FLAVOUR STRATEGIES FOR INTRODUCING NOVEL MEAT PRODUCTS

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Background

Meat flavour choices and preferences are affected by culture as is clearly seen in cooking styles and dietary habits throughout the world. For food exporting countries seeking to introduce new meat products to foreign cultures the question may be posed: for new products is it better to copy the flavour styles that are familiar to the target markets or is it better to introduce the meat with the flavours common to the country of origin? In the case of sheepmeat the dominant consumers are ethnic Europeans and the favoured herbs include garlic, onion, rosemary, mint, and thyme. How would affluent Asian markets react to the flavours in these herbs as a means of overcoming the purported dislike of sheepmeat flavour by many Asians? The mainstream Asian supermarkets currently remain largely free of sheepmeat and totally free of sheepmeat products and so present a huge unexploited opportunity if perceived and real barriers to acceptance can be overcome.

In designing an experiment to test acceptance it was important that the product form presented was unfamiliar so that consumer expectations would not bias the results. We chose a 15-mm cube that was presented hot to consumers. None of the authors was aware of a meat product presented in that form in the two target markets, among ethnic Chinese in Singapore and ethnic Europeans in New Zealand. One-year-old lamb forequarter was minced with a base mixture of ingredients upon which were superimposed herbs and spices common in Chinese, Indian or European cuisines. The resulting flavours were designed to be signature flavours for those cuisines. No extreme or hot flavours were developed. The base mixture contained minimal quantities of onion, garlic, and other ingredients to affect a cook binding and provide antioxidative properties. Among the herbs and spices used with sheepmeat, garlic and onion are common to very many cultures (Smith & Young, 1990), so were included in the base mixture. The data presented below are abstracted from the completed part (Singapore) of the experiment, which also includes attitudinal questions about meat and demographic questions (data not presented). The questions in the meat flavour survey asked of the samples presented were: How much do like this flavour? How familiar are you with this flavour?

Objectives

- To show which signature flavours in lamb is most liked by Singaporean Chinese.
- To find if the identification of lamb and claimed health advantages affected liking.
- To show the relationship between liking and familiarity.
- To suggest a flavour strategy for sheepmeat introduction to Singaporean Chinese.

Methods

Diced lamb forequarter (lean: fat = 10:1) was minced with base ingredients (descending abundance; starch, salt, carrageenan, sodium tripolyphosphate, sodium erythorbate, garlic, onion powders) to yield 93.4% of the final uncooked weight. To this was added water (Control), water and ethnic herbs and spices (Chinese, European, Indian) to 100%. The herbs/spices were drawn from white pepper, mint, rosemary, thyme, pimento, ginger, coriander, Chinese five spices, mild curry, clove, sugar, soy sauce and Chinese cooking wine. The minces were layered into steel trays measuring 295 x 195 x 20 mm, evacuated once, then sealed under vacuum in oxygen impermeable bags before immersion cooking to an internal temperature of 75°C. After cooling in ice/water, the cooked slabs were removed from the trays and vacuum-packed in foil laminate bags, then frozen stored at -18°C for four weeks before consumer tasting. For presentation the thawed slabs were progressively sliced into the cubes and reheated to 65°C in microwave ovens. Each flavour treatment was assigned two three-digit numbers, one of which was used when a treatment was presented as the dummy sample (tasted first, data discarded) and the other for the real comparison of the four treatments. The presentation order was designed as described by MacFie et al. (1989). The three conditions "you will taste samples of *meat*, *lamb*, and *lamb which is high in nutritious zinc, iron, and protein and important for a healthy body* (*lamb + claims*) were rotated with every six consumers. A total of 246 consumers (82 consumers each condition) were ethnic-Chinese females aged 17-50, and recruited at Nanyang Technological University, Singapore. They rated their liking and familiarity on the line scales and were instructed to eat unsalted crackers and rinse with water between each sample. The extremes of the line scales were *extremely dislike/unfamiliar* and *extremely like/familiar*. The ratings were scored and normalised to 100 for analysis of variance.

Results and discussion

The conventional analysis of variance indicated that three conditions (meat, lamb, and lamb + claims) did not significantly affect consumer liking and familiarity of three ethnic and control sample flavours ($P > 0.05$) (Table. 1).

Table 1. Mean liking and familiarity scores for three information conditions and four flavours.

Condition (summed over flavour)	Liking	Familiarity	
Meat	48.3	49.0	
Lamb	47.4	44.5	
Lamb + claims	48.4	48.4	
Statistical effect of condition	NS	NS	
Flavour (summed over condition)			Correlation coefficient
Control	56.8^{a}	54.3^{a}	0.30
Chinese	50.5^{b}	46.7^{b}	0.27
European	43.9^{c}	46.1^{b}	0.51
Indian	41.0^{c}	42.1^{b}	0.41
Statistical effect of flavour	$P < 0.001$	$P < 0.001$	
Flavour x condition	NS	NS	

($^{a, b, c,}$ Within column, means with a different superscript are significantly different at $P < 0.05$)

Liking and familiarity were, however, significantly affected by flavour ($P < 0.001$) and mean scores had a similar pattern. The control was rated as the most liked, followed by Chinese, then European and Indian, the last two not significantly different from each other. The Control was rated as the most familiar flavour, and significantly different from the other three which between themselves were insignificantly different.

