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Integration of Customer Needs in Sativa Mouthwash Design With Quality Function Development (QFD) Approach

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Abstrak

Kesadaran masyarakat akan kebersihan mulut dan kesehatan telah mempengaruhi peningkatan permintaan produk obat kumur. Untuk mendukung program inovasi hijau, diperlukan obat kumur berbahan herbal dan halal. Obat kumur Sativa adalah produk inovatif yang menggunakan 3% ekstrak Nigella Sativa. Metode QFD digunakan sebagai evaluasi produktivitas obat kumur Sativa melalui penyusunan matriks HoQ. Hal tersebut menunjukkan tingkat keterkaitan antara Customer dan Technical Importance untuk mendapatkan prioritas pada kepentingan teknis utama yang harus segera dilakukan oleh perusahaan produksi. Hasil perhitungan matrik HoQ menunjukkan atribut produk dengan peringkat tertinggi adalah kandungan *Nigella sativa*, Raw Material Management, dan Halal Label Design. Prioritas teknis untuk mencapai atribut minat pelanggan adalah jenis kemasan. Artinya atribut penambahan dan pengolahan bahan Nigella Sativa yang tepat dan berlabel halal memiliki ciri khas yang sangat mempengaruhi produktivitas penjualan produk Sativa Mouth Wash. Namun pada atribut jenis kemasan, Sativa Mouth Wash belum diproduksi dalam bentuk sachet atau botol kecil yang memberikan kemudahan dan kepraktisan yang dibutuhkan pelanggan.

Kata Kunci : *sativa,* obat kumur, herbal, halal, atribut

Abstract

Public awareness of oral-hygiene and health has influenced the increase demand for mouthwash products. To support the green innovation program, a mouthwash made from herbs and halal is needed. Sativa mouthwash is an innovative product using 3% Nigella Sativa extract. The QFD method is used as an evaluation of the productivity of Sativa mouthwash through the preparation of the HoQ matrix. It shows the level of connectedness between Customer and Technical Importance to get priority on the main technical interests that must be carried out immediately by the production company. The results of HoQ matrix calculation shows the highest-ranking attributes of the product is Nigella Sativa content, Raw Material Management, and Halal Label Design. The technical priority to achieve the customer interest attributes is packaging type. This means that the attributes of adding and processing Nigella Sativa ingredients that are right and labelled as halal have unique characteristics that greatly affect the sales productivity of Sativa Mouth Wash products. However, on the attribute of the type of packaging, Sativa Mouth Wash has not yet produced in sachets or small bottles which provide convenience and practicality that is needed by the customers

Key words : *sativa, mouthwash, herbal, halal, attribute*

INTRODUCTION

The oral cavity is the gateway to the body (Agrawanty & Setiawatie, 2014). That the cleanliness and health of the oral cavity has a major impact on the emergence of systemic diseases in the body. The resilience of the oral cavity reflects the condition of the body's resistance. Poor oral hygiene conditions cause gram-negative bacteria, bacterial toxins, transient bacteraemia, and inflammatory mediators to have a negative impact on poor oral hygiene conditions. Inflammation of the oral cavity that is protracted and untreated will reduce the risk of cardiovascular disease, diabetes mellitus, stroke, premature birth, rheumatoid arthritis, and other systemic diseases. Whereas in Basic Health Research (2018) the Indonesian people still have dental and oral health problems on average 57.6%.

This is a new opportunity for efforts to prevent systemic diseases through efforts to improve oral

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hygiene, health, and care. Oral therapy products are still dominated by imported products with prices that are still relatively expensive and not affordable for all people in Indonesia. Anti-septic mouthwash *Nigella sativa* based on the herb has unique characteristics that differ from other mouthwash products at affordable prices, economical, practical, safe and halal packaging (Hamid, 2012). As an effort to prevent systemic diseases, mouthwash Nigella Sativa has five functions, namely anti-bacterial, anti-inflammatory, antioxidant, anti-fungal and strengthens gum epithelial cells so that it can prevent bacteria and their toxins from entering the bloodstream (Marahimin, 2006; Majidah, 2014).

