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About

INSIGHT Journal is an online, open access, international refereed research journal established by Universiti Teknologi MARA Cawangan Johor, Malaysia. It is indexed in MyJurnal MCC.

INSIGHT Journal focuses on social science and humanities research. The main aim of INSIGHT Journal is to provide an intellectual forum for the publication and dissemination of original work that contributes to the understanding of the main and related disciplines of the following areas: Accounting, Business Management, Law, Information Management, Administrative Science and Policy Studies, Language Studies, Islamic Studies and Education.

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FOREWORD BY DEPUTY RECTOR OF RESEARCH, INDUSTRIAL LINKAGES & ALUMNI

Since 2018, the INSIGHT JOURNAL (IJ) from Universiti Teknologi MARA Cawangan Johor has come up with several biennial publications. Volume 1 and 2 debuted in 2018, followed by Volume 3 this year as well as Volume 4 with 19 published papers due to the great response from authors both in and out of UiTM. Through Insight Journal, lecturers have the ability to publish their research articles and opportunity to share their academic findings. Insight Journal is indexed in MyJurnal MCC and is now an international refereed journal with many international reviewers from prestigious universities appointed as its editorial review board members.

This volume 5 as well as volume 6 (which will be published in 2020) are special issues for the 6th International Accounting and Business Conference (IABC) 2019 held at Indonesia Banking School, Jakarta. The conference was jointly organized by the Universiti Teknologi MARA Cawangan Johor and the Indonesia Banking School Jakarta. Hence, the volumes focus mainly on the accounting and business research papers compiled from this conference, which was considered a huge success as over 66 full papers were presented.

Lastly, I would like to thank the Rector of UiTM Johor, Associate Professor Dr. Ahmad Naqiyuddin Bakar for his distinctive support, IJ Managing Editor for this issue Dr. Noriah Ismail, IJ Assistant Managing Editor, Fazdillah Md Kassim well as all the reviewers and editors who have contributed in the publication of this special issue.

Thank you.

ASSOCIATE PROF. DR. SAUNAH ZAINON
Deputy Rector of Research, Industrial Linkages & Alumni
Editor-in-Chief for INSIGHT Journal
Universiti Teknologi MARA Cawangan Johor

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Organic Rice New Product Screening: Customers Preference Application

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Abstract

Value adding to new products can be a challenge for organic rice growers, rice mill owners, and food supplement producers. Therefore, the Consumers Preference theory to allow consumers to express through the new product screening and consumers' sensory testing should be examined before the products are sold at the markets. The aim of this study is to analyse new product screening and to test consumers' sensory in order to develop a new product model leading to health supplement. The mixed methods research by survey was used in data collection and data analysis. Broken-milled organic rice (Hommali Rice around Roi-Kaen-Sarn-Sin area in the Northeastern region, Thailand) and its by-products were used for screening and testing. The taste, smell, colour, and the texture preference from the prototype products in the form of cereal powder mixed drink were evaluated. 269 consumers were surveyed for consumers' preference and 15 rice mill owners were in-depth interviewed through a focus group. Consequently, the most preferred product was the Broken-Milled organic rice cereal powder mixed drinks. A questionnaire was used to survey the consumers' preference factors and possible purchasing intention. The results demonstrate that respondents preferred formula A (3.52), with the flavour added, the colour (3.85), the strong taste (3.58), and the smell (3.56) respectively. The factors leading to purchasing intention is the mellowness of the taste and the aroma, statistically at a significant level of 0.05.

Keywords: Sensory Test, New Product Screening, Customers Preference Application, Affective Stage, New Product Development

1. Introduction

Thailand is a major rice producing country. In 2017, the total volume of Thai rice exports was 7,395,579 metric tons (US$ 3, 324.03 million) (Thai Rice Exporters Association, 2017, Kraithong S. et al, 2018, pp. 259-266). Thai rice can be classified into 2 types: non-pigmented (or white rice) and pigmented rice (or coloured rice). White rice is obtained by removing the husk and outer layer from the entire grain while coloured rice is achieved by eliminating the husk and only a small amount of the outer layer that contains some pigment. Different pigments that include anthocyanin, proanthocyanidins,

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and carotenoids produce differences in rice grain colour that range in black, blue, red, and brown (Pereira-Caro et al., 2013, pp. 7976–7986., Kraithong S. et al, 2018, pp. 7976–7986). Even though white rice has long been a staple food in Asia, few people know that pigmented rice actually contains higher health benefits (Sampaothong, 2016, pp. 74-85., Kraithong S. et al 2018, pp. 7976–7986.). Recently, pigmented rice has become a popular alternative for health conscious consumers. (Kraithong S. et al 2018, pp. 7976–7986) Customers often present certain preferences relative to the same product, such as function, shape, colour, and cost. The ideas in the mind of the customer can be represented by higher level concepts. However, the actual shape, colour, and cost embodied in the product can only be viewed as lower-level features (Cao D. et al, 2011, pp. 162–176). Customer preferences have always been of interest to researchers aiming to support the strategic planning and decision making of business managers (Quan Vu H. et al, 2014, pp. 247–272).

