Application of Quality Function Deployment to Develop a Pork Scratchings Production

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Abstract

This research aimed to provide the guidelines for designing and developing the pork skin drying process in producing the pork scratchings of a women group association. The main problem of this group was to use the old technique in drying pork skin that had poor hygiene and took a long time. Therefore, this research was to apply the Quality Function Deployment technique (QFD) to develop the pork skin drying process in producing pork scratchings. The results of this research found that after applying QFD technique, the development of pork skin drying process could meet the needs of women group.

Keywords: Quality Function Deployment, House of Quality, Pork Skin Drying Process

Introduction

Nowadays, the Thai government has supported the community economy to raise their standards of product and develop their products for export to international market. In addition, the Thai government has the strategy to develop Thailand to become the World's Kitchen as well. Pork scratchings is a popular food of Thai and foreign consumers. A women group, who produced the pork scratchings as a main product, was selected as a case study. This women group needed to develop their pork scratchings making process and had consulted with the research group about their processes. The research group found that the current process of making pork scratchings were 1) to wash the pork skin thoroughly 2) to scrape the hair out of the pork skin 3) to cut the pork skin into small pieces 4) to boil the pork skin in boiling water about 15 minutes 5) Lay them in direct sun for two days (about six to ten hours/days) or dry in the oven at a temperature about 80-100 degree Celsius until it was really dry 6) to simmer the pork skin into the vegetable oil about five hours 7) to scoop the pork skin up from the oil 8) to fry the pork skin in the vegetable oil about 2 minutes 9) to scoop the pork scratchings up and remove the oil, and 10) to weigh the pork scratchings and store in the containers that were protected from the moisture, the air and the light. This process of making pork scratchings must employed many labors and took a long time in

drying the pork skin. Moreover, in the drying process, sometimes it could not control the cleanliness of their products that had some complaints from their consumers.

Therefore, the research group conducted this research in order to develop the pork skin drying process by applying the quality functional deployment technique. This research aimed to solve those problems and to produce the pork scratchings which were clean and safe to the consumers, reduce the production time, and could be stored for a long time.

Objectives

1. To study the current pork skin drying process in producing the pork scratchings of a women group.

2. To present the development steps of pork skin drying process by using the quality function deployment technique.

Research scope

The research scopes of this study were established in order to fulfill the research objectives as following;

1. A women group who produced the pork scratchings as their main product was selected a case study.

2. The duration time of research was between February until December, 2018.

Methodology

The QFD steps of this research was based on Becker Associates Inc. (2000). These consisted of seven main steps as following;

Step 1: Customer Requirements - "Voice of the Customer"

First of all, the research group had to identify the customer. The customer of this research was a women group association, who produced the pork scratchings as the main product. The first step of the QFD process was to determine the customer needs which consisted of customer requirements, expectations, and complaints. In this research, the focused group discussions method was employed in order to collect the customer needs. The discussion panel consisted of five research members, six members of a women group association, and one expert. Therefore, the customer requirements of this women group association could be summarized into four main aspects as following;

1. Ease of production
2. Able to dry in any time
3. Energy saving
4. Cleanliness and safety in production

After that, the main four customer requirements were categorized into two levels which were summarized in Table 1.

Table 1 Customer Requirements

Primary Customer Requirements	Secondary Customer Requirements
Ease of production	Easy to practice in production
	Suit for all genders and ages
	Perform by one staff
	Not less than 10 kg. of each production
	Convenient to move
	Able control the drying temperature
Able to dry in any time	Able to control in any time and any situation
Energy saving	Do not increase the cost of production
	Able to control the maintenance cost
Cleanliness and safety in production	Contain within a closed system to maintain cleanliness
	Provide the user protecting system
	Provide the working sign

Step 2: Regulatory Requirements

The customer knows not all product or service requirements, our requirements for the product: Degree of power supplying and flexibility, setup time, durability and compatibility for the roofs. In this step, the customer did not know all product requirements, then, the research group must document requirement that were dictated by management or regulatory standards. Therefore, the requirements were identified such as the degree of power supply.

Step 3: Customer Importance Ratings

The customers had to rate the importance of each requirement on a scale from one to ten. These numbers will be showed in the relationship matrix. Therefore, the data gained by interviewing with some members of a women group association.

