Brazilian Consumers' Preference towards Pork

Sivanilza Teixeira Machado*, Irenilza de Alencar Nääs,
João Gilberto Mendes dos Reis, and Oduvaldo Vendrametto

Paulista University, Postgraduate Studies Program in Production Engineering,
Dr. Bacelar 1212, 04026-002 São Paulo, Brazil
sivateixeira@yahoo.com.br

Abstract. Brazilian pork supply chain has various challenges reflected by the consumers' preference perception, which is one of the lowest in the Western world. Several researches have shown that there is a divergence between consumer preferences and actual pork consumption. This study aimed to examine the Brazilian consumers' preference towards pork. An online survey was developed in order to investigate the marketing of pork at the retailer level. Analytic Hierarchy Process (AHP) was applied in order to classify the consumers' alternatives related to the frequency of eating pork, which were weekly, biweekly and monthly consumption. Results showed that the factors that most contribute to the purchase decision of pork are household income, commodity price and the characteristics related to meat quality.

Keywords: Food, Consumers preferences, Market, Brazil.

1 Introduction

Brazilian meat market follows a different pattern of the global market, especially in term of pork consumption [1], [2]. Several surveys related to Brazilian consumers' preference has shown that the most eaten meat are beef, poultry meat, fish, and the last one is pork [2], [3]. However, in the last years this scenario has been changing and due to marketing, and pork has been added more frequently to the table of consumers. It occupies nowadays the third place in the consumers' preference, behind the consumption poultry meat and beef [4].

The ultimate goal of supply chains is to meet the final consumer demands, which, in this specific case, determines the strategies of future business development of the meat market [5]. In order to identify the areas for improvement when analyzing supply chain, the first step is investigating the product attributes which are valued by consumers [6]. Research towards the consumers' demands brings up a new reality, which is a challenge to the supply chains that search for optimization of costs, and to improve the quality during the steps of production. This requires investments in production, marketing and distribution of products.

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It also implies in the involvement and training of stakeholders, in the use of new and efficient techniques [6], [7].

The Analytic Hierarchy Process (AHP) is a mathematical model to support decision making [8]. AHP is a method that is characterized by the ability to analyze a problem and propose a decision-making through the construction of hierarchical levels. The problem is analyzed by pre-established criteria. The criteria are decomposed into sub-criteria up to a determined level. These criteria are organized into a hierarchy descending where the ultimate goals should be at the top, followed by their sub-goals, immediately below, and; finally, the various possible outcomes or alternatives are selected. The scenarios determine the likelihood of achieving the goals [9], [10].

Consumers' surveys are an interesting tool to describe the actual scenario of the retail market, and the results may help the agribusiness to determine the consumers' preferences and expectancies towards the products which are offered in supermarkets shelves. This study aimed to analyze the consumers' preference towards pork. It was also verified the frequency of eating pork in three scenarios once a week, every two weeks, and once a month.

2 Methodology

2.1 Development of the Survey

To develop this work initially literature review was done in order to study the quality parameters and aspects of the consumption of pork in Brazil. This helped to select specific questions for the survey. In a second step, one field survey was conducted using the google docs tool, and it was sent to consumers using the internet resources (emails and social networking) during July-August 2013.

The survey was constituted of 17 closed questions, divided into two parts (1) six questions related to the social and economic status of the participant (gender, degree of education, marital status, age, household income, and the geographic region of residence), and (2) eleven questions related to several aspects of pork production and commercialization. The idea was to identify the relationship between the consumers' perception and the characteristics of the product consumption.

2.2 Calculating Size of Sample

For calculating the size of the sample, we considered the five regions of the country North, Northeast, Midwest, Southeast and South. The sampling error was set in 10% and the size of the population was obtained by [11]. The result reassured for each region was estimated 100 inhabitants. Sample distribution is shown in Table 1.