However, the number of product variants needed to satisfy individual customer needs is still an open question, as feature models do not incorporate any direct customer preference information (Zhou F. et al, 2017, pp. 306–317). Opportunity identification is the initial stage in the new product development process where ideas for new products are generated and screened (Rochford L., 1991, pp. 287–296). Therefore the quest for success in new product development requires management to navigate complex processes (Tzokas N. et al, 2004, pp. 619–626). New product development requires a long and detailed process with numerous activities such as product line planning, strategy development, concept generation and screening, business analysis, development, testing and validation, manufacturing development and commercialization. Furthermore, each of these activities has its own unique requirements, some requiring information collection from the market, whereas others requiring the collaboration of different people who are involved in the new product development activities (Muammer Ozer, 2003, pp. 517–530). The rate of market and technological changes have accelerated in the last years. This turbulent environment requires new methods and techniques to bring successful new products to the marketplace. Much attention has focused on new development techniques, but little empirical research has been conducted to validate these techniques (González F.J.M and Palacios T.M.B., 2002, pp.261–271). This study consists of three questions as follow: 1. Prototype product development, for the sensory testing of consumers on the product, what is the development model? 2. What factors do consumers have in screening new products? and 3. What could be the correlation between consumers' preference factors and their purchasing intention?

2. Literature Review

Products and applications are getting more and more complex. From this point of view product development is basically decision making. Product development has changed over time from a sequential to a concurrent or simultaneous process. (Frank S. and Matthias M., 2018, pp. 106 – 124) In this context the development of products has become a key process to increase the competitiveness of the company. (Camila Alejandra L. V. et al, 2018, pp 249-262) In which product development is an indispensable process product testing. Product testing depends on the type of product.

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This research focuses on a food supplement product. Therefore, product testing is performed by tasting. Descriptive analysis with sensory panel has thus been the most well defined methodology to characterize various products. (In-AhKim et al., 2018, pp. 250-260) Sensory benefits have a high impact on consumer product choice. During the last few years, experts have observed sensory impressions as the new "consumer exciter." The scientific discipline of sensory analysis describes the relationship between products (ingredients) and their perception and evaluation by the human senses. Sensory-testing methods represent important tools which enable issues associated with the development, quality assurance, marketing, and sales departments to be addressed (P. Huber., 2017, pp. 617-633). In this research, various theories are studied:

- New Product Development.
- New Product Screening.
- Sensory Test.
- Customers Preference Application.
- Affective Stage.

2.1 New Product Development

New Product Development is now well established. Most of these researches argue that early and close collaboration with key suppliers are important factors in achieving reduced development cost, reduced time to market, and improved product quality (Ole S. Mikkelsen and Thomas E. Johnsen, 2018). Besides new product development is a crucial process in maintaining a company's competitive position and succeeding in dynamic markets. One of contemporary trends in the global economy is mass customisation that bases on modifications of existing products instead of designing everything anew. The advancement of information technology helps today's enterprises in managing business processes and collecting data in enterprise systems that can be a potential source of information. Specifications of previous products deliver information of design, cost and time of past new product development projects that can be the basis for developing new products. (Relich M. and Pawlewski P., 2018, pp. 40–45) As a result new product success requires excellence in three categories: (i) reducing product development cycle time, (ii) increasing product development innovation and (iii) reusing company knowledge assets (Pinna C. et al, 2018, pp.184–195)

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2.2 New Product Screening

The aim in the idea of screening is to retain the successful ideas and eliminate the ideas which could be failures - much easier to write than to carry out in practice. If in doubt, keep the idea until more information is obtained. Idea screening can be based on tacit knowledge of the individual and of the company, with little new explicit information sought in or outside the company. But the aim in successive screenings is to build up the necessary information for the decisions to be made in a quantitative, objective way. Screening is both a reiterative and a progressive process, so there is a need to relate to the first screening even in the last screening in case the product description has changed and it no longer fits the screening criteria first set out.