Nigella sativa is cultivated in the Mediterranean region and grows in various regions, including India and Pakistan (Bolar *et al.*, 2017). In Pakistan, the Nigella Sativa plant has a plant height of 74.6-90.5 cm, seed production per plant is 8.75-9.22 g and the weight of 1000 seeds is 2.23-2.80 g (Rabbani *et al*., 2011). The capsule of the Nigella Sativa plant is relatively large, having 3-7 follicles each containing seeds. Normal seed length ranges from 1-5 mm, is black or dark gray with a rather rough surface, the inside of the seed is white and oily *(*Benkaci–Al*i et al.*, 2007). *Nigella sativa* has potential as a traditional medicinal plant. The part of the Nigella sativa plant that is used is the seed, so it is often referred to as the black cumin seed. Small and short with three irregular angles (Yulianti, 2006; Lestari, 2019).

Nigella sativa has been used for a long time in several countries, especially in the Middle East and in several other Asian countries, including in Indonesia. One of its components is a protein extracted from black seed oil residue, which is known to have properties to enhance the body's immune system and as an anti-inflammatory (Sulistiawati & Radji, 2014). The chemical ingredients contained in Nigella Sativa are 35% fat and vegetable oil, 32% carbohydrates, 21% protein, 5% water, saponins, nigellin, amino acids, flavonoids, various minerals, and vitamins (Pratomo *et al,* 2020). The minerals contained in cumin are calcium, sodium, potassium, magnesium, selenium, and iron. While the vitamins are vitamins A, B1, B2, B6, C, E and niacin (Yulianti, 2006). According to Mahfouz and El-Dakhakny (1996), *Nigella sativa* oil contains nigellone and thymoquinone (Burits & Bucar, 2000). Nigella sativa or Black Seed is known in Indonesia as an annual aromatic medicinal plant, cultivated mainly in the Mediterranean area with temperatures below 20 C (Aziz *et al*., 2017).

To evaluate the productivity of Nigella Sativa mouthwash, this study uses the Quality Function Deployment (QFD) method to describe the level of company interest with the level of customer satisfaction as a user (Zhang *et al.,* 2022). Then compile the House of Quality matrix to assess the relationship between Customer Importance and Technical Importance (Chohe, 1995). With the House of Quality matrix, the main priority of technical interests can be identified so that customer expectations for the safe and halal quality of Sativa Mouth Wash are increasingly fulfilled and satisfied towards a healthy Indonesia, free from systemic diseases. The QFD fram work is used to translate the understanding of product standards desired by stake holders. Quality Function Deployment focuses on redesigning customer requirements into engineering characteristics that support product attributes through the House of Quality framework (Eldermann *et al*., 2017).

METHODS

This study used a descriptive research method by analysing the problems found in the existing conditions. Then a solution to the problem is obtained as a product development strategy for Sativa mouthwash which is unique in its raw materials based on *Nigella sativa* as an herbal product. While the method used is Quality Function Deployment. The research approach uses mixed methods, where the quantitative method is the main research approach and qualitative methods are included to complement and sharpen the discussion of research results.

Research Timeline

The research was conducted in December 2022 - March 2023. Research to obtain primary data from final consumer respondents directly in Surabaya. Consumer surveys were conducted on sales of Sativa Mouth Wash products because the number of customers was increasing. More and more people are concerned about the cleanliness and health of teeth and oral cavity. People are increasingly being educated that oral health plays a major role in the health of the whole body. So, the Sativa Mouth Wash product has a great opportunity to be developed for health-conscious people.

Research Stage

The stages in this research are the preliminary stage, the data collection stage, and the data processing stage which is further divided into several important stages.

Preliminary Survey

The preliminary survey was carried out by direct observation of the Sativa Mouth Wash business which is the object of research. Looking directly at the activities of the production system, products, facilities and supporting factors. Data collection was carried out directly through observation and interviews to obtain a direct description of the Sativa Mouth Wash product.

Variable Identification

Variables consist of independent variables and dependent variables. The independent variables of Sativa Mouth Wash include taste, aroma, colour, weight, price, safety, quality, durability, brand logo, composition information, presentation method, production and expiry label, halal profit, packaging design, packaging form and packaging volume. The dependent variable Sativa Mouth Wash is the technical capability a company needs to carry out to produce Mouth Wash products that meet the wishes and expectations of consumers. The technical capabilities referred to include selection of raw materials, processing time, colouring, flavouring, adding scent, packaging type, packaging design, halal label design, storage methods, and marketing distribution.

Selection of Respondents

This study involved several components of respondents, namely academics, business experts and customers. The academic respondents consisted of doctors and lecturers at the faculty of dentistry at Airlangga University, business experts or selected practitioners: mouth wash business owners who have a lot of information about the mouth wash processing process. The selected customer respondents are end consumers. The selected consumer respondents are direct consumers who live in Surabaya. These final consumer respondents were selected with the aim of assessing consumer perceptions and expectations of the product attributes of Sativa Mouth Wash. Information regarding consumer expectations for Sativa Mouth Wash product attributes were obtained from interviews and distribution of pre-questionnaires and questionnaires.