To perform the data analysis [12] the problem was organized as follows (1) the determination of the goal and definition of alternatives; (2) defining the structure of the decision tree based on the characteristics to be evaluated and

Table 1. Sample distribution by the gender, country' regions, age, degree of education, marital status, and household income

Response Options	North	Northeast	Midwest	Southeast	South	All	p-value
	17(2.8) *	31(5.2)	241(40.2)	200(33.3)	111(18.5)	600(100.0)	
Gender							
Female	9(2.7)	22(6.5)	130(38.9)	112(33.5)	61(18.4)	334(55.6)	0.686
Male	8(3.0)	9(3.4)	111(41.7)	88(33.0)	50(18.9)	266(44.4)	
Age (years)							
13-17	–	–	6(60.0)	2(20.0)	2(20.0)	10(1.6)	0.275
18-21	2(1.4)	4(2.8)	84(60.8)	20(14.5)	28(20.5)	138(23.0)	
22-30	5(2.6)	13(6.8)	74(39.2)	52(27.6)	45(23.8)	189(31.5)	
31-40	2(1.6)	6(4.8)	45(36.3)	55(44.3)	16(13.0)	124(20.6)	
> 40	8(5.7)	8(5.7)	32(23.1)	71(51.1)	20(14.4)	139(23.1)	
Education							
SC	13(4.2)	19(6.2)	78(25.6)	142(46.4)	54(17.6)	306(51.0)	0.020
SI	4(1.9)	6(2.8)	112(53.0)	36(17.2)	53(25.1)	211(35.2)	
M	–	4(8.1)	28(57.1)	14(28.5)	3(6.3)	49(8.2)	
F	–	(4.0)	19(76.0)	4(16.0)	1(4.0)	25(4.1)	
Sc	–	1(1.2)	4(4.4)	4(4.4)	–	9(1.5)	
Marital status							
Single	7(2.0)	17(4.8)	160(45.9)	94(27.0)	70(20.3)	348(58.0)	0.091
Married	8(3.7)	11(5.1)	64(29.8)	95(44.2)	37(17.2)	215(35.8)	
Other	2(5.4)	3(8.2)	17(45.9)	11(29.7)	4(10.8)	37(6.2)	
Household income							
< 1	1(4.5)	2(9.0)	12(54.5)	4(18.2)	3(13.8)	22(3.6)	0.052
1-3	3(1.5)	11(5.7)	93(48.3)	48(24.9)	38(19.6)	193(32.2)	
> 4	13(3.3)	18(4.6)	136(35.4)	148(38.5)	70(18.2)	385(64.2)	

* Consumers number and (%)

the selected alternatives; (3) build up a pairwise matrix for comparison between the attributes in different levels; and (4) using the priorities obtained from the comparisons to determine the weights and priorities of its lower level. The comparison is made as a table of 2 [13].

In order to give proper weight to each attribute ANOVA was applied to the set of data, and the test t-Student was applied to help to select the values for the weights to be applied to each criterion. The measures adopted for attributing the weights were based on the p-value found in the statistical analysis. For p-value < 0.0001 the weight was related to extreme importance, 9; p-value < 0.01 the weight was of demonstrated importance, 7; p-value < 0.05 indicated strong importance, 5; $p - value < 0.1$ indicated moderate importance, 3; and p-value > 0.1 the weight indicated equal importance, 1. This provided an association between the qualitative scales defined by Saaty [12] with the values found with statistical significance.

Table 2. Adopted scale of importance

Importance	Definition
1	Equal importance
2	Moderate importance
5	Strong importance
7	Very strong or demonstrated importance
9	Extreme importance
2, 4, 6, 8	Intermediate values

Model consistency was calculated considering the matrix is consistent if and only if:

$$\lambda max = n \tag{1}$$

However, the inequality $\lambda max > n$ always exists. Therefore, the average of the remaining eigenvalues can be used as a 'consistency index' (CI), which is the difference between λmax and n divided by the normalizing factor $(n - 1)$.

The software Expert Choice was applied to the calculations of the Multicriteria Decision Analysis (MCD).

3 Results and Discussion

The results of the pairwise comparisons are summarized in Figure 1.

