

MARKET-ORIENTED METHODOLOGIES TO OPTIMIZE CONSUMER ACCEPTABILITY OF GOUDA-TYPE CHEESES

TỐI ƯU HÓA MỨC ĐỘ CHẤP NHẬN CỦA NGƯỜI TIÊU DÙNG ĐỐI VỚI SẢN PHẨM PHOMAT DẠNG GOUDA BẰNG PHƯƠNG PHÁP ĐỊNH HƯỚNG THỊ TRƯỜNG

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TÓM TẮT

Mục tiêu của nghiên cứu này là sử dụng phương pháp phân tích thị trường và phân tích cảm quan để khảo sát thị hiếu của người tiêu dùng đối với các sản phẩm phomat Gouda. Trong phân tích thị trường, thói quen sử dụng sản phẩm và mức độ chấp nhận của người tiêu dùng đối với sản phẩm phomat được khảo sát dựa trên một bảng câu hỏi được cấu trúc sẵn. Phương pháp phân tích cảm quan sử dụng một hội đồng người thử đã qua huấn luyện để mô tả, xác định những tính chất cảm quan tiêu biểu cùng cường độ của chúng cho tám sản phẩm phomat loại Gouda, đồng thời khảo sát mức độ ưa thích của 500 người tiêu dùng trên những sản phẩm phomat đó. Kết quả cho thấy mức độ chấp nhận của người tiêu dùng đối với phomat dao động tùy theo từng người và liên quan đến mức độ ưa thích của người tiêu dùng với những tính chất cảm quan tiêu biểu của từng loại phomat. Người tiêu dùng có khuynh hướng ưa thích những sản phẩm phomat béo, màu vàng, mặn và có mùi phomat đặc trưng, cũng như sản phẩm có độ ẩm cao và béo, trong khi đó, họ ít ưa thích phomat có vị bột ngọt, cứng, có nhiều protein hòa tan và chua.

ABSTRACT

The formulation and marketing of new food products are very complex and there are many interacting influences on consumer acceptance, e.g. the person, the food product and the environment. Market analysis and sensory analysis were used to determine consumer preferences for Gouda-type cheeses. Consumers' attitudes, perceptions and purchase behaviour were investigated by means of a structured questionnaire. Eight Gouda-type cheeses were objectively assessed by a trained panel using descriptive sensory profiling, and, in parallel, were hedonically rated by 500 naive consumers. The cheeses acceptance varies widely among consumer and is related to consumer preference for different cheese profiles. Preference mapping was used to examine the relationship between descriptive sensory data and consumer responses. Consumers preferred cheeses described as "greasiness", "yellow", "saltiness" and "cheese flavour" as well as "humidity" and "fat", whereas they least liked a cheese described as "umami", "hardness", "solute protein" and "acidity".

Keyword: Consumers' attitudes, cheeses, sensory analysis, preference mapping, chemical composition.

1. INTRODUCTION

Cheese is a most versatile and nutritious dairy product which is commonly consumed in many different ways, at many different times, in most societies where milk is produced. Although cheese is a regular addition to the shopping baskets of some of Vietnamese households, its consumption remains one of the lowest in Asia. Since 1996, the world's major cheese making countries produced 11.9 million tonnes [1] the Vietnamese cheese market is still below 1,300 tonnes [7]. In recent years, consumers have become more conscious of their diet, more affluent, more discerning and thus seek variety. Ultimately, the most successful cheeses will be those that most satisfy consumer needs. To determine whether new food products will gain consumer acceptance is a complex process. Some consumer choice models proposed [6] included people factors such as age, gender, education and nutritional knowledge; environmental influences such as marketing variables, convenience foods and size of household; and intrinsic sensory influences such as flavour, texture and appearance. The concept of new product development has been defined as “development based on an understanding of the needs and wants of the customer” [3]. The link between market orientation and new product success has been illustrated by some researchers [3].