Sampling

The type of sampling used in this research is purposive sampling. Consumer respondents selected for this study totalled 65 customers, who are customers who have frequently used Sativa Mouth Wash for at least the last 3 years. Sampling was carried out by distributing questionnaires using the Accidental Sampling technique, which is a random sampling technique for each consumer who is found by chance in a place that fits the criteria specified in this study.

Data Collection Methods

This study uses primary and secondary data. Primary data were obtained directly from respondents through observation, interviews and secondary data obtained through companies and literature studies.

Data Analysis

Data analysis was carried out through the preparation of the House of Quality (HoQ) matrix. The House of Quality is structured as a series of phases from the stages of the Quality Function Deployment (QFD) Method, including the following steps :

- Data Collection of Consumer Requirements : It contains the product variables of Sativa Mouth Wash which are the needs and desires of consumers.
- Technical Requirements : Technical Requirements obtained from discussions with academics and practitioners. Every characteristic that exists must be directly related to customer requirements and can be measured.
- Develop a relationship matrix between Customer Requirements
- Develop a Relationship Matrix between Technical Requirements/How's (Co-Relationship). This matrix is located on the roof which is filled with numbers that will describe the relationship or influence of one Technical Requirement to another. This matrix shows that there is a strong positive relationship, weak positive, strong negative, weak negative or no relationship at all between one Technical Requirement and other Technical Requirement.

RESULTS AND DISCUSSION

What's Matrix – Customer Requirements

Important things that become the focus of consumers' attention in choosing herbal or environmentally friendly mouthwashes that can minimize the adverse effects on health are taste, aroma, colour, weight, price, safety, quality, durability, brand logo, composition information, presentation method, production label. and expired, halal label, packaging design, packaging form and packaging volume. Consumers want mouthwashes that taste good and are fresh in the mouth. Besides taste, aroma is also an important factor in choosing a mouthwash. Consumers tend to want products that have fresh aromas and are not too strong. Consumers also pay attention to the colour of mouthwash when choosing to buy a product. The colours that are often available in the market are green, yellow, blue, or transparent. Consumers also consider the size and weight of the mouthwash packaging when choosing a product, especially when they want to or often travel. Most consumers make price an important factor in choosing mouthwash products for making buying decisions. Consumers tend to look for mouthwash products with good quality standards and affordable prices. Consumers try to choose and ensure that the mouthwash products purchased are safe to use and do not cause side effects or are harmful to the health of other organs.

How's Matrix – Functional Requirement

Contains several technical characteristic attributes that need to be done by the company. The Functional Requirements matrix is obtained by translating the customer's expectations or desires (what's) into the form of product development characteristics that the company needs to carry out so that it can meet the expectations and desires of consumers. The results of the interviews and observations made obtained 12 (twelve) attributes, namely: raw materials, raw material management, processing time, colouring, added flavour, added aroma, Nigella Sativa content, type of packaging, packaging design, halal label design, method of storage, marketing distribution. In Nigella Sativa mouthwash, the selection of quality raw materials is very important. The selection of Nigella Sativa ingredients must be done properly so as not to reduce its quality and benefits. Processing time also needs to be considered so that it runs more efficiently and effectively not spending time on processing so as not to reduce the freshness and efficacy of the Nigella sativa mouthwash. Giving a colour variant to Nigella Sativa mouthwash is necessary even though the natural colour is quite attractive.

Giving flavour to Nigella Sativa mouthwash can be done by adding ingredients such as mint or cinnamon but without reducing the efficacy of Nigella Sativa. Likewise with the variant of the aroma of Nigella mouthwash Sativa can be done without reducing the efficacy of Nigella Sativa. The type of packaging used for Nigella Sativa mouthwash can be in the form of bottles or sachets, so that it is more flexible according to the frequency of use. The packaging design for Nigella Sativa mouthwash should be attractive and informative. The packaging must contain information about the ingredients used and instructions for use. The halal label design for Nigella Sativa mouthwash must include clear and complete information about the product, including product name, halal ingredients used, and instructions for use.

For storage methods, Nigella Sativa mouthwash should be stored at a cool, dry room temperature and away from direct sunlight. In its marketing distribution strategy, Nigella Sativa mouthwash must be proactively and aggressively distributed through drugstores, pharmacies, online shops, dental clinics, and other health clinics. It is important to choose the most optimal distribution channel to reach the desired target market.

