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A Note on Consumer Preference of Smoked Salmon Colour

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Abstract

A visual panel of 386 consumers held in the departure lounge of Dublin airport indicated a preference for smoked salmon which had a light pink colour. The effect was independent of the nationality and sex of the panellists but frequent purchasers of smoked salmon preferred a more orange product.

Keywords: Consumer preference; consumer surveys; smoked salmon

Introduction

Colour is a particularly important component of food sensory quality and this applies especially to smoked salmon where a wide range in colour is found. Colour can vary from light to deep pink and/or from light to deep orange in both wild and farmed salmon and a number of authors have used objective tests for assessing fish colour (Young and Whittle, 1985; Skrede and Storebakken, 1986; Skrede et al., 1990; Gormley, 1991).

The food industry uses a wide range of colours to make food more attractive to the consumer and considerable attention is being focused on ensuring that colourants are safe (Counsell, 1989; Daly and Lyons, 1989), and on increasing the use of natural or nature-identical colourants rather than synthetic ones. Despite this, the pigments used in farmed salmon have received a bad press which relates more to canthaxanthin than to astaxanthin (Blake, 1989). The former gives a rich orange colour in the flesh while the latter gives a pinker colour which is closer to the colour of the wild fish (Sinnott, 1988); astaxanthin also ‘survives’ freezing more effectively.

The present study was carried out to assess consumer preference of smoked salmon colour; the colour of the fish was also assessed objectively and by comparison with a Roche colour card.

Experimental

The test was carried out (in Northern daylight) in the departure lounge of Dublin airport and 386 consumers were interviewed as to their colour preference for the sides of smoked salmon presented. The consumers were selected at random as they proceeded to departure gates and eight commercial sides of vacuum-packed smoked Atlantic salmon (Salmo salar) were presented for evaluation. In reality there were only four samples as each was duplicated (i.e. mirror image sides from the same fish). Each consumer was asked to choose the sample that he/she would buy (based on colour) and details of nationality, frequency of purchase of
smoked salmon, sex and age (in 10-year spans) were recorded. The colour of the samples was measured prior to the panel test on a D25A Hunter colour meter (5 cm specimen port) [data computed as L/a and hue angle (θ)] as outlined by Gormley (1991). Fish colour was also matched with a Roche colour card; a description of the colour of each side was obtained from each of 10 evaluators at The National Food Centre and a consensus colour description of the sides was composed.

Results and Discussion
Smoked salmon colour
The four sides of smoked salmon had distinctive colours and the 10-member laboratory panel had no difficulty in reaching a consensus on a colour description for each (Table 1).

Skrede and Storebakken (1986) cite a* and L* (both for Minolta and Hunter Lab instruments) as useful objective indices of smoked salmon colour while Gormley (1991) has suggested that Hunter L/a values <1.90 and hue angles <40° are desirable in smoked salmon. On this basis Side 3 (Table 1) is “border-line” as it is very light in colour. However, to an extent this is counterbalanced by a low hue angle indicating a good level of pinkness. Sides 1, 2 and 4 (Table 1) lack pinkness based on hue angle values and were visually orange to dark orange. This applied especially to Side 4. The Roche card values indicate darkness/strong orange-red when high and lightness/weak orange-red when low (Table 1); however, the cards are designed for fresh salmonids and colour matching with smoked sides is difficult. Having said this, Side 3 had the “weakest” colour based on the colour card readings.

Consumer preference of smoked salmon colour
There was a preference for Side 3 with 43% of panellists choosing this side on the basis of colour (Table 2). The other three samples were preferred relatively equally. The preference for Side 3 was surprising in view of its lightness and pale colour but many of the panellists thought it looked natural with no added colour whereas the converse was said about the other sides, i.e. a number of consumers felt that the deep orange colour was synonymous with added colour. Usually a deep red/orange colour is desirable in most markets where salmon is sold (Moe, 1990; Blokhuis, 1986). On this basis it could have been expected that Side 2 would have performed well as it had the blend of orange/pink normally associated with high-quality wild smoked salmon. The fat contents of the sides were not measured. However, it should be stressed that fat deposits in droplet form could affect light angles and dispersions and otherwise dilute pigment perception.

The colour preference for Side 3 was consistent across ‘nationalities’ and was particularly strong for the USA and the

<table>
<thead>
<tr>
<th>Side</th>
<th>Visual colour</th>
<th>Hunter L/a</th>
<th>Hue angle (θ)</th>
<th>Roche card</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deep orange</td>
<td>1.64</td>
<td>40</td>
<td>15.5</td>
</tr>
<tr>
<td>2</td>
<td>Orange pink</td>
<td>1.85</td>
<td>39</td>
<td>16.0</td>
</tr>
<tr>
<td>3</td>
<td>Pink, not orange, lightish</td>
<td>1.90</td>
<td>35</td>
<td>14.5</td>
</tr>
<tr>
<td>4</td>
<td>Dark, kipper-like</td>
<td>1.69</td>
<td>39</td>
<td>17.5</td>
</tr>
</tbody>
</table>

1Consensus visual colour perception from 10-member panel at The National Food Centre.
TABLE 2: Percentage of panellists choosing smoked salmon samples

<table>
<thead>
<tr>
<th>Side</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>No. of panellists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep orange</td>
<td>21</td>
<td>15</td>
<td>43</td>
<td>21</td>
<td>386</td>
</tr>
<tr>
<td>Orange pink</td>
<td>17</td>
<td>25</td>
<td>49</td>
<td>17</td>
<td>221</td>
</tr>
<tr>
<td>Pink, not orange; lightish</td>
<td>9</td>
<td>12</td>
<td>62</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Kipper-like</td>
<td>31</td>
<td>3</td>
<td>45</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>18</td>
<td>64</td>
<td>6</td>
<td>33</td>
</tr>
</tbody>
</table>

By country:
- UK | 20 | 13 | 49 | 17 | 69 |
- USA | 9 | 12 | 62 | 18 | 34 |
- Scandinavia | 31 | 3 | 45 | 18 | 29 |
- Other | 12 | 18 | 64 | 6 | 33 |

By frequency of purchase:
- Once/week | 38 | 17 | 33 | 13 | 24 |
- Once/month | 23 | 11 | 36 | 18 | 73 |
- Once/quarter | 12 | 21 | 42 | 24 | 66 |
- Occasionally | 21 | 14 | 47 | 18 | 191 |
- Never | 19 | 16 | 50 | 16 | 32 |

By age (years):
- <20 | 20 | 10 | 40 | 30 | 10 |
- 20-29 | 30 | 18 | 28 | 24 | 57 |
- 30-39 | 20 | 16 | 44 | 20 | 80 |
- 40-49 | 18 | 14 | 49 | 19 | 36 |
- 50-59 | 17 | 13 | 51 | 19 | 39 |
- >59 | 18 | 9 | 50 | 23 | 44 |

By sex:
- Male | 17 | 13 | 46 | 24 | 206 |
- Female | 26 | 18 | 39 | 17 | 180 |

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References

"other" consumer categories (Table 2). The effect was independent of the sex of the consumers and also of their age except for the 20-29 age group who preferred the colour of Side 1. Side 1 colour was also preferred by those purchasing smoked salmon at least once per week (Table 2). There was an increasing consumer preference for the colour of Side 3 as frequency of purchase of smoked salmon decreased. These data suggest that frequent purchasers of smoked salmon like an orange colour whereas occasional buyers prefer pink. This may be a familiarity/education effect and it warrants further investigation. Only 6% of the consumers interviewed were frequent (once/week) purchasers of smoked salmon; 49% purchased occasionally and 8% never (Table 2).


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