The components in idea screening are product idea descriptions or concepts, screening factors and screening techniques. There is a need to have product idea descriptions that everyone involved in screening understands and is evaluating in the same way. The choice of screening factors is of course fundamental - obviously the direction of choice is strongly influenced by the criteria. Lastly the people who do the screening, and the techniques they use, affect the screening results. (Mary D. Earle and Richard L. Earle, 2001)

2.3 Sensory Test

The aim of the sensory testing is to describe the product. Distinguishing two or more products: are there any differences between the quality, its magnitude and direction. Performing: the expert or the consumer. So the enjoyment is the sum of the organoleptic characteristics (Szabó P. Balázs, 2014). Sensory evaluation is a scientific discipline that analyses and measures human responses to the composition of food and drink, e.g. appearance, touch, odour, texture, temperature and taste. The precise way in which sensory evaluation is conducted, along with the different tests and sensory language used needs to be taught. (Food a Fact of lift, 2018)

2.1 Customers Preference Application

Customers' preference is a marketing term that means the likelihood to choose one thing over another. In economic, consumers' preferences are defined as individual tastes and being measured by the utility of various bundles of goods (Sowunmi, Omigie, & Daniel, 2014, pp. 78-86.,;Thiyagaraj, 2015; Kontot K., Hamali J. and Abdullah F., 2016). Psychologically, preference is viewed as an individual's attitude towards a set of objects that stimulates, his or her behaviour in the decision-making process (Lichtenstein &Slovic, 2006; Kontot K., Hamali J. and Abdullah F., 2016, pp.167–175). The customer is making a choice decision in many ways, from the simple decision to a complex decision. It is a process by which customers are collecting relevant information regarding products' attributes; evaluate the information according to their preferences before assigning a value to choose between alternatives (Hawkins & Mothersbaugh, 2010; Kontot K., Hamali J. and Abdullah F., 2016, pp.167–175).

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2.1 Affective Stage

The affective stage is that which attempts to create a preference for one product, brand, or service in the target buyer's or customer's mind, in relation to all others. In other words, communications at the affective stage are designed to develop, maintain, and reinforce positive attitudes in the mind of the target buyer, customer, or consumer. Investment of resources of time and money in attaining such an objective can be huge (Yorke D., 2015).

3. Methodology

The objectives of this study are to analyse new products through screening and consumers' sensory testing. The mixed methods research by survey research was used in data collection and data analysis to verify accuracy and help to provide more complete research results. Organic Hommali Rice from Roi-Kaen-Sarn-Sin area, the Northeastern region, Thailand was used to develop a new product model for health supplement. The prototype of the product model was collected from the sensory testing of the taste, smell, colour and the texture preference. The data from consumers' intention to purchase were also surveyed.15 rice mill owners were in-depth interviewed through focus group. 269 consumers were surveyed for the product's preference.

3.1 Step 1: The new product screening

The new product screening to explore the new product that is the most attractive new product development concept from the health supplements product model from broken-milled and by-product of organic Hommali rice to produce for the market. Exploratory Qualitative Research is used to collect data on the design and development of product concepts by Documentary Research from Secondary Archival Data, include 15 rice mill owners were in-depth interviewed through focus group of Relevant Subjects about Development Trends of the health supplements product model from broken-milled and by-product of organic Hommali Rice with producers of processed rice products in Roi-Kaen-Sarn-Sin area, in the Northeastern region, Thailand. Content analysis was used to analysedata.

3.2 Step 2: The consumers' sensory testing

After the new prototype product has come, to evaluate the effectiveness of the actual use and study relation of consumer preferences factors with the purchase intention, quantitative research using the field questionnaire survey, was conducted to consumers' sensory testing about consumer preferences about the taste, smell, colour, and texture preference, was conducted to test with the non-probability sampling was proceeded using purposive, quota and convenience sampling methods included selecting the market locations (Organic and Natural Expo : ONE, during 23 - 26 July 2558 between 10.00 - 20.00 at the Queen Sirikit National Convention Center. Ratchadaphisek Road, Klongtoey, and Bangkok, Thailand) with 269 respondents and selection criteria included Thai consumers and experience on Organic Rice products. The 3 parts of questionnaire: part 1 is the general information of respondents such as gender, age, occupation, income and education, part 2 is consumer preferences factors of broken-milled organic rice cereal powder mixed drink, and part 3 is the purchase intention of the broken-milled

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organic rice cereal mixed drink. The data analysis used percentage, mean, standard deviation and multiple regression analysis for test the correlation between consumers' preference factors and their purchasing intention.

