DETERMINATION OF THE SURCHARGE THAT CONSUMERS ARE WILLING TO PAY FOR AN ORGANIC CHEESE IN SPAIN

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Abstract— **Consumer requirements for preferably new, quality products with health guarantees are causing competitive adaptation by agro-food businesses. In this sense, cheese-producing enterprises are immersed in restructuring to adapt to the new scene. To assure the greatest possible success in this process it is advisable to determine what the preferences of cheese consumers are. In searching for the answer to this question, 420 surveys were made on regular food shoppers for at-home consumption in the metropolitan area of Madrid (Spain). Treatment of this data consisted in using the Conjoint Analysis technique and maximum willingness to pay. Results show that the main differentiating element for cheese is origin and the maximum willing to pay for an organic cheese with respect a conventional one is 15.42%.**

Keywords— **Consumer behaviour, Organic, Food Marketing.**

I. INTRODUCTION

Nevertheless, in spite of advances in modernization and innovation of dairy industries, the consumption of dairy products and especially of cheese has reached a standstill. In Spain in the year 2005, consumption by Spaniards was 7.5 kg per person per year, much lower than the European average, at 12 kg per person per year [1] where France, Italy and Germany stand out as the greatest consumers.

To the reduced consumption of cheese in Spain, the fact must be added that importation of this product increases year after year, reaching 181,700 t in 2005, an increase of 21% over the previous year. Therefore, the national cheese industry is losing its market quota.

In such a situation it is advisable for the national cheese sector to carry out a strategy to increase its demand, for which they can take advantage of new consumer tendencies. For, consumers are more and more interested in knowing the qualities of the product they are about to buy. This fact leads to increasing the information within reach of the consumer and simultaneously obligates producers to differentiate their merchandize from that of their competitors.

In this sense, the growing concern for health and environment can be established as an element that differentiates organic cheese, given that organic food has a positive image for consumers. These products are differentiated basically because they promote health and are respectful of the environment. Therefore, from a marketing perspective, organic cheese-making is a way to differentiate the product.

Due to all of the above, this research pursues several objectives. The first aim is to analyse the cheese consumer preference structure, as well as to determine the relative importance of the organic attribute as a differentiating element. Secondly, to establish what the maximum surcharge is that consumers would be willing to pay in the case of an organic cheese.

II. MATERIALS AND METHODS

The chief source of information used was personal interviews given to a representative sample of customary food buyers for home consumption, residents in Madrid (Spain).

The poll was carried out during the month of December, 2006, on a stratified random sample per number and age of inhabitants, on persons shopping in stores, supermarkets and malls. 420 questionnaires were obtained. Maximum error did not surpass 5.0 per cent, for a 95.5 per cent confidence level (k = 2), under the principle of maximum indetermination (p=q=50 per cent). Before field work, a preliminary questionnaire was given to 25 people who normally purchase groceries to confirm that the questions on the poll were well-designed and understandable.

Data analysis included carrying out a multivariate analysis by means of the Conjoint Analysis (CA)

technique [2]. Through the CA, consumer preference structure for vegetable oil was determined, with the aim of identifying, exploring and quantifying their attitudes to diagnose what consumers really prefer.

Nowadays, market researchers are greatly interested in the composition and formation of consumer preferences. Such preferences, which depend on information received by the consumer, are formed both by extrinsic elements (labelling, place of purchase, price, origin, etc.) and intrinsic elements (colour, texture, fat content, freshness, etc.). The former are part of the production process while the latter are part of the product itself. In turn, the composition of consumer preferences seems to be linked to a quest for quality as well as an interest on the part of the consumer in food safety and health matters [3-6].

To implement a conjoint analysis it is necessary to identify all of those attributes that will form part of the study, as well as establishing the levels associated with each attribute. With a review of literature, interviews with experts and a pilot questionnaire, the attributes and levels most representative of the process of buying cheese are then selected. The attributes (and their levels) identified as the most important were a) price (6 €/kg, 9 €/kg and 12 €/kg), b) *origin* (Castilla-La Mancha, Rest of Spain and Foreign), c) commercial *type* (fresh, semi-aged and aged), and d) production system (organic or conventional) due to the growing importance of organic production in the regional and national market. This assumes a new marketing opportunity for quality cheese.

By combining these four attributes and their 11 levels, 54 potential profiles would be obtained, which is considered an elevated number of products. Therefore an orthogonal design was used that reduced the combinations to nine [7]. The choice of the orthogonal design instead of presenting all possible product combinations limits the information obtained solely to the principal attribute effects. Although this reduces the number of interactions, the consumer is only obliged to chose between 9 products (Table 1), thus preventing fatigue and routine answers [8].
Once the set of hypothetical cheeses was designed, the questionnaire was presented to consumers in the form of cards. They were asked to arrange them according to their preferences, by assigning a rank from one to nine to each card, with "one" being the least valued product and "nine" being the most valued. These partial utility scores were used to describe the characteristics which most influence the overall preference for the product, as well as the relative importance of each attribute

