



MEAT YIELD AND QUALITY

CONSUMER PREFERENCES OF PORK CHOPS: RESULTS OF AN INTERNATIONAL CROSS-CULTURAL COMPARISON*

Tania M. Ngapo¹, Jean-François Martin and
Eric Dransfield²

Propriétés Sensorielles et Préférences, Station de Recherches sur la Viande, INRA Clermont Ferrand – Theix, France.

¹Current address: Agriculture and Agri-Food Canada, Food Research and Development Centre, Saint-Hyacinthe, Canada.

²Current address: Wageningen UR, Agrotechnology and Food Innovations, Wageningen, the Netherlands

Introduction

The pork industry is competitive at both international and national levels and is responding to consumers' demands and expectations for safe, nutritious products which conform to their life-styles. With increasing international trade, the industry needs to be aware of different consumer preferences for meat according to their different cultures and traditions. This will be increasingly important for the pork market.

Consumer preferences of pork are based on expectations of enjoyment within a given context. Expectations are different when the pork is for oneself, others or for a particular meal or event. These contextual differences play a role in the selection of pork and the type of pork to be bought. At the point of purchase, the choice is based on an expectation of good eating quality, an expectation that the pork will be tender and juicy. These expectations are based on information and previous experiences. Choice is therefore based on expectations, price and the appeal of the pork, where appeal is strongly expressed as a preference for the appearance characteristics.

Appearance characteristics of the pork are thought to be the main factors governing choice and comprise the main characteristics: colour, amount of fat cover,

marbling and drip. Preferences for pork characteristics have been determined separately in different countries in several local studies but the practical limitations, imposed by the short display-life of meats, make it inevitable that the people in different localities have assessed different meats. The meats also will have differed simultaneously in several of those characteristics and the relative importance of those characteristics is uncertain. The conclusions from such studies are therefore limited when considering the cultural and international dimensions.

These limitations, particularly so when surveying large numbers of people in different countries, have been overcome by using photographs varying systematically in four appearance characteristics. This approach is the first time a large scale systematic study has been conducted on meat appearance and consumer preference.

The objectives of this study were to identify the most important characteristics of fresh pork which determine preference and to show any variations in preferences among people from different countries.

Materials and Methods

Photographs of 16 pork chops were computer-modified to give two levels of each of the characteristics: fat cover, colour, marbling and drip. The pork chops were purchased at local supermarkets and butcher shops. The resulting 256 (2x2x2x2x16) images have been published as a book (Dransfield et al., 2001) which can be used as a tool for analysing the importance of those factors in consumer choice. The book is comprised of 6 series of which series 1+2, 3+4, and 5+6 each contain all 256 images. A series constitutes 16 (A4) pages or 8 double-pages. Every double-page contains the 16 different chop shapes and each chop represents one of the combinations of the four characteristics studied. Therefore every double-page contains a complete set of all 16 combinations of the 2 levels of each of the four characteristics. Both the order of representation of the characteristics with respect to the chop shape and the position of the chops in a double-page are randomised. It is important to note that the chop shape was not a factor studied, but can be considered a distraction and a means to realistically present a range of characteristics to the consumer.

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Consumers, older than fifteen years of age and who eat pork, were chosen at random and asked to select their preferred chop from each double-page. The selection was repeated 8 times completing one series. The consumers then completed a short questionnaire (translated by the research group undertaking the survey into the language of that country) asking basic socio-demographic and purchase- and eating-behaviour information (Table 1). Each new consumer was given a series in the order 1 to 6 so that all series were used approximately equally throughout a survey period. Consumers were surveyed at a range of sites, including agricultural shows, supermarkets and at their workplaces. The surveys were undertaken by 28 research groups in 26 countries and coordinated by the French group. These countries and the number of consumers surveyed in each were Argentina (505), Australia (498), Belgium (353), Brazil (710), Canada (Alberta and Quebec; 1053), China (544), Denmark (200), Estonia (248), Finland (305), France (573), Germany (143), Greece (412), Ireland (300), Japan (645), Korea (1014), Mexico (751), New Zealand (327), Poland (480), South Africa (562), Spain (358), Sweden (200), Taiwan (716), The Netherlands (873), United Kingdom (290), USA (Iowa and Texas; 732) and Yugoslavia (488).

Detailed analyses of the French results have been reported earlier (Ngapo et al., 2002; Ngapo et al., 2004) and, more briefly, the results of the Korean (Cho, et al., 2003) and Brazilian (Cipolli et al., 2003) surveys.

Results and Discussion

From the results of the 8 replicates given by each person, the frequency of choice for the 4 main characteristics was calculated. For each of the 2 levels of each characteristic, the choice was classed as consistent when the same level was chosen at least 6 times from the 8 replicates, otherwise the choice was deemed inconsistent. Three classes were then produced for each characteristic: with the percentage of people choosing level 1 (for example for colour, light red), level 2 (dark red) and inconsistent (with <6 of the replicates the same choice) for each of the 26 countries. Using replicate choices, the study was able to show those characteristics which were consistently chosen and those which were not. This is a unique consumer study conducted with replication,

but without the consumers knowing it. Consistency is interpreted as a measure of importance to the individual, who presumably paid more attention to those characteristics to be able to give a consistent choice. It was shown that, overall, colour and fatness were the most important appearance characteristics and marbling and drip were less important.