A key aspect of a market-oriented approach to product development is an understanding of how they are perceived by the consumer, thus determining where new opportunities exist. Positioning the new product in the marketplace also requires an awareness of how its sensory and extrinsic attributes compare with those of other products on the market, and of the synergy between its “taste” and its “image”. Although sensory analysis and marketing share a common goal, which is the production of a successful product basing the needs of the customer, linkage between both disciplines has been far from optimal in practice [4]. The objective of this study was to evaluate the flavour profile and acceptability of eight Gouda-type cheeses using descriptive analysis and consumer acceptance tests combined with physio-chemistry analysis to help cheese manufacturers to understand, control and optimize the sensory characteristics of their products.

2. MATERIALS AND METHODS

2.1 Selection of cheeses

Eight Gouda-type cheeses selected for sensory analysis were five handicraftsman cheese samples: M1, M2, M3, M4, M5 and 3 foreign samples: Even Gouda (GoudaH), Even Edam (EdamH) and Edam Bola de Oro (EdamF). These represented the variety commercially available on the Vietnamese market [2]. All samples were presented for analysis as 5g cubes in covered glass containers at 20°C. Order of tasting was balanced to take account of first order and carry-over effects [5], and tasting took place in the sensory laboratory designed by ISO (8589:1988).

2.2 Gross composition

Chemical properties (content of solute protein, fat, amino acid, acidity and humidity) were analysed at Experimental Services and Analytical Center and Pasteur Institute [10].

2.3 Descriptive Sensory Analysis

A total of 11 trained assessors quantitatively described the flavour, appearance and texture characteristics of the eight cheeses using a vocabulary of 15 terms. Descriptive analysis was conducted at HCMUT and used a 10-point universal intensity scale and a cheese flavour sensory language [2]. Evaluations were conducted individually in an enclosed room dedicated to sensory analysis and free from external aromas, noise, and distractions. Panellists were instructed to expectorate samples after evaluation. Spring water and cucumber was available to each panellist for palate cleansing.

2.4 Consumer Evaluation

A total of 500 regular cheese consumers, who were “naïve” in that they had no training in sensory evaluation, expressed their preference for each of the eight Gouda-type cheeses on a nine-point hedonic scale. Beside, they had answered a questionnaire about their consumption and perceptions of its nutritional value,

influenced factors of purchase decision (weight, sensory appeal, and price) and appropriateness of use, familiarity, convenience, and socio-economic data were also collected on all respondents.

2.5 Statistical Analysis

The sensory analysis data, both descriptive and hedonic, were analysed by analysis of variance (ANOVA) using software R version 2.11 to determine the main differences between the cheeses in terms of sensory character. Principal components analysis (PCA) was used to analyze the hedonic data as a technique called preference mapping [4]. This technique identified the main preferences of consumers for the different Gouda-type cheeses. Consumer preference data were also analyzed using hierarchical cluster analysis.

3. RESULTS AND DISCUSSION

3.1 Descriptive Analysis

ANOVA test showed that the eight cheeses were distinguished from one another ($p < 0.05$) by 10 of the 15 terms (hardness, umami, greasiness, full-favour, cheese flavour, saltiness, yellow, bitterness, acrid, and rancid).

3.2 Consumer Evaluation

Consumers' attitudes to and preferences for cheese. A half of total of 500 respondents (50.4%) consumed cheese 1-3 times/month, 18.4% of respondents consumed 1-2 times/week and 8.2% more than 3 times per week. Cheese was rated highly (4.45 on a scale of 1 to 5) for its health value, when sensory appeal was 3.99, familiarity was 3.89, and price 3.74 [7].

