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PRIMARY RESEARCH

Effect of food shelf life on food quality

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Abstract
Foodstuffs are a crucial part of the food processing process. The shelf life of foodstuffs is considered one of the influences in producing quality food. This study tried to describe the effect of food shelf life on food quality. The research method used descriptive qualitative. Data were from articles and journals related to the shelf life of foodstuffs and their relation to food quality. The results of the study indicated that there is an effect on the shelf life of foodstuffs with food quality. In particular, each food ingredient has its properties and characteristics, thus must adjust the storage process and the shelf life to maintain food quality for safe consumption.

INTRODUCTION

Food unconsciously is the most important and most needed by humans. It is one of the most crucial needs that help sustain the human body. Nutri in food will give humans energy (Tapsell, Neale, Satija, & Hu, 2016). By eating healthy foods from the best meal sources, humans can maintain a healthy body and function better in their daily lives. Moreover, the food system is a complex entity that influences diet, human health, and many other outcomes like economic growth, natural resource, environmental security, and socio-cultural factors (Fanzo, Bellows, Spiker, Thorne-Lyman, & Bloem, 2021). So, food is a significant part of the food processing process. With good food, ingredients can be obtained and served as the best food.

Food is anything that humans can generally consume. Based on Government Regulation (PP) Number 68 of 2022 (Peraturan Pemerintah Republik Indonesia, 2022), all that comes from biological and water sources, both processed and not, is intended as food or drink for human consumption. Including food additives, its raw materials, and other materials used during the preparation process, processing, and/or making food or beverages. On the other hand, according to the Big Indonesian Dictionary (KBBI, 2021), this food is a noun that means food. Meanwhile, the word food can enter three senses. They are everything that can be eaten like snacks, side dishes, and cakes; any material that is eaten or enters the body that forms or replaces body tissue; provides energy or regulate all processes in the body; and sustenance.

One of the efforts to get the best food ingredients is also in the storage process. It aims to extend shelf life and provide consumers with safer products using different materials and technologies (Hernández-García, Vargas, & Torres-Giner, 2022; Jam, Khan, Zaidi, & Muzaffar, 2011). The reason is that in the storing process, a very striking weight loss and changes in the content of pigments or dyes in the tissue can happen. In foodstuffs, for example, by decreasing chlorophyll, other pigments can also increase or lessen at storage temperature, packaging, and variety. The shelf life is a significant part of the food storing process. Therefore, the shelf life of food products is necessary information for consumers (Fauzia, Farooq, & Farooq, 2012; Herminiati, Nurfajrina, Achyadi, & Agustina, 2021).

The shelf life of these foodstuffs affects the quality of the food. Storage time also considerably influences the vitamin C content on food products during storage. It is because, during the storage process, an increase in respiration can continue forming simple sugars that can act as precursors

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in a vitamin C formation. An increase in vitamin content like this will usually occur with the length of storage time. But if the substrate for vitamin formation is no longer available, the content will decrease. Stored foodstuffs for a certain period may also affect the quality of the food. Quality food is what consumers usually judge by the level of freshness, taste, and appearance (Khan, Akbar, Jam, & Saeed, 2016; Petrescu, Vermeir, & Petrescu-Mag, 2020).

Based on the explanation above, there is a possibility that the shelf life of foodstuffs influences food quality. Therefore, it is essential to discuss and describe the effect of food shelf life on food quality. Food-related research such as this is fundamental to helping promote healthy living (Sacks, Riesenberg, Mialon, Dean, & Cameron, 2020). That way, this research can help in improving the quality of food.

METHOD

The research method used in this research is descriptive qualitative by conducting a literature review. Meanwhile, the data collected related to the effect of food shelf life on food quality was obtained from articles and journals. The data found is then described to provide an explanation and elaboration of the research objective, namely picturing the effect of food shelf life on food quality.

RESULTS AND DISCUSSION

Shelf Life

Food storage is one way to preserve food for consumption at a particular time or in an emergency. For example, the short shelf life of fresh food is one of the main limitations for a product class commercialization mainly because its high nutrient content and shallow moisture lead to the rapid growth of spoilage and pathogenic microorganisms (Gogliettino et al., 2020). Meanwhile, food preservation involves different food processing steps to maintain food quality at the desired level to achieve the utmost benefits and nutritional value (Amit, Uddin, Rahman, Islam, & Khan, 2017). The process of storing food can be in various ways, one of which can be fermentation and packaging.

In the storage process, one significant factor is to ensure that food does not change or decrease in quality. The reason is that a decrease in the food quality and food can occur if do not carefully consider the mass of oxygen, light, water vapor, microorganisms, and toxic chemicals in it. These factors can cause further deterioration of quality like lipid oxidation, damage to vitamins and proteins, changes in aroma and odor, browning reactions, changes in organoleptic elements, and the possibility of forming toxins. Thus storage is a security measure for goods that by certain circumstances or purposes must be held for some time before being sold, distributed, or further processed. Therefore, this storage is always related to the time issue where many things can happen during a specific time. Thus, it is necessary to know about the shelf-life extension approach, which can provide helpful information for selecting the most appropriate technologies, procedures, and industrial innovations (Pinto de Rezende, Barbosa, & Teixeira, 2022).