Table 1: Quantitative Data Collection - Respondent's Profile

Respondent's Profile	Frequency (person)	Percentage
Gender		
Female	194	72.1
Male	75	27.9
Total:	269	100.0
Age		
20-30 years old	66	24.5
31-40 years old	49	18.2
41-50 years old	54	20.1
51-60 years old	57	21.2
Above 60 years old	43	16.0
Total:	269	100.0
Marital Status		
Single	152	56.5
Married	102	37.9
Divorce/Widow	15	5.6
Total:	269	100.0
Education Level		
Primary school/Secondary school/High school or equivalent	50	18.6
Bachelor degree	163	60.6
Higher than Bachelor degree	56	20.8
Total:	269	100.0
Occupation		
Private company officer	59	21.9
Entrepreneur/Business owner	61	22.7
Government officer	23	8.6
Freelance/Part-time job	29	10.8
Student	38	14.1
Stay home parent	30	11.2
Employee / State Employee	10	3.7
Laborer / Farmer	10	3.7
Other	9	3.3
Total:	269	100.0
Income (Baht per month)		
Less than 20,000	85	31.6

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20,001-40,000	84	31.2
40,001 - 60,000	35	13.0
60,001 - 80,000	20	7.4
80,001 – 100,000	24	8.9
More than 100,000	21	7.8
Total:	269	100.0
Number of family members (persons)	55	20.4
1 – 2	140	52.0
3 – 4	57	21.2
5 - 6	17	6.3
More than 6	269	100.0
Total:		

4. Findings

The new product models was screened by the food product development experts, provided information on trends in the development of Hommali rice health food products found that the production of health food products is highly feasible because consumers prefer simple, easy-to-eat foods and have more benefits than conventional foods. Hommali rice is rice with high nutritional benefits. However, the processing of products to other products is less, if the study and production of health food products from Hommali rice, it is possible to carry out. Due to the production of organic Hommali rice flour or organic Hommali rice by-products, the organic Hommali rice production of organic rice growers should be studied closely to increase the reliability of the product development process. In other raw materials, the producer should be searching pre-produced data because some organic ingredients may be marketed as specific products, therefore it is important to thoroughly study the information.

Moreover, the industry-leading manufacturers of health food products provided information on the development of Hommali rice health supplements, that all products have the potential to sell, but they need to look at the costs and prices to analyse the feasibility before bring products to market. However, production may be a problem with inadequate production capacity due to time constraints because the production of one product takes at least 1-2 months. Therefore, the manufacturer must choose some new product concepts to develop in order to maximize the time and resources available and manufacturers must first find the needs of the consumer before introducing new product ideas to meet the needs of consumers. Consequently, the product trends and possibilities for producing health food 6 products were selected;

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1. Specialized benefits Organic Rice Milk Powder (Ready-to-drink)
2. Fermented Rice Pellet
3. The Broken-Milled organic rice cereal powder mixed drink
4. Probiotic Active Drink from Brown Rice
5. Rice Bran Protein Extract (Dietary Supplements That Help Lower Blood Sugar And Blood Fat)
6. Organic Rice Pudding

From the six products profiles, the broken-milled organic rice cereal powder mixed drink has the most potential for product development because the products contain Hommali rice which the main nutritional value is carbohydrates that are an important source of energy to the body and are also rich in protein, fat, fibre, vitamins and minerals. It is suitable for those who are on a hectic schedule and those who want to eat supplements. Raw materials are a mixture of varieties ofrice, especially the broken rice from organic Hommali rice and also contain a variety of cereals, such as millet, black sesame. The benefits of the product include substances that help cure chronic diseases such as diabetes, coronary heart disease, cerebral ischemia, and asthma. The characteristics of the product are brown coarse powder and can be dissolved in hot water, which is easy to be taken. Accordingly, in this study, we chose the broken-milled organic rice cereal powder mixed drink to study the consumers' sensory testing as the next step.

Figure 1: Sample of the broken-milled organic Hommali rice cereal powder mixed drink product

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In order for the consumers' sensory testing, the broken-milled organic rice cereal powder mixed drink was generated in 4 formulations (A, B, C, and D), each with a different flavour. The consumers' sensory testing was conducted for the selection of the best prototype formulas and for the improvement of prototype products to meet the requirements and in line with the consumers' preferences.

