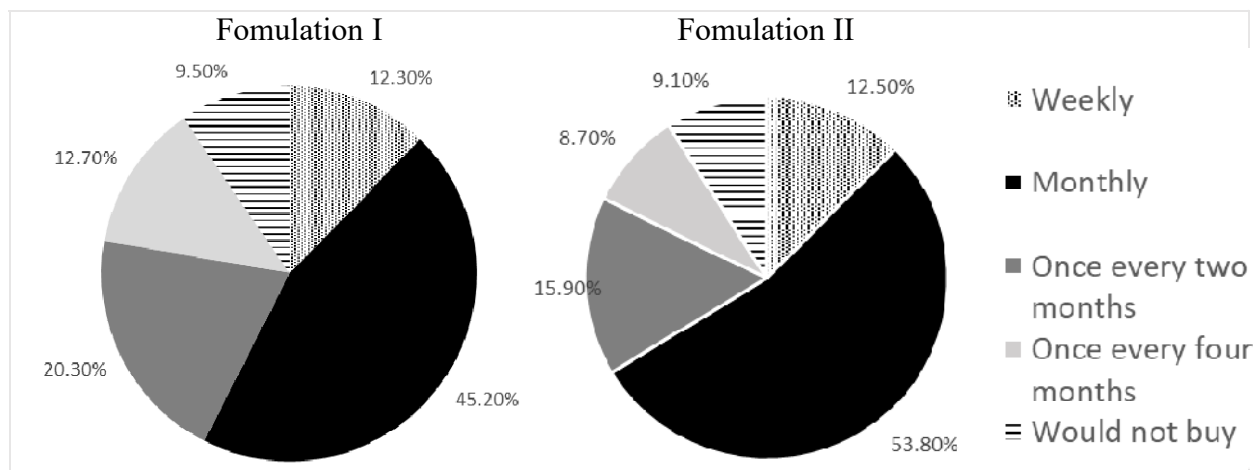

Figure 3. Evaluation of formulations I and II based on frequency of purchase

Figure 4 illustrates the favored occasion that the sensory panel would buy the product with formulation II, the most suitable for selling, which reveals that the vast majority prefer the product for consumption in barbecues. Such information corroborates with the results presented in Figure 3, since an event involving the barbecue takes place on a weekly to monthly basis for Brazilians.
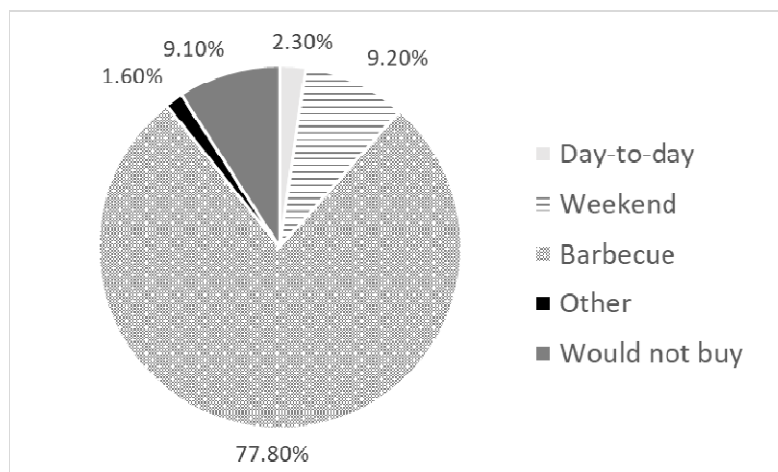

Figure 4. Evaluation of formulations II based on the occasion for consumption

This study displays results of great importance in planning the insertion of a new food product on the market, based on the preferences of potential consumers. The sausage made of 'frescal' lamb meat and dried figs represents a differentiated product, with added value and greater appreciation for small producers of lambs.

4 Conclusion

The present work elaborated four different formulations of 'frescal' sausage composed

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of lamb meat and dried fruits. The results of the sensory analysis showed greater acceptance by formulations I and II, referring to the combination of lamb meat and dried figs, in two different concentrations. Subsequent analyzes have shown that the preference of both formulations is indicated for males and for the age group of 31 to 35 years, these being the characteristics to be sought for the target audience.

The vast majority of the sensory panel - about 90% - say that they would buy the product if it entered the market, and formulationII received better results of consumption frequency. Finally, the successful insertion of the product on the market can benefit the added value of meat product processing, in addition to expanding the possibility of generating income for the small sheep producer.

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