Table 1. Hypothetical cheese cards shown to those surveyed

Card number:	Price (€/kg)	Type	Origin	System
1	12	Semi-aged	Foreign	Conventional
2	12	Aged	CLM[(1)]	Organic
3	9	Fresh	Foreign	Organic
4	9	Aged	RSP[(2)]	Conventional
5	9	Semi-aged	CLM	Conventional
6	6	Aged	Foreign	Conventional
7	6	Fresh	CLM	Conventional
8	12	Fresh	RSP	Conventional
9	6	Semi-aged	RSP	Organic

[(1)] Castilla-La Mancha, [(2)] Rest of Spain

The researcher should specify what the composition rule of the respondent is. The composition rule describes how the respondent combines the partial components of total utility of the factors to obtain the joint value. The composition rule most commonly used is the additive model, which considers that individual preference for a stimulus is obtained by adding partial utilities assigned to the factor levels that constitute this stimulus [9]. Beginning with an additive model, explaining a high percentage (80% to 90%) of the variance in individual preference [10]. Its formulation is:

$$Evaluation = b_0 + \sum_{i=1}^{3} b_i D_{1i} + \sum_{j=1}^{3} b_j D_{2j} + \sum_{k=1}^{3} b_k D_{3k} + \sum_{l=1}^{2} b_l D_{4l}$$

where b_{1i}, b_{2j}, b_{3k} *and* b_{4l} *are the coefficients associated with levels i (i=1,2,3); j (j=1,2,3), k (k=1,2,3), y l (l=1,2) of the attributes price (1), origin (2), type (3), and system (4); D_{1i}, D_{2j}, D_{3k} and D_{4l} are the fictitious variables for each attribute.*

The final result of the *Conjoint* software enables to calculate partial utilities of each of the attributes and the total utility of each profile. With the partial utilities of each respondent, and to determine the preference structure of the consumers, relative importance (RI) of the attributes of each product was calculated, as well as the range proportion assigned to each attribute over the variation of total ranges [10], according to:

$$RI(\%) = \frac{\max U_i - \min U_i}{\sum (\max U_i - \min U_i)} \times 100$$

where, RI = relative importance; maxUi = maximum utility; minUi = minimum utility.

In function of the relative importance of the attributes rated by the respondents, and in order to identify the degree of consumer loyalty to wines from their own region, segmentation was done using cluster analysis of K-means, considering the consumer preference structure (price, origin, type and system), using the *Quick Segmentation Analysis* algorithm [7].

Finally, multivariate data analysis with logistic regression was performed to calculate consumer willingness to pay (WTP) for organic cheese.

Consumer WTP for organic cheese was measured by using contingent valuation (CV), a direct valuation method. A mixed questioning procedure was used, normally called closed-ended with follow-up. This procedure consists of a dichotomous choice (DC) question and a maximum WTP question. In the DC question, consumers were asked whether or not they were willing to pay a given premium, Ai, to buy an organic cheese product instead of a conventional one. The Ai amount was a percentage over the price of the conventional product, and differed across consumers (10%, 25%, 50% and 100%)[1]. Consumer responses were *yes* if they were willing to pay at least Ai for an organic cheese or *no* otherwise.

Consumers were then asked the exact premium they were willing to pay. If their answer was positive, they were asked another question which would indicate how much more they were willing to pay. If their answer was negative, the next question would determine what the maximum price increase would be that they were willing to pay. The dichotomous individual response is similar to the maximum utility choice which allows calculation of WTP from appropriate welfare measurements. Hanemann [11] assumed that consumers were certain of the utility function before being asked and after paying the A_i amount to buy organic cheeses. However, some components of these utilities are unknown or unobservable by researchers who consider them

stochastic. This issue is the crucial assumption that explains the relation between statistical binary response models and the utility maximizing theory. By assuming a linear utility function and a logistic distribution function for the binary question, WTP can be measured through the estimation of the following logistic function:

$$P_i = \frac{1}{1 + e^{-(a + b \times A_i)}}$$

where P_i : 1 if consumers are willing to pay the Ai amount and 0 if not, A_i : the four premiums offered to consumers (10%, 25%, 50% and 100%)

Therefore, the mean WTP is calculated as follows:

$$E(WTP) = \int_0^\infty \frac{1}{1 + e^{-(a + b \times A_i)}} dA = -\frac{a}{b}$$

III. RESULTS AND DISCUSSION

A. Cheese consumer preference structure estimate

By analysing the relative importance of the different attributes considered, it is seen that for the total population the attribute with the greatest RI is origin (36.36%), followed by type of cheese (31.22%), price (20.53%) and production system (11.89%). The utilities calculated in each level of the various attributes show that consumers lean toward semi-aged, low priced cheese from Castilla-La Mancha, produced according to the traditional system, basically associated with the Designation of Origin (D.O.) Manchego Cheese [12] (Table 2).

B. Willingness to pay

When analysing total population WTP for an organic cheese, it is observed that consumers are willing to pay a price increase in the case of semi-aged organic cheese (10.17 €), which corresponds to a 12.97% increase compared to a semi-aged traditional cheese (Table 3). This WTP is even greater in the case of segments 1 and 3, as seen on Table 3.

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1. [1] Consumers are randomly offered a premium of 10%, 25%, 50% or 100% above the market price of a conventional product. Our 420 interviews worked out to 105 questions per A_i premium.

ACKNOWLEDGMENT

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