Results indicated that criteria with higher importance and contribution, in the consumers decision, in relation to the frequency of eating pork were associated to consumers preferences with 49%; while to the market was 45.1%. Brazilian pork consumer has a high preference to eat pork once a month. When focusing on the weekly frequency of eating pork, it was found that market and preferences had similar importance, with the exception of the social criterion (Figure 2).

The criteria followed by the performance bar in Figure 2 show the alternative for consumption of pork, which were once every two weeks and once a month. In this case, they converged to the same value indicating that this is the forecast consumption preference of the market. Studying the consumption of pork in a county within Southeastern Brazil [3], the authors found low consumption rate of pork (63.7%). The participants indicate they ate pork once every two weeks or once a month, agreeing with the results from this present study. Preferences and market are the criteria with higher weights in pork consumption (Figure 3). This suggests that Brazilian pork industry needs to invest in market' strategies in order to increase pork consumption.

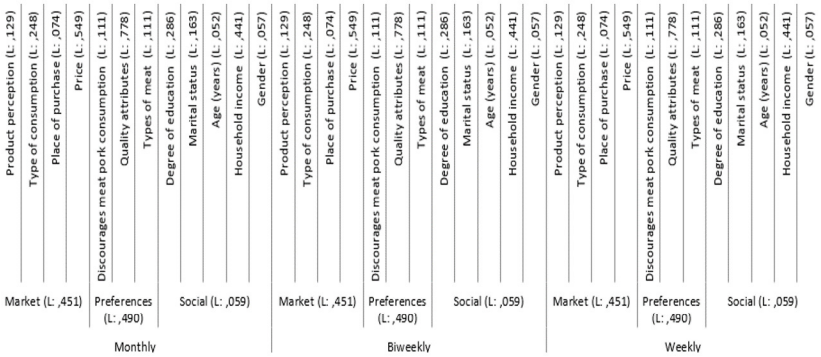

Fig. 1. Summary of the criteria and sub-criteria weights

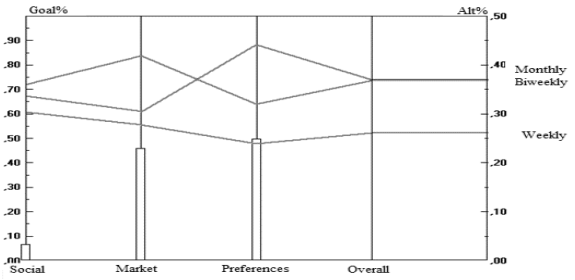

Fig. 2. General results from the criteria and computed weights

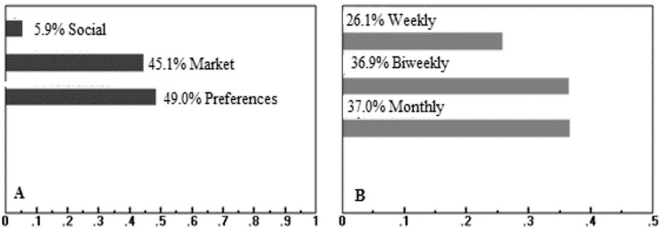

Fig. 3. Weights found for the attributes social status, market and preferences (A) and pork consumption (B)

3.1 Social Criteria

Despite the social criterion shows less value in the frequency of consumption of pork study, in the sub-criteria level household income represented 44.1% of the total weight, followed by the degree of education (28.6%), and marital status (16.3%). In the third level criteria of education, undergraduate was the one that most contributed to the decision of eating pork (68.2%). Marital status in this level was equally important (45.5%), as well as the household income above four minimum wages (48.1%). The criteria gender and age were not important in the decision analysis. Pork consumption changes and social demands affect the whole swine production supply chain [7]. New eating habits may require market alternatives [2], and the consumers search for food which are affordable and easy prepare are a real challenge.

