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The Development of Green Tea-flavored Thong Yod Thai Dessert Production by the Nurul Mubin Mosque Community Through a Social Engineering Process

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Abstract

This research aimed to explore the participatory product development methodology employed by the Ban Somdet Mosque community (Nurul Mu Been Mosque), located in the Hiran Ruji Sub-district of Thonburi District, Bangkok. The initiative applied a social engineering framework to design products that address community needs while simultaneously transferring production technology to enhance local capabilities. A participatory approach was employed to facilitate knowledge exchange, encourage community decision-making, and co-develop product prototypes.The focus was on developing Thong Yod (a traditional Thai dessert), using formulations that integrated both conventional and innovative ingredients to align with consumer preferences. Results showed that the third formulation of Thong Yod, comprising 360 grams of chicken egg yolk and 90 grams of Thong Yod flour, was most preferred in sensory evaluation ($p < 0.05$) with respect to appearance, odor, taste, and overall acceptance. Furthermore, the formulation enriched with 10% green tea powder achieved the highest preference scores across all attributes ($p < 0.05$). Participants expressed high levels of satisfaction with the workshop (mean score = 4.65) and demonstrated confidence in the potential of the green tea-flavored Thong Yod as a viable income-generating product.

Keywords: Product Development, Green Tea-Flavored Thong Yod, Social Engineering

1. Introduction

Thailand is rich in cultural diversity, including traditional foods and desserts that reflect the unique identities of each community. Thai traditional desserts are popular in many regions due to their distinctive flavors and flexible preparation methods, allowing for adaptation to create new value. One interesting approach is the integration of local ingredients or those currently trending in the market. Dhonburi Rajabhat University's core mission encompasses providing education,

conducting research, offering academic services, preserving arts and culture, and supporting community and local development. A key objective is to produce graduates who possess both core professional competencies and essential life skills necessary for living and coexisting in communities. (Strategic Plan of Dhonburi Rajabhat University 2023-2027)

According to an interview with Mr. Narong Sirito, the community leader of Nurul Mubeen Mosque, conducted on Saturday, October 19, 2024, the Muslim community at Nurul Mubeen Mosque consists of Malay-descended Muslims who migrated from the southern part of Thailand. They are renowned for their craftsmanship, culinary expertise in both savory and sweet dishes, and construction work. Most of the community members were originally from Pattani and Satun provinces and were highly skilled in various handicrafts. Currently, approximately 90% of the community earns a living through local trading. Recently, the community has begun to develop local products, particularly traditional Thai desserts, for commercial purposes. These include Thong Yod, Foi Thong, and Thong Yip, golden-colored desserts made from egg yolks and sugar syrup. However, they face significant challenges in developing these dessert products to meet market standards and evolving consumer preferences.

The Concept of the Social Engineer refers to an individual who recognizes social issues and actively participates in addressing them through structured and systematic processes. This concept aligns with systems theory, which emphasizes that social problems should be addressed through interconnected processes, including observation, data collection, and analysis, to achieve rational solutions (von Bertalanffy, 1968). Consequently, social engineers serve as agents of change, integrating innovation theory and community development approaches to enhance the quality of life within local contexts (Rogers, 2003). Rajabhat Universities in Thailand have adopted this framework as a guiding philosophy to cultivate 21st-century graduates with key competencies. According to the Framework for 21st Century Learning, these competencies include rational thinking, effective communication, collaboration, and innovation. These skills not only strengthen individual capacities but also correspond with human capital theory, which views education as a critical driver of socio-economic progress (Becker, 1993). Moreover, student engagement in social engineering initiatives reflects the principles of participatory development theory, which emphasizes the active involvement of community members in addressing their own problems (Chambers, 1997). This approach enhances community empowerment, strengthens resilience, and promotes self-reliance. Ultimately, the integration of social engineering into higher education plays a significant role in fostering sustainable national development. A social engineering process involves actively addressing societal issues by engaging directly with local communities through observation, data collection, logical analysis, and systematic problem-solving to create innovations that encourage community participation. This process ultimately fosters active citizenship, enhances community capabilities, and promotes self-reliance. Recognizing the value of this approach, Rajabhat Universities nationwide have adopted the social engineering concept as a framework to cultivate students capable of systematic and rational

thinking, building strong community connections and contributing to national development. To advance this goal, the Rajabhat University Network developed the "Social Engineer Toolkit," an initiative supported by H.E. Privy Councillor Dapong Ratanasuwan, aiming to equip graduates as thinkers, communicators, coordinators, and innovators, ready to meet labor market demands and contribute to sustainable social development (Supaspong Ruthamnong, 2023).