Two inferences can be drawn from these data. First, Singaporean Chinese females do not appear to be influenced in their perceptions by ovine species identification suggesting that barriers to introduction of novel meat products may be lower than anticipated. Second, minimally flavoured lamb appears to be the best option perhaps confirming the international acceptance of *Allium* flavours with lamb. At the same time, it appears that should a further flavour be required, a flavour the target market is used to is the best option. In this case Chinese flavour is the best option even though the consumers claimed to be no more familiar with it (statistically) than European or Indian flavours.

Plots of liking and familiarity provided further insights into consumer perceptions. The more like and familiar they claimed to be with a flavour the less correlated of liking and familiarity for the flavour (Figs. 1-4). (Correlation coefficient: $r^2 = 0.51$ for European, $r^2 = 0.41$ for Indian, $r^2 = 0.30$ for Control, and $r^2 = 0.27$ for Chinese). The flavour unfamiliarity of introducing a new meat product to a target market appears to influence consumer perception due to high correlation of its liking and familiarity.

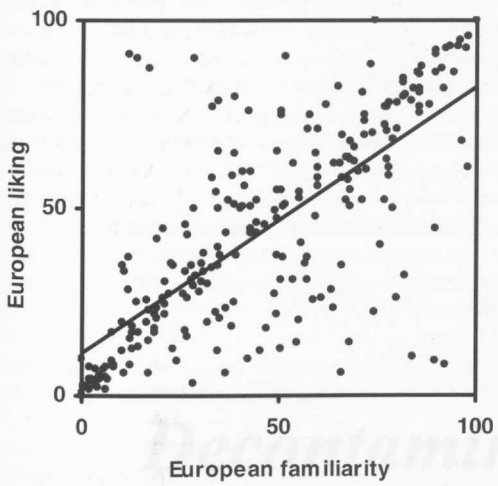

Figure 1. European flavour plots by liking *vs* familiarity

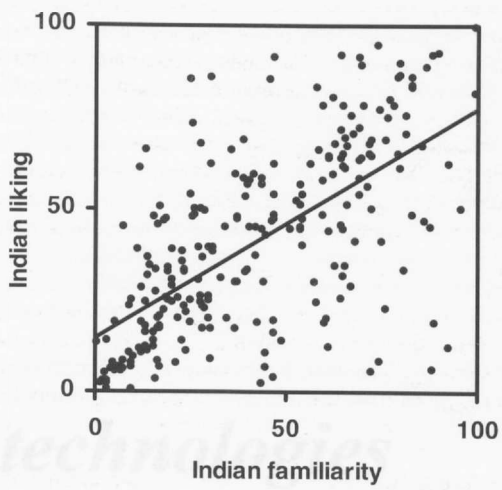

Figure 2. Indian flavour plots by liking *vs* familiarity

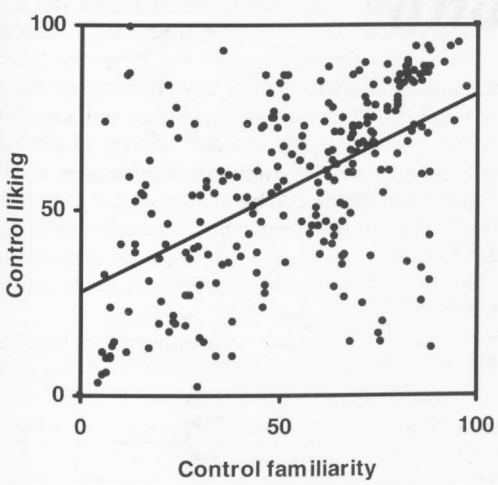

Figure 3. Control flavour plots by liking *vs* familiarity

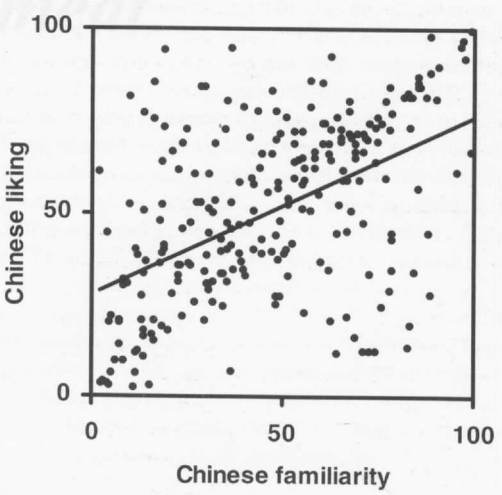

Figure 4. Chinese flavour plots by liking *vs* familiarity

Pertinent literature

MacFie, H.J.H., Bratchell, N., Greenhoff, K. & Vallis, L. V. (1989). Designs to balance the effect of order of presentation and first-order carry-over effects in hall tests. *Journal of Sensory Studies*. 4, 129-148.

Smith, M. & Young, O.A. (1990). How the world spices its sheepmeat. Paper presented at the Twenty-sixth Research Conference of the Meat Industry of New Zealand, Hamilton, New Zealand, 14-16th August 1990.

Acknowledgements

This research was funded by the New Zealand Foundation for Research, Science and Technology. We wish to thank Science and Technology Education Institute of Nanyang Technological University for providing facilities and recruiting panelist.