3.3 Consumers' attitudes to and preferences for Gouda-type cheese.

Of the Gouda-type cheese consumers, 39% of consumers interested in those products, 48% of those have no ideas and 13% don't interest and this was reflected in the interest by which they were often consumed. Consumers often eat cheese in breakfast (67%), lunch (6%) [7]. A total of 54% respondents consumed Gouda with bread, 50% with sandwich, 14% in a salad, 15% with biscuits and 14% with wine. The result showed that 21% consumer used Cheddar, 11% for Gouda, 8% for Emental and 59% didn't remember the names of eaten cheeses

3.4 The degree of interest of consumers to Gouda sensory attributes.

The results showed that before eating products, consumers liked milk-odour (6.72 on 9-point scale) most, then greasiness (6.65), butter-odour (6.52), saltiness (5.87) and hardness (5.41), while they didn't like rancid (2.81), acrid (2.85), sourness (3.90) and acetic (3.38) properties. The most important intrinsic attributes which influenced purchase of Gouda-type cheeses and the consistency of these attributes are shown in table 1.

Table 1 Correlations between consumer perceptions of cheese attributes

	Color liking	Taste liking	Structure liking	Flavor liking	Overall liking	Accept
Color Liking	1.00					
Taste Liking	0.61	1.00				
Structure liking	0.69	0.78	1.00			
Flavor liking	0.69	0.78	0.76	1.00		
Overall liking	0.67	0.90	0.82	0.84	1.00	
Accept	0.65	0.90	0.78	0.80	0.95	1.00

It was found that overall liking correlated strongly with acceptance ($R=0.95$), taste ($R=0.90$), flavour ($R=0.84$) and structure ($R=0.80$). Taste was also the most important of all influences on purchase (i.e. including extrinsic attributes).

3.5 Subjective consumer preference analysis.

The consumer's preferences for the eight different cheeses showed that the foreign Gouda-types were most preferred and the least preferred was M1 (4.43) (average score of over 500 consumers). However, the differences in consumer likes and dislikes may be miss-evaluated through an ANOVA where overall means from a number of consumers are generated and compared. For this reason, hierarchical cluster analysis and preference mapping

was performed to determine whether there were distinct segments of Gouda-type cheese consumers within the populations polled. Hierarchical cluster analysis separated consumers into four groups with different preferences (fig.1).

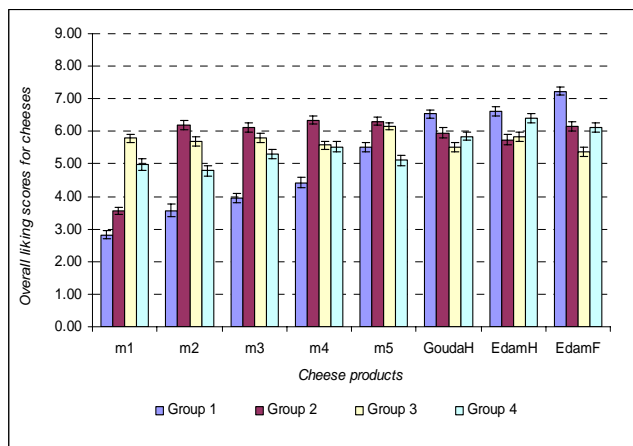


Figure 1. Overall liking scores for cheeses within different consumer groups

EdamF was most liked by group 1 (composed by 101 consumers) and group 4 (by 121 consumers). The consumer from the group 2 (126 consumers) preferred M2, M3, M4, M5 to GoudaH, EdamF and EdamH. In group 3 (composed by 152 consumers), EdamF cheese is also a lowest mean preference (5.38) but the others were higher preferred. The preference mapping could predict the sensory attributes that consumers in each group liked (fig3-6). The overall preferred cheese for consumer in group 1 was a cheese characterized by saltiness, yellow and cheese flavour, the others weren't (fig.2). Consumers in group 2 liked the same cheeses properties as consumers in group 1 but added greasiness. Consumers in group 3 were different from the other groups when they added umami in their list of preferred properties such as cheese flavour, yellow, saltiness and greasiness. Consumers in group 4 liked cheese flavour, yellow, full-flavour and saltiness.