Green tea, rich in catechins and polyphenols, exhibits potent antioxidant and anti-inflammatory effects that contribute to cardiovascular protection by lowering cholesterol, improving endothelial function, and reducing heart disease risk (Frontiers in Nutrition, 2022). Its polyphenols, particularly epigallocatechin gallate (EGCG), have anti-cancer properties, inhibiting tumor growth and inducing apoptosis in cancer cells. Catechins also modulate inflammatory pathways, providing benefits for conditions like Crohn's disease and ulcerative colitis. Additionally, green tea enhances metabolic rate, promotes fat oxidation, and improves insulin sensitivity, supporting weight management and type 2 diabetes prevention (Frontiers in Nutrition, 2022). The synergistic effects of antioxidants help neutralize free radicals, preventing cellular and vascular damage. Regular consumption of green tea offers a practical dietary strategy for overall health promotion. However, moderation is recommended to avoid potential adverse effects on liver function.

Based on the comprehensive analysis of community needs and market trends, it was found that the Nurul Mubin Mosque community possesses strong potential in forming organized groups to produce traditional Thai desserts for commercial purposes. The community holds valuable local wisdom and demonstrates readiness to develop new products aligned with the Muslim way of life. Also, the growing health consciousness among consumers has led to increased market acceptance of green tea-infused products, making this integration commercially viable. Therefore, this research aims to develop a green tea-flavored Thong Yod recipe through a social engineering process, adding value to traditional Thai desserts while preserving cultural heritage. The primary goal is to create sustainable income generation opportunities, expand product value, and support community enterprises through knowledge transfer and capacity building. This initiative will ultimately contribute to community economic development, a vital foundation for strengthening the national economy and enhancing the quality of life while preserving the authentic character of traditional Thai dessert

2. Research Objectives

1. To study participatory product development approaches of the Nurul Mubin Mosque community using a social engineering process.
2. To develop a green tea-flavored Thong Yod recipe through sensory evaluation.
3. To transfer the production knowledge of green tea-flavored Thong Yod to the community.

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3. Research Methodology

1. Product Development Approach

Our product development was built on a participatory approach, specifically utilizing a social engineering process to ensure deep community involvement and create relevant outcomes. A diverse group of stakeholders within the community was invited, including one community leader, three local dessert-making experts, 20 community residents, three dessert product development specialists, and 13 student representatives trained as social engineers by purposive sampling. This collective engaged in open dialogues and idea exchanges to collaboratively define the product's direction and format. The research tools included formal interviews, conducted using structured interview guides to gather information related to community resources, local culture and wisdom, and preferred types of food products that could support local livelihoods. In addition, informal interviews were conducted to capture spontaneous perspectives, complementing participatory observation in the collection of data and engagement with community members throughout the process. During all interviews, prepared questions with open-ended prompts were used in combination. This flexible strategy encouraged deeper insights and facilitated more organic, in-depth discussions.

2. Selection of the Basic Thong Yod Recipe

The basic Thong Yod recipe was selected based on the similarity of ingredients and preparation methods. Three formulations were chosen for comparison. These desserts were then subjected to a sensory evaluation using a 9-point hedonic scale, ranging from 9 (like extremely) to 1 (dislike extremely) to assess participant preference. A total of 50 participants (N = 50) rated their preferences across several attributes, including color, odor, taste, texture, appearance, and overall preference. Results are presented in Table 1.

Table 1: Ingredients for the basic Thong Yod recipe

Basic Recipe	Ingredients (grams)		
	Egg yolk from chicken eggs	Egg yolk from Duck eggs	Thong Yod flour
formulation1	90	220	50
formulation2	180	220	70
formulation 3	360	-	90

3. Study of the appropriate amount of green tea powder

The appropriate amount of green tea powder in the green tea-flavored Thong Yod recipe was investigated by adding green tea powder at 10, 15, and 20% ratios relative to the weight of Thong Yod flour. The resulting green tea-flavored Thong Yod samples were then subjected to a sensory evaluation involving 50 participants. A 9-point hedonic scale, ranging from 9 (like

extremely) to 1 (dislike extremely), was employed to determine the optimal formulation. The participants rated their preferences across several characteristics, including color, odor, taste, texture, appearance, aftertaste, and overall preference. The experiment was designed using a Randomized Complete Block Design (RCBD). Statistical analysis was conducted to evaluate differences among samples using Analysis of Variance (ANOVA). Mean comparisons were performed using Duncan's Multiple Range Test at a 95% confidence level using statistical software.