Step 4: Customer Rating of the Competition

The customers were asked to consider how your product rates in relation to the competition. The research group compared among a women group association and other companies who also produced the pork scratching.

Step 5: Technical Descriptors (Voice of Engineer)

The technical descriptors, sometimes was called the functional requirements, were about the quality of products that can be measured and benchmarked against the competition. Technical descriptors may exist that customer was already using to determine product specification, however new measurements could be created to ensure that the product was meeting customer needs. The research group had determined these technical descriptors according to two main aspects, which included the machine design, and the using of hot air oven instead of laying them in direct sun. Each aspect was measured by the functional requirements as shown in Table 2.

Table 2 Technical descriptors

Factors	Functional Requirements
The using of hot air oven instead of laying them in direct sun	Easy to practice in production Suit for all genders and ages Perform by one staff Not less than 10 kg. of each production Convenient to move Able control the drying temperature Able to control in any time and any situation Do not increase the cost of production
The machine design	Able to control the maintenance cost Contain within a closed system to maintain cleanliness Provide the user protecting system Provide the working sign

Step 6: Relationship Matrix

The relationship matrix was where the research group considered the relationship between customer needs and the capability to meet those needs and the research group determine these needs according to data from a women group association. Therefore, from all above steps, the house of quality of this research was shown in Figure 1.

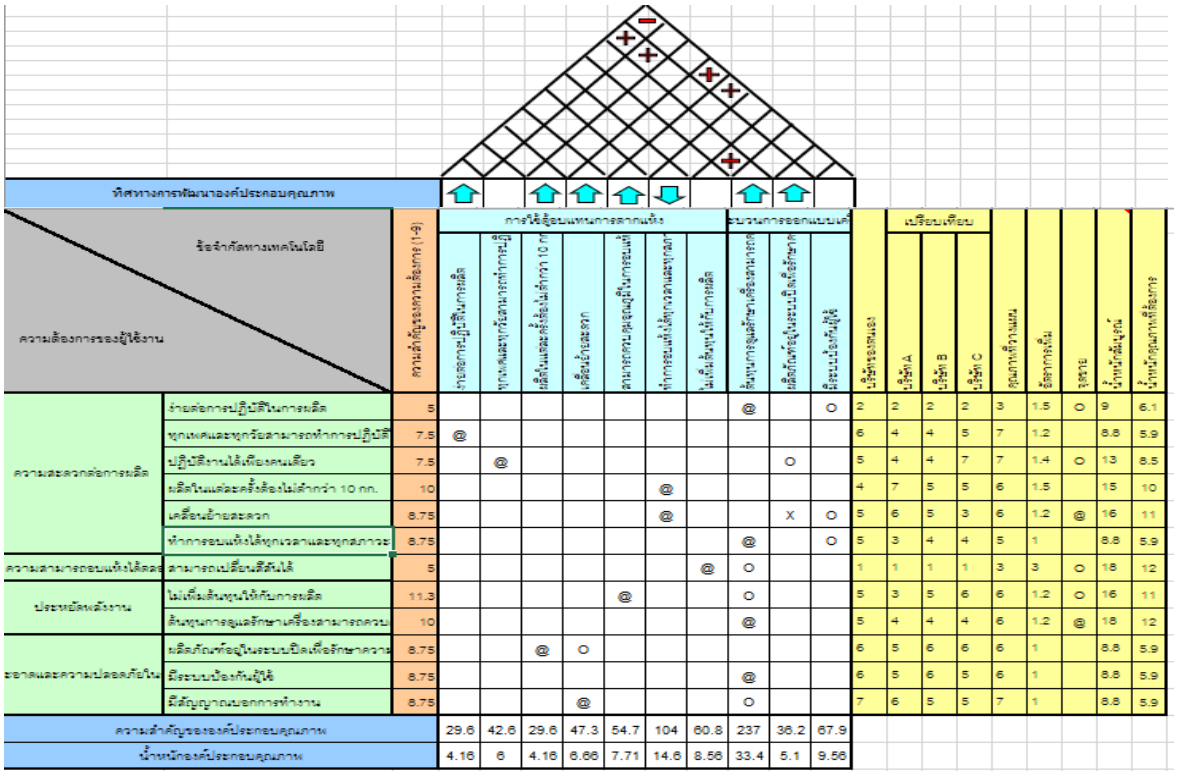

Figure 1 House of Quality

Results

From creating the house of quality, it showed that the development steps in drying pork skin process had to considered the designing elements as follows;

1. Pork skin drying process could perform in any time and any situation which was the most important step.
2. Pork skin drying process must be easy to perform.
3. The production must save energy and not increase the production cost.
4. Each production must not be less than 10 kg.