Customer Importance Planning Matrix

Contains important information as a place to determine the goals/purpose of Sativa Mouth Wash products.

a) Maximum Relationship Sub Matrix

The value indicates how closely the relationship between customer needs and the characteristics of the Sativa Mouth Wash product will be made. The importance score of customer needs is obtained from the Voice of Customer process.

b) Customer Importance Sub Matrix

Regarding the consumer's assessment of each quality attribute of Sativa Mouth Wash products in meeting their needs. The value of Customer Importance is obtained by dividing the total priority value (from the questionnaire) by the number of respondents. The attribute value of consumer expectations (What's) that gets the

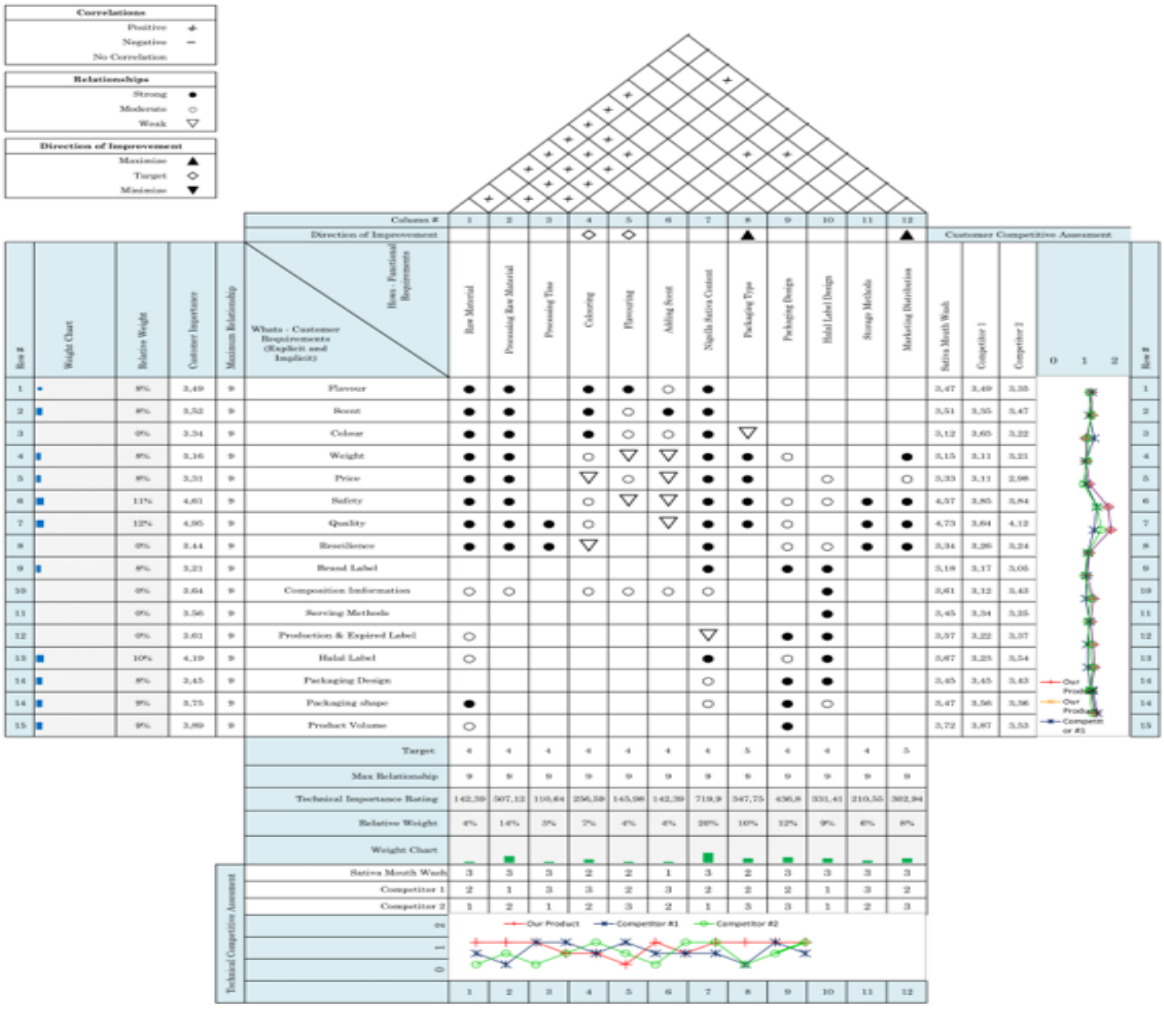

Figure 1. House of Quality (HoQ) Sativa Mouth Wash

highest priority is the benefits of the Nigella Sativa Mouth Wash product for dental and oral health, followed by taste, aroma, colour, weight, price, safety, quality, durability, brand logo, composition information, method of presentation, production and expired labels, halal labels, packaging designs, packaging forms and packaging volume.