3.2 Market Criteria

Within the sub-criteria involving the market scenario, the price obtained more than half of the weights (54.9%). This should be examined further within the pork supply in order to seek alternatives to keep the meat and its competitive derivatives market. Fixing modest price must be one of the primary goals of the chain [6]. Secondly, the criterion which presented more important was the way the meat is bought (24.8%), and the third level criterion in natura represented 75% in the frequency of consumption of pork. The consumer perception regarding the product was in third place (12.9%) while the product display were the most important (44.4%), the type meat cut (19.7%) and the product brand (13.2%). The understanding of consumers towards meat and its industrial derivatives is complex, and it is a critical issue for the food processing industry [14].

Although the place of purchase was not found to be an important decision, almost 60 of the answers bought pork at a supermarket, showing the relevance of this type of retailer and the trust established with consumers, which is a key factor in the purchase decision [2]. Another important issue is relates to the information in the label of the product, which helps the consumer while selecting food products.

3.3 Preferences Criteria

The criteria related to meat quality which is known as an important factor in the consumers buying decision was 77.8%. Within the sub-criteria the items such as sensorial factors, which are related to tenderness and texture contributed to this results with 59.8%. Sub-criteria associated to health issues an nutritional characteristics of had similar weight (10.4%), while ethnic factors did not impact in the frequency of consumption. This difference in the results occurs due to the notion the consumers perceive regarding tangible attributes at the time of purchasing [6], which reflects the purchasing decision on the product. The pork has good sensory attributes and consumers consider it a tasty meat [3]. Consumers

also consider an expensive meat combined with low/average household income, which should influence the frequency of consumption.

With respect to the preferred types of meat by Brazilian consumers and the items which lead them to no consumption of pork, it was noted that beef is the direct competitor of pork (47.0%), agreeing with the demotivation of meat consumption. The sub-criterion 'no preference for pork meat' resulted in 33.6%. The poultry meat and fish are also important in the decision of buying high protein products (17.1%); however, the pork obtained a reasonable good score (13.9%). It is not yet clear which are the items that discourage Brazilian pork consumer, as the sub-criteria health, myths and various other concerns have together 33.6% of the weight in the purchasing decision, showing that there is still a lack of knowledge about the features and benefits of pork [3]. Apparently there are consumers still keeping the idea that pork is harmful to health, due to its fat content, and not appropriate to consumption in the Brazilian diet.

Cultural aspects and price also were found important in not buying pork, and they represented only 14.1% in consumers? preference. Religion was not an issue in the purchase decision.

3.4 Challenges of the Pork Supply Chain in Brazil

The challenges of the supply chain of pork in Brazil is beyond the aspects of meat production and processing, but it involves the factors surrounding the trade and changes in eating habits of Brazilians. Meat and its by products consumption may be affected by the quality characteristics (sensory, safety and convenience), and others as animal welfare, sustainable production process [6], [7], [14]. The analysis of consumer eating behavior and consumption frequency may need an overview on the supply chain in many relevant actions in product improvement, or yet in the development of new strategies to increase demand through consumer incentives. The considerable increase in the consumers and stakeholders demands in late years are impacting Brazilian pig production. Recent research shows that, at low cost (efficiency in the processes of production and processing, logistics) and high quality (food safety, low environmental impact, animal welfare, traceability) are primordial aspects to competitiveness [7].

Results from the present study showed that pork quality parameters were the most important factors with respect to the preference criteria, the criterion market price and household income from the social criterion. It is needed an integration between producers, industries and wholesalers/retailers, and government to develop strategies to facilitate the increase in pork demand.According to other studies, Brazilian pork consumption is related to household income [3]. Therefore, the income increase in the last year generates good opportunities in the meat sector [5].

Both prices of fresh and processed meat are highly valued and consumed by Brazilian. The key factor inhibiting the consumption increase is the price, and the price reduction implies in strategic decisions within the supply chain.

3.5 Conclusion

The results of the study allowed the identification of three key points related to the low consumption of pork by Brazilians, which are the household income, the price, and meat quality. The increase in pork consumption might depend on solutions to address the gap between socioeconomic variables and market.

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