4. Production Knowledge Transfer to the community

A voluntary knowledge transfer workshop was conducted to share the knowledge gained from producing green tea-flavored Thong Yod with the Nurul Mubin Mosque community. Upon completion of the workshop, an evaluation was performed using a satisfaction questionnaire. The collected data were then analyzed using percentages, means, and standard deviations to assess participant feedback.

4. Research Results

1. Product Development Approach

Our discussions on product development, the process of social engineering in which students participate in solving problems systematically to create innovations for the community, revealed a rich history within the Nurul Mubin Mosque community, as shown in Figure 1. This community comprises Malay-descended Muslims who migrated from Thailand's southern part, bringing with them exceptional skills in craftsmanship, cooking, dessert making, and construction. Historically, when the ex-regent, Somdej Chao Phraya Borommaha Sri Suriyawongse (Chuang Bunnag), relocated Muslim groups from Pattani and Satun to Bangkok, he generously allocated land for the construction of the Nurul Mubin mosque and cemeteries (kubor). The remaining land was distributed for residential and occupational use. This significant land grant led to the community being known as "Ban Somdej Muslims" or "Ban Khaek". At present, the community includes 238 households (with 231 officially registered). Approximately 99% of residents practice Islam, and about 90% are involved in local trades.

The community has begun developing local dessert products for commercial purposes, such as Foi Thong, Thong Yip, and Thong Yod. However, they have encountered challenges in elevating the product to meet broader market standards. To address this, community members expressed a strong desire to create a new product, Green Tea-Flavored Thong Yod. This innovative offering aims to differentiate their products from typical market offerings, attract consumer interest, generate local employment, and increase income for residents. Ultimately, this initiative is expected to boost community economic development, serving as a vital pillar for both the regional and national economies, and thereby improving the overall quality of life.


Figure 1: Community product development discussion activity.

2. Sensory Evaluation of Basic Thong Yod

To identify the basic Thong Yod recipe, a sensory quality analysis was conducted on three formulation by evaluating color, odor, taste, texture, appearance, and overall preference.

The sensory analysis revealed that formulation 3 was significantly preferred over formulation 1 and 2 ($p < 0.05$). Specifically, formulation 3 received the following average scores: Color: 7.40 ± 0.60 (liked), odor: 7.02 ± 0.71 (liked), taste: 7.52 ± 0.70 (liked very much), Texture: 7.32 ± 0.81 (liked), Appearance: 7.24 ± 0.43 (liked), Overall preference: 7.26 ± 0.44 (liked). Therefore, formulation 3 was chosen as the foundation for developing the green tea-flavored Thong Yod. Results are presented in Table 2.

Table 2: Sensory analysis results of basic Thong Yod recipe

Attribute	formulation1	formulation 2	formulation 3
Color	5.26±0.56^a	5.04±0.69^a	7.40±0.60^b
Odor	5.96±0.56^a	5.60±0.49^a	7.02±0.71^b
Taste	6.92±0.63^a	6.14±0.75^a	7.52±0.70^b
Texture	6.04±0.45^a	5.92±0.69^a	7.32±0.81^b
Appearance	6.86±0.35^a	6.42±1.02^a	7.24±0.43^b
Overall preference	6.12±0.55^a	6.28±1.04^a	7.26±0.44^b

Note: Means within the same row followed by different letters indicate a statistically significant difference ($p < 0.05$)

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Figure 2: Basic Thong Yod dessert

3. Sensory Evaluation of Green Tea-Flavored Thong Yod

A sensory quality analysis of green tea-flavored Thong Yod with 10, 15, and 20% green tea powder was conducted by evaluating color, odor, taste, texture, appearance, aftertaste, and overall preference. The results showed that the 10% formulation was significantly preferred over the 15 and 20% formulations ($p < 0.05$). The sensory analysis for the 10% formulation were as follows: Color: 7.28 ± 0.60 (liked), odor: 7.50 ± 0.50 (liked), taste: 7.50 ± 0.50 (liked), Texture: 7.36 ± 0.52 (liked), Appearance: 7.26 ± 0.44 (liked very much), Aftertaste (feeling after swallowing): 7.32 ± 0.71 (liked), Overall preference: 7.26 ± 0.44 (liked). Results are presented in Table 3.