3.6 Correlation between physio-chemical properties and sensory attributes.

The results showed positive correlations between content of solute protein and umami ($R=0.92$) and negative correlation with greasiness ($R=-0.75$) and humidity ($R=-0.91$). The basic taste umami was also positively correlated with the hardness attribute ($R=0.70$) and negatively correlated with Gouda flavour attribute, saltiness

($R=-0.80$), greasiness ($R=-0.67$) and chemical composition, humidity ($R=-0.95$). Humidity was strong correlation with saltiness ($R=0.85$) and good correlation with greasiness ($R=0.63$). In chemical composition, the result also showed fat was strong correlated with acidity ($R=0.82$), saltiness ($R=0.81$) and proved that there were relations between Gouda cheeses' sensory attributes and gross composition.

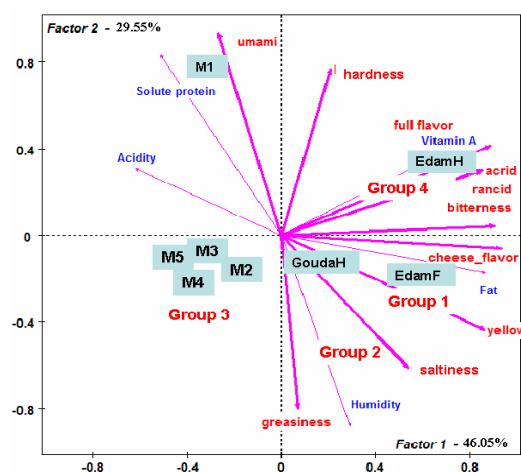


Figure 2. Biplot of sensory, chemical properties and cheese products

4. CONCLUSION

Descriptive and gross composition analysis and consumer evaluation showed distinctive flavour profile for foreign and Vietnamese cheeses and their relationship with acceptability. Furthermore, the preference mapping analysis showed that no unique cheese would satisfy all consumer groups for all attributes. The result of this study supported a multi-functional approach to new product development, which took into account the many influences on food choice, using the skills of sensory scientists and marketing personnel. The type of information gathered in this study showed the current competitive position of selected products in terms of strengths and weaknesses and will enable product developers to identify niches in the marketplace for new and improved products.