The frequency of choice was subjected to a correspondence analysis (SAS, 1999) to determine the relationships among countries of choice for each of the 12 classes (3 frequency classes for 4 appearance characteristics). The first 2 dimensions of the correspondence analysis accounted for 80% of the total variation and are shown graphically in Figure 1. The positions of the countries are given relative to 8 of the choice options. Countries shown close to a given choice have a greater percentage of their people who chose consistently that characteristic as its preferred appearance. Conversely, large distances from a choice characteristic usually denote preference for the other option of the characteristic. Inconsistent choices tend to be found in the central region of Figure 1.

This unique study of preferences for appearance characteristics, in which consumers in 26 countries viewed exactly the same appearance characteristics, shows that choice of pork is influenced by its colour, fatness, marbling and drip and that preferences differed considerably between countries. Compared to the other consumers, more of the Polish, Australian and Irish consumers preferred non-marbled, light red pork, that is, they are positioned in the upper left quadrant. Those in Estonia preferred light red pork without drip. On the contrary, more people from Korea and Japan tended to prefer the fat and marbled options and are positioned in the upper right quadrant of Figure 1. More people in Taiwan preferred the dark red pork whilst the Dutch and Finnish preferred lean meat with little overall preference for colour. Most countries tended to group close to the 'centre' of Figure 1 showing that preferences for colour, marbling and drip were not strongly in favour of any one option but they were more consistent in their choice of the leaner option.

Using groups of people from different regions within the same country has also enabled the variation within country to be established which was found to be much less than that between countries. France,

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different regions, and estimates can be made of the within and between country variation. In France, 3 regions were studied (Ngapo *et al.*, 2004) which showed differences in preferences between the regions composed of about 200 consumers each.

Conclusions

- Significant differences were found for consumer choice of pork chops based on 4 appearance characteristics. The greatest differences were for external fat cover with preferences for both fat and lean chops differing among countries. The second criterion for selection was for colour where both dark and light red chops were preferred by different people.
- Differences in preference between regions within country were generally smaller than those between many of the countries surveyed.
- Significant market segmentation exists in preferences on a global scale.
- Pork producers should be aware and prepared to respond to such market opportunities.

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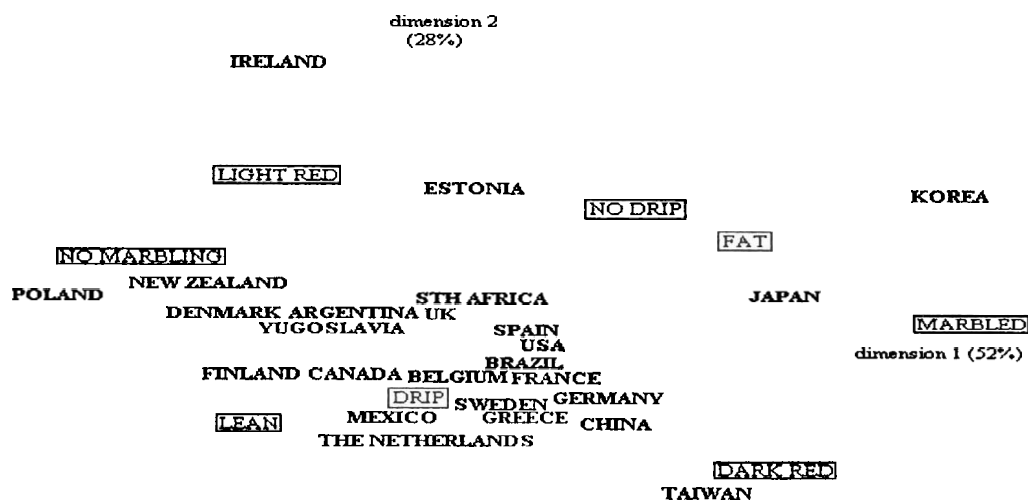


Figure 1. Preferences for 4 pork characteristics from surveys conducted in 26 countries.

| | <i>Light</i> | <i>Dark</i> |
|-----------------------|--------------|-------------|
| Colour L* | 64.3 | 55.7 |
| Colour a* | 18.3 | 23.7 |
| Colour b* | 20.8 | 18.8 |
| <hr/> | | |
| (% chop surface area) | <i>Fat</i> | <i>Lean</i> |
| Cover fat | 16.9 | 7.9 |
| Drip | 5.4 | 5.7 |
| Bone | 15.7 | 16.1 |
| Loin muscle | 39.2 | 43.9 |

Table 1. Mean composition of the 256 pork chop images.