Table 2: Result of Consumers' sensory testing of the product

Preference Factors	**Consumers' preferences mean level**			
	Formula A	Formula B	Formula C	Formula D
Color	**3.85**	**3.56**	**3.65**	**3.37**
Sweetness	**3.31**	**3.19**	**3.24**	**2.97**
Oily	**3.45**	**3.19**	**3.26**	**3.01**
Strong	**3.58**	**3.19**	**3.25**	**2.97**
Mellow taste / deliciousness	**3.51**	**3.32**	**3.33**	**3.07**
Smell	**3.56**	**3.42**	**3.34**	**3.18**
Texture	**3.42**	**3.24**	**3.22**	**3.03**
Overall liking	**3.52**	**3.38**	**3.35**	**3.10**
Purchase Intention	3.65	3.33	3.38	3.03

Note: Mean interpretation; **1.00 - 1.79***: strongly dislike/not buy,* **1.80 - 2.59***: dislike/may not buy,* **2.60 - 3.39***: medium like/uncertain to buy,* **3.40 - 4.19***: like/maybe buy, and* **4.20 - 5.00***: strongly like/buy*

The result of consumers' sensory testing of the broken-milled organic rice cereal powder mixed drink product (Table 2) found that in overall preference factors, respondents preferred formula A (3.52), with the favourite attributes were colour (3.85), strong (3.58), and smell (3.56), including the most formulas' preferences corresponded with the purchase intention. If the product is available in the market, it was found that respondents maybe buy the broken-milled organic rice cereal powder mixed drink formula A (3.65).

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Table 3: The relationship between the Consumer preferences factors and the purchase intention of the Broken-Milled organic rice cereal powder mixed drink formula A

Dependent Variable: Purchase intention	
Consumer preferences factors	Beta
Constant	1.274
Colour	.038
Sweetness	.094
Oily	-.008
Strong	-.070
Mellow taste / deliciousness	.260*
Smell	.290*
Texture	.127
R	.657*

*Note: Multiple Regression Analysis,*significant level at 95*

Based on data analysis to ensure that the broken-milled rice cereal powder mixed formula A is consistent with the purchase intention. The result from multiple regression analysis of consumer preferences factors and the purchase intention (Table 3) found that the consumers' preference factors are the mellowness of the taste/delicious ($t = 3.080$, $p = .002$) and the aroma ($t = 3.195$, $p = .002$) of the prototype product that was positive influences the purchase intention at a significant level of 0.05.

5.0 Conclusion and Discussions

The broken-milled organic rice cereal powder mixed drink was the new product that is the most attractive new product development concept from the health supplements product model from broken-milled and by-product of organic Hommali rice to produce for the market by reason of the product has many nutritional values and maybe developed to meet the consumers' preferences. If the broken-milled organic rice cereal powder mixed drink is available in the market, that formula A was chosen by consumers in the sensory testing step, which corresponds to the consumers' preference factors are the mellowness of the taste/delicious and the aroma of the product that was a positive influence to the purchase intention.

A study on the development of health food products from Jasmine Rice found that consumers tend to consume foods that are more beneficial than general foods and that have less processed products. This is according with ThipawanNgamsak (1994) approach to the development of food products, such as the development of new food products that have never been sold in the market, the improvement of existing food

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products to compete with competitors in the quality of the main benefits/nutritional value, the improvement of the production process of the original food products with the production guidelines to commercial, and the development of new food products for nutritional products such as food supplements for the health of its mellow taste/smell and food packaging in the form that appeal to and meet the needs of consumers, and consistent with Saleki, Seyedsaleki, & Rahimi (2012) in terms of the ability to develop effective marketing strategies to motivate consumers. Therefore, entrepreneurs interested in producing this product should pay attention to colour, strong, and smell aspects of it. Especially the aroma that influences the consumers purchases intention. In the other hand, the consumer's acceptance, interest and awareness of the product which is the selling point of the product are important to consumers.

6.0 Limitation for Research

This study only investigated customers' preferences factors of a new product development concept from the health supplements product model from broken-milled and by-product of organic Hommali rice is the broken-milled organic rice cereal powder mixed drinks. Future studies should include an in-depth study of each of the factors studied in order to achieve clear results so that they can be easily and accurately replicated, should studies on other factors, such as consumer perceptions, new product acceptance, and entrepreneurial demand for new product development. It should also be noted that the demand for the product in the consumer is related to the product being studied in order to develop the product in a wider variety of perspectives, and should be studied more in other varieties of organic rice because if some rice production is not available in the market, producer can use other varieties of rice instead.

7.0 Future Research

Future research should consider the continuity of product studies. Market research should be conducted when selling products in the market for a certain period of time to bring improved products to suit the needs of most consumers. Study of development of related products with similar materials to add value, value for the product and organic jasmine rice should be conducted.

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