Table 3: Sensory analysis results of green tea flavored Thong Yod

Attribute	Sensory analysis		
	10%	15%	20%
Color	7.28±.060[a]	5.18±0.77[b]	5.12±0.74[b]
Odor	7.50±0.50[a]	5.64±0.56[b]	5.62±0.52[b]
Taste	7.50±0.50[a]	6.06±0.70[b]	6.10±0.73[b]
Texture	7.36±0.52[a]	5.92±0.69[b]	5.92±0.69[b]
Appearance	7.26±0.44[a]	6.42±1.02[b]	6.42±1.02[b]
Aftertaste	7.32±0.71[a]	5.60±0.49[b]	5.60±0.49[b]
Overall preference	7.26±0.44[a]	6.28±1.04[b]	6.06±0.90[b]

Note: Means within the same row followed by different letters indicate a statistically significant difference ($p < 0.05$)

Figure 3: Green tea-flavored Thong Yod with 10% green tea powder

4. Knowledge transfer for producing green tea flavored Thong Yod

Following the successful development of the green tea-flavored Thong Yod, a voluntary knowledge transfer workshop was conducted for the Nurul Mubin Mosque community. The hands-on training workshop entitled "Development of Green Tea-Flavored Thong Yod" was held on Saturday, January 4, 2025, at the Faculty of Science and Technology, Dhonburi Rajabhat University. The workshop aimed to share the production process and enhance product value through social engineering. A total of 40 participants attended this practical training session.

The results showed the following participant demographics. For gender, 30 participants (75%) were female and 10 (25%) were male. For affiliation, 30 participants (75%) were members of the Nurul Mubin Mosque community, and 10 (25%) were students (social engineers). For the age group, 10 participants (25%) were under 30 years old, 5 participants (12.5%) were aged 30-39, 5 participants (12.5%) were aged 40-49, and 16 participants (40%) were aged 50-59. Results are presented in Table 4.

Table 4: General information of participants

Information	Quantity	Percentage
Sex		
Female	**30**	**75**
Male	10	25
Status		
members of the Nurul Mubin Mosque community	30	75
students)social engineers(	10	25
Age		
under 30years old	10	25
39 - 30 years old	5	12.5
49 - 40 years old	5	12.5
59 - 50 years old	4	10
Age 60 years and above	16	40

Table 5: The satisfaction results on the knowledge transfer of green tea-flavored Thong Yod production

Evaluation list	$\bar{x}$	S.D	Interpretation of results
1. The readiness of the venue and equipment used for the training	4.70	0.47	highest level
2. The effectiveness of the instructor in delivering content and answering questions	4.65	0.49	highest level
3. The clarity and comprehensibility of the training content	4.65	0.49	highest level
4. Appropriateness and usefulness of training materials	4.45	0.69	high level
5. Knowledge gained after the training	4.75	0.44	highest level
6. Applicability of knowledge gained	4.70	0.47	highest level
7. The ability to use the knowledge gained to create career opportunity	4.22	0.45	high level
8. The ability to transfer the knowledge gained to others	4.65	0.49	highest level
9. Overall satisfaction with the training	4.65	0.49	highest level

For participant satisfaction with knowledge transfer, the hands- on workshop received overwhelmingly positive feedback, with participants expressing overall satisfaction at the highest level

($\bar{x}$ = 4.65). Several key aspects achieved the highest satisfaction ratings ($\bar{x}$ = 4.65 - 4.75), including the readiness of the venue and equipment, instructor effectiveness, clarity and comprehensibility of content, knowledge gained, applicability of knowledge, and ability to transfer knowledge. Participants were delighted with the training environment. The instructor's ability to deliver content and answer questions was rated exceptionally well. The training material was found to be straightforward to understand. Participants reported high satisfaction with the new knowledge acquired. Participants felt confident in their ability to apply the skills learned. The training effectively equipped participants to share their newfound knowledge with others. Furthermore, other satisfaction results remained high ($\bar{x}$ = 4.22 - 4.65) regarding the usefulness and appropriateness of training materials and the ability to use the knowledge gained to create career opportunities. Results are presented in Table 5.

Figure 4: Knowledge transfer of green tea-flavored Thong Yod production

5. Discussion of Research

1. The development of community-based products through the application of the social engineering process revealed that the Muslim community of Ban Somdet Mosque expressed the need to produce green tea-flavored Thong Yod as a new community product. This aligns with the community's cultural capital, indigenous knowledge, traditions, and social resources, with the aim of self-reliance through local resource management. In addition, the production process employs simple household tools and equipment, making it practical for daily life and responsive to community needs.