Shelf life or storage time is the critical point at which food changes. In addition, a decrease in the quality of food products or foodstuffs can occur during distribution and storage processes until they are ready for consumption. The shelf life extension of a product or food ingredient could happen if the factors affecting the product shelf life are known. There are three factors influencing the shelf life of food products. They are like the product characteristics, the environment during distribution and storage, and the packaging used. Extending the shelf life can be done in several ways, namely by increasing the value of quality and slowing down the rate of deterioration. Strengthening the initial quality or treatment during the storage process can extend the shelf life of food products. One method is a vacuum, which is a packaging method that can extend the shelf life of foodstuffs. Further, the microorganisms contained in food are one of the factors that can determine the product quality that can be maintained or otherwise decreased. With proper storage and storage period, it can reduce contamination.

Foodstuffs

Food is essential for anyone in this world, including the people of Indonesia. Local food systems can generally be associated with three domains of proximity, namely geographic, for example, physical locality; the distance between food production and consumption; relational proximity, for example, close relationships between actors in the food system; and proximity of values such as place of origin, traceability, freshness, and quality (Enthoven & Van den Broeck, 2021). The food industry in Indonesia itself is quickly growing. The use of food additives is increasing, especially in small fields. The use of additives and production processes that are not suitable or by regulations can threaten consumers. The materials used in the wrong place can poison consumers, especially the lower middle-class people prone to be ignorant about food safety. Low-income families usually get low-quality food (French, Tangney, Crane, Wang, & Appelhans, 2019). However, food security and security are two essential complementary elements for a sustainable future (Vågsholm, Arzoomand, & Boqvist, 2020) and even have to reach the lower middle class (Bai, Alemu, Block,

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Headey, & Masters, 2021). Government policies continue to emphasize agricultural production of fundamental commodities and support for the food industry motivated by conventional perspectives on food security, economy, and trade (Mozaffarian, Angell, Lang, & Rivera, 2018). Thus, food quality must always be maintained so that it is not contaminated until it reaches the hands of consumers. Consumers or buyers expect food ingredients to produce quality, safe, sustainable, and standardized ingredients with specific expertise (Martindale, 2021). The reason is that the pollution experienced by food will influence the quality of the product produced. However, what is more, worrying is the contamination of foodstuffs that can cause disease or symptoms of poisoning for consumers who consume them. Meanwhile, to maintain the quality of food ingredients or products, it is necessary to understand the nature of food ingredients and the factors that cause a decrease in the quality of food products.

Physical properties closely related to the properties of foodstuffs include allometric properties, texture, elasticity, coefficient of friction, and thermal conductivity. This physical property is close to the food quality because it can act as basic information in determining the level of handling and processing methods. The food ingredients' strength, size, and shape are important physical properties that play a role in processing. The texture of foodstuffs also varies, which can range from fine to coarse textures. These textures are also related to the natural protection of these foodstuffs. It is close to the way of confectionery and foodstuffs processing. Meanwhile, its elasticity is closely related to the amount and type of weave owned and the level of freshness. Because each food ingredient will have a different number and type of binding weave with another food ingredient that will affect its elasticity. For example, beef is chewier when compared to fish because it has more and larger weaves.

In addition, each food ingredient has a different texture from other food ingredients, some have a smooth one, such as grains, and some have a rough one, such as durian and jackfruit. This texture influences the coefficient of friction. Knowledge of the coefficient of friction of various foodstuffs is necessary as information in determining the design of equipment and designing means of transportation of foodstuffs during handling or processing. On the other hand, chemical properties are also significant because food contains chemical compounds that can change depending on the level of biological maturity, sexual maturity, temperature, supply of food or fertilizer, stress, or other environmental parameters. Most foods have a relatively high-water content. Due to this water content, food becomes a perfect medium for spoilage microbes to grow and develop.

Food Quality: Shelf Life and Food Ingredients

Food quality is essential and the primary goal of all food processing processes. This quality itself is a matter of degree. It is a difficult concept to grasp, and understanding how consumers perceive food quality has become a central issue seen as a consumer judgment of the overall superiority of a product, a basic understanding of what food quality means is by no means universal (Petrescu, Vermeir, Burny, & Petrescu-Mag, 2022). However, determining food quality is more often by the amount and distribution of the main micronutrients in the food (Jomaa, Hwalla, & Zidek, 2016). Meanwhile, food quality information service is a significant criterion in consumer channel selection and purchasing decisions (Yu & Ren, 2018). Food storage is crucial to maintaining quality. There are differences in storage time due to differences in storage purposes in food storage. Due to the different storage times, the techniques and storage requirements are also diverse. Depending on the food quality or commodity and the method, it requires higher requirements to store the food longer.

Short-term storage

The actual storage period is quite relative. The meaning of short and brief is also relative from one country to another. However, short-term storage generally means storage that lasts about one season. Meanwhile, one season in Indonesia can vary from three to nine months. While for subtropical areas, it can be around one year. Storage