

International preferences for pork appearance: I. Consumer choices

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Abstract

Using the same digital photographs of pork chops varying systematically in fat cover, colour, marbling and drip, 12,590 consumers from 23 countries each selected their preferred chop. Preferences differed considerably between individuals, between groups and between countries when comparing equivalent subsets of consumers taken from each country. Most choices were based on two appearance characteristics. Overall, both dark and light red pork were preferred equally and often with low fat cover. Preference for the light red pork was frequently chosen in association with no drip. Low fat cover was preferred by the majority of consumers, particularly in Poland, Finland and Mexico. Strong characteristic pork preferences were given by consumers in Ireland (the majority preferring light red, lean, no marbling and no drip), Australia (light red, lean, no marbling), Korea (marbled), Taiwan (dark red and lean) and Poland (lean). Effective marketing of pork should respond to the differing consumer preferences.

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1. Introduction

Pork is consumed in all continents and has an important role in the economies of many countries, but significant changes in the pork industry are occurring across the world. World meat consumption increased by almost 30% in the last decade of the 20th century (FAO, 2002) and is projected to increase at 2.2% per annum over the decade to 2007 (FAPRI, 1998). Pork accounts for more than half of this growth. China, the EU and the USA are the largest producers of pigs. Asia supplies about half and Western Europe about one-quarter of the world's pork production of more than 90 million tonnes of meat.

Pork is traded internationally with the largest exports, in 2000, from the EU (FAO, 2002). From Denmark alone, the world's biggest exporter of pig meat, exports reached 1.3 million tonnes. Japan is the largest importer of pig meat. International trade is rising, with exports from and imports into Western Europe increasing from 1995 to 1999 by about one-third.

Consumption of pork varies widely, from an annual per capita consumption of less than 3 kg in South Africa to over 60 kg in Austria, Denmark and Spain (FAO, 2002). Pig meat is by far the most consumed meat in Europe, both Eastern and Western, comprising almost half the total meat consumption, poultry and beef each occupying less than one-quarter. The challenge to this industry is to become more consumer driven. It is therefore important to establish consumer demands. Pork is seen, at least in some European countries, as an ordinary meat which is not expensive, but equally not suitable for special occasions (Bryhni et al., 2002; Ngapo et al., 2002). Prescott, Young, O'Neill, Yau, and Stevens

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(2002), in considering export markets from New Zealand, emphasised the need to know the factors determining choice in other cultures. Culture may be the strongest determinant of food choice (Rozin, 1996) and sensory appeal is often an important motive across different cultures (Prescott et al., 2002).

This study aims to both identify and compare the most important characteristics of fresh pork that determine consumer choice in 23 countries from all five continents. One of the difficulties in establishing the contribution of sensory appeal to choice of meats, particularly on an international scale, is their perishable nature. This was overcome by using computer-modified photographs that allowed comparison of preferences of pork chops from consumers worldwide.

2. Materials and methods

2.1. Pork chops

The method and chop characteristics are described in detail by Ngapo, Martin, and Dransfield (2004a). Briefly, photographs of 16 commercial pork chops were computer-modified to give two levels of each of the characteristics: fat cover (averages of 8% or 17% chop surface area for lean or fat chops, respectively), colour (average CIELAB L^* of 64 or 56, and a^* of 18 or 24 for light and dark red chops, respectively) marbling (absent or about 1.5% of the muscle area) and drip (absent or 5.5% of the chop area). The resulting 256 ($2 \times 2 \times 2 \times 2 \times 16$) images have been published as a book (Dransfield, Martin, Miramont, & Ngapo, 2001) in which every double-page contains the 16 different chop shapes and each chop shape represents one of the combinations of the four characteristics studied. Therefore every double-page contains a complete set of all 16 combinations of the two 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.

2.2. Consumers

Consumers were pork eaters older than 15 years of age and chosen at random. Consumers were surveyed at a range of sites, including agricultural shows, supermarkets and at their workplaces. In total 12,590 consumers completed the survey, the numbers of consumers surveyed in each of the 23 countries is given in Table 1.

Table 1

The total number (N) of consumers from each country and the percentage from each sub-panel using 0–4 characteristics to make their choice

	N	Number of characteristics used (% consumers)				
		0	1	2	3	4
Argentina	505	4	26	41	23	6
Australia	498	6	15	41	33	5
Belgium	353	5	27	40	24	4
Brazil	710	5	27	42	22	3
Canada	1053	6	25	42	23	5
China	544	7	28	41	21	4
Estonia	248	2	23	46	24	4
Finland	305	3	24	44	26	4
France	573	7	25	39	25	4
Germany	143	3	20	45	27	4
Greece	412	3	25	41	26	5
Ireland	300	2	17	41	32	8
Japan	645	3	25	42	25	4
Korea	1014	3	16	38	36	7
Mexico	751	0	21	46	29	4
New Zealand	327	3	18	45	26	7
Poland	480	2	15	43	33	8
South Africa	562	8	30	37	20	5
Spain	358	4	26	42	23	5
Taiwan	716	4	25	41	24	6
The Netherlands	873	2	29	32	30	8
USA	732	5	22	39	26	7
Yugoslavia	488	9	27	39	23	2
Average	547	4	23	41	26	5

2.3. Selection

Each consumer selected their preferred chop from each double-page showing the 16 combinations of two options of each of the characteristics of colour, fat cover, marbling and drip. The selection was repeated from eight different double pages that showed the same 16 appearance characteristics and chops, but in different combinations as previously described (Ngapo et al., 2004a).

2.4. Data analyses and statistical methods

2.4.1. Sub-panel selection

To facilitate comparison of results from the different countries, age and gender were selected as a common base. From each country, a sub-panel of 200 consumers was randomly selected comprising 100 of each men and women, and each divided into two groups of 50 consumers of <35 and ≥ 35 years of age. For each country the chop choices were calculated for each gender \times age group of the sub-panel and for the corresponding group of the entire panel. When significant differences (χ^2 test, $P < 0.05$) were observed between the choices of the sub-panel and the entire panel, a new sub-group was randomly selected. The process was repeated until

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