These findings are consistent with Wuttichai Witanang (2021), who emphasized that strengthening grassroots communities requires the integration of cultural heritage, local knowledge, attitudes, and wisdom to generate added value for community products. Similarly, the study of Atcharawan Sukkoet and Warunee Chaowsookom (2022) revealed that cultural capital in food, beliefs, and traditions can be utilized to create value and uniqueness, thereby developing community-based products that generate sustainable income.

Furthermore, Jiraporn Srisombat (2020) found that the development of local food products through community participation enables intergenerational knowledge transfer, fosters pride in local identity, and contributes to the creation of unique community products that stand out in the

broader market. In addition, Yodmongkol & Chantarasomboon (2021) reported that incorporating local raw materials with innovative concepts not only enhances product value but also supports sustainable economic development within communities.

Therefore, it can be concluded that the development of green tea-flavored Thong Yod in the Muslim community of Ban Somdet Mosque does not merely reflect the local demand but also corresponds with previous studies highlighting the significance of local wisdom and community participation in creating unique, value-added, and sustainable products.

2. Development of the Green Tea-Flavored Thong Yod

The developed green tea-flavored Thong Yod exhibited a pleasantly sweet taste and a smooth texture free from sugar crystallization. It boasted an appealing color, was free from any eggy odor, and carried a distinct green tea aroma. The product successfully met all criteria in the sensory evaluation.

This outcome was consistent with the finding of Wattana Wiriwutthikon (2017), which reported that adding green tea powder enhances flavor and appeals to sensory panelists, particularly those who are current green tea lovers. Green tea is widely consumed due to its distinctive aroma. It contains catechin, a type of phenolic compound in the polyphenol group (flavonoids). The catechin content in tea leaves influences the color, smell, and taste of green tea, and also helps reduce the eggy odor in desserts.

3. The results of the study on the satisfaction toward the training program for transferring the production of green tea-flavored Thong Yod to the community through the social engineering process revealed that participants reported high to the highest levels of overall satisfaction. This indicates that the integration of knowledge transfer with community participation can foster effective learning and enhance the perceived value of local product development.

These findings are consistent with Pramuk Srichaiwong and Korakamon Wairabutr (2018), who reported that extending local wisdom and resources into product development reflects a positive transformation in communities. Such processes contribute to the revitalization of indigenous knowledge, the transmission of local wisdom, the strengthening of grassroots economies, and the creation of additional career opportunities and income-generating activities. Moreover, the collaboration between local people, academics, and researchers fosters new knowledge that can be applied in daily life.

In addition, the findings align with Kulthida Thongbai et al. (2020), who investigated the transfer of food product development knowledge within communities. Their study demonstrated that participatory training workshops enhance experiential learning, enabling participants to apply the knowledge in practice. Furthermore, such initiatives increase community pride in local identity and uniqueness, leading to a high level of satisfaction with the training activities.

Therefore, the training on green tea-flavored Thong Yod production using the social engineering approach not only provided participants with practical skills and knowledge but also

functioned as a mechanism to strengthen local economies, support sustainable livelihoods, and foster collaborative learning between communities and academics.

6. Conclusion

The findings from this study highlight the pivotal role of the Nurul Mubin Mosque community in the successful development of a green tea-flavored Thong Yod. Their active participation and valuable insights effectively addressed local needs and aspirations. Among the three Thong Yod formulations evaluated, formulation 3 comprising 360 g of egg yolk and 90 g of Thong Yod flour received the highest sensory scores and was selected as the foundation for further development. Incorporating green tea powder at 10, 15, and 20% revealed that the 10% formulation achieved the most favorable scores across all attributes, including color, odor, taste, texture, appearance, aftertaste, and overall preference ($p \square 0.05$), suggesting strong consumer acceptance. The integration of cultural heritage with product innovation through the social engineering process not only enhanced community engagement but also underscored the value of traditional knowledge in developing marketable, value-added products that contribute to regional economic growth. The knowledge transfer workshop further reinforced this impact, with participants reporting high satisfaction (4.65) and expressing confidence in the product's potential to generate income and create sustainable livelihood opportunities within the community.

7. Recommendations from the Research

1. Further study should be conducted on the shelf life of the product.

2. A cost analysis of each production process should be carried out to guide community investment and financial planning.

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