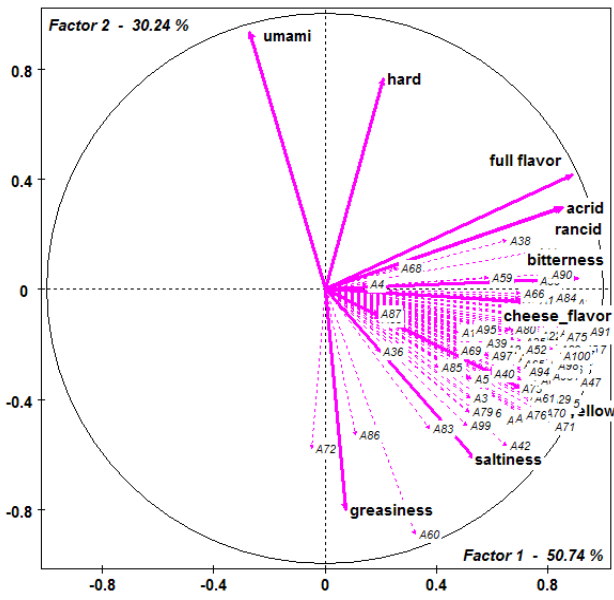


Fig 3. Preference mapping of Group 1

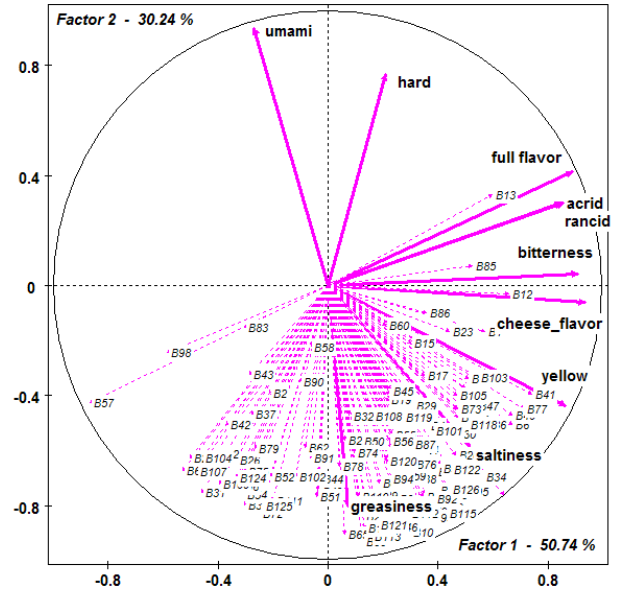


Fig 4. Preference mapping of Group 2

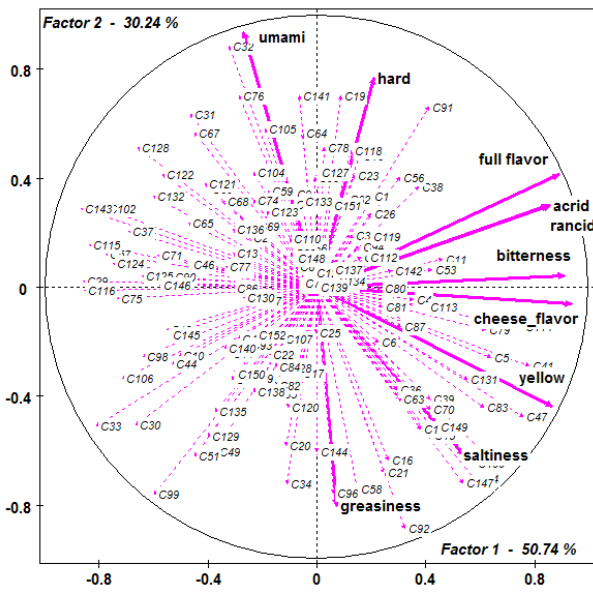


Fig 5. Preference mapping of Group 3

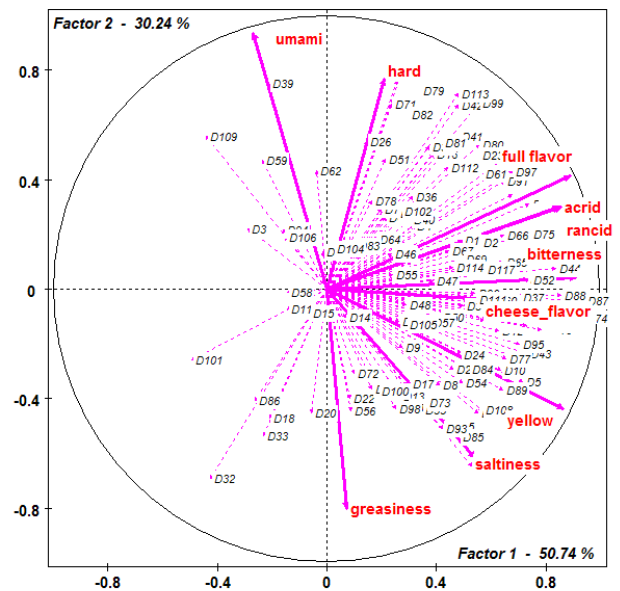


Fig 6. Preference mapping of Group 4

ACKNOWLEDGMENTS

This study was funded in part by Food Industry College-HCM City. The use of trade names in the publication does not imply endorsement by these organizations nor criticism of ones not mentioned. We thank Ms. Uyen Phan for passing the sensory tests. We also thank My Dung for their precious help in consumer test and thanks to all assessors for their participations.

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