These four elements were significant which the women group had the high level of needs and when compared to the competitors, all four elements were significant to the competitors as well.

Moreover, from the voice of a women group association which needed to develop all four main elements of QFD, the research group had analyzed and provided the steps of drying process by using the infrared hot air oven. Because the infrared provided the lower heat energy than the heating coil and could easier installation than a microwave generator. Furthermore, the research group suggested that the use of solar cell integrating with electricity would reduce the electricity cost and could reduce the production cost as the

needs of a women group association. In addition, the research group had designed the infrared hot air oven and the energy generation set from solar cell which had the following specifications.

1. The infrared hot air oven was made from the stainless steel.
2. The infrared hot air oven contained 10 drying trays which were 80 cm of width x 64 cm of length x 168 cm of height.
3. The size of inside infrared hot air oven was 60 cm of width x 56 cm of length x 123 cm of height.
4. The infrared hot air oven was the hot air oven which generated the heat by electricity system with 3000 watts 220 volts.
5. The infrared hot air oven had the automatic temperature control set which could adjust the temperature as well.
6. The temperature inside the infrared hot air oven was consistent.
7. The infrared hot oven had the automatic drying timer
8. The drying trays were made from the extra strength stainless steel.

Additionally, the research group calculated the energy consuming of the infrared hot air oven and the time consuming of each drying process in order to specify the specifications of solar cell set. These could be presented as following;

1. The solar cell charge must be 300 watts, total seven panels.
2. The solar control charger must be in the range of 25-35V.
3. Backup power required eight batteries.

Conclusion

From the development of the pork skin drying process in making pork scratchings by applying the QFD technique, the results found that the old technique in drying pork skin which laid them in direct sun for two days in order to remove the moisture. A women group association faced the problems which was not able to control the duration of drying process due to many factors such as sunlight, temperature, and climate. Therefore, the research group proposed to develop the drying process by using the hot air oven. Moreover, the research group employed the steps of QFD in the hot air oven design step. Consequently, the results showed that the step of drying process should use the infrared hot air oven because it could save more energy, quickly provide the heat, and easily install the system. Also, the research group suggested the energy saving system by using the solar cell system in order to save the production cost which was the needs of women group. As a result, the development of pork skin drying process by using the infrared hot air oven could solve the problems of a women group and had meet all needs of a women group association.

Discussion

From the research objectives that to provide the steps in developing pork skin drying process in making pork scratchings by using QFD technique. House of Quality (HOQ) was created to improve the quality of product and fulfill the needs of consumers. The research group had presented the steps in developing pork skin drying process and the results showed that the steps of making pork scratchings process could be changed in the better way that could increase their productivities and reduce the production cost. Furthermore, this research results were consistent with other earlier researchers in various industry such as Tsai et al. (2008) had applied QFD in designing a new power-assisted wheelchair to overcome the disadvantages of traditional manual wheelchairs. This research result could fulfill the needs of users as well. Moreover, Haron n. (2012) had applied QFD in house construction industry in Malaysia. The apartment layout design was considered and the results were satisfying the customer's requirements. Additionally, in education sector, the QFD could apply in order to design the course of students (Mazur, G.H., 1998). All earlier researches had applied the QFD technique to fulfill the needs of customers same as our research.

Suggestion

From this research, the research group found that the women group association as this case study, the important factors, which could not compete with their competitors, were lacking of technology, lacking of knowledge in management, and lacking of knowledge in marketing. These had the direct impacts on their products that could not compete with other competitors or export to international market. Therefore, the further research should conduct the technology and business research in order to raise the level of products which could be exported to the international market as well.

Acknowledgement

This research was supported by Valaya Alongkorn Rajabhat University under the Royal Patronage, annual government statement of expenditure of year 2018 through National Research Council of Thailand.

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