c) Relative Weight Customer Requirements

It consists of the weight percentage of Sativa Mouth Wash Product Customer Requirements, namely: taste, aroma, colour, weight, price, safety, quality, durability, brand logo, composition information, presentation method, production and expired label, halal label, packaging design, packaging form and packaging volume.

d) Weight Chart Customer Requirements

Bar graph or table containing vertical pipelines whose number corresponds to the value contained in the Relative Weight Customer Requirements for Sativa Mouth Wash products. The number of vertical piping marks will be multiplied by the number 50 so that the size of the resulting bar chart or table will be larger and easier to read.

e) Customer Competitive Assessment

It is the consumer's perception of how good the quality of Nigella Sativa Mouth Wash's products is when compared to some of its competitors' products, namely Competitor 1 and Competitor 2. The level of consumer satisfaction with the taste attributes of Nigella Sativa Mouth Wash's products is lower than Competitor 1 because Nigella Sativa Mouth Wash has not launched various variants flavour. Nigella Sativa Mouth Wash still survives launching products with

original flavours. The level of consumer satisfaction with the product colour attributes of Nigella Sativa Mouth Wash is lower than Competitors 1 and 2 because Nigella Sativa Mouth Wash has not yet launched various colour variants. Nigella Sativa Mouth Wash still survives launching products with original colours by minimizing additives for colouring. The level of consumer satisfaction with the product weight attribute Nigella Sativa Mouth Wash is lower than Competitor 2 because Nigella Sativa Mouth Wash has not launched a product in small sizes. has not yet launched a product in the form of a sachet or small bottle size. The level of consumer satisfaction with the product packaging volume attributes of Nigella Sativa Mouth Wash is lower than Competitor 1 because Nigella Sativa Mouth Wash has not yet launched a product with a small and practical packaging volume for easy traveling.

Technical Importance Planning Matrix

Prioritizing the most important technical characteristics to achieve the desired Sativa Mouth Wash product objectives, to design Sativa Mouth Wash products that are better and more in line with customer and market expectations.Of the twelve performance comparison values for the technical response attributes of the Sativa Mouth Wash product, there are some that are still lower than the target value, therefore the technical response performance must be improved. Maximum Relationship Sub Matrix indicates how closely the relationship between customer needs and the characteristics of the Sativa Mouth Wash product will be made. Product characteristic performance scores of Sativa Mouth Wash were obtained from the Voice of the Engineer process. By calculating the Maximum Relationship value, Sativa Mouth Wash product designers can find out which product characteristics are most important to improve to suit the needs and desires of customers and the market.

Some of the technical response requirements in the production of Sativa Mouth Wash are still below its competitors, namely in terms of adding colour, adding flavour, adding aroma and type of packaging. The three requirements for a superior Sativa Mouth Wash product technical response include proper Nigella Sativa content and good raw material management, halal label design. The assessment above.

CONCLUSIONS

To find out and evaluate the level of company interest related to performance targets and the level of customer satisfaction using Nigella Sativa herb-based Sativa Mouth Wash, the Quality Function Deployment method was used. Through distributing questionnaires to 65 respondents. Then a House of Quality matrix was prepared to assess the relationship between Customer Importance and Technical Importance so that the priority of technical interests from the Sativa Mouth Wash production process in the future could be identified which had to be implemented immediately. Based on the House of Quality matrix, Sativa Mouth Wash products have advantages on the attributes of Nigella Sativa content (3893.6), Raw Material Management (673.5), and Halal Label Design (578.5). While the technical priority to achieve the customer's interest attribute with the greatest importance value is the Type of Packaging (355.4). This means that for Sativa Mouth Wash products, the provision and processing of Nigella Sativa ingredients and the halal label have unique characteristics that greatly influence the attributes of Sativa mouthwash products. However, on the attribute of the type of packaging, Sativa Mouth Wash has not produced in sachets or small bottles that provide convenience and practicality for customers at certain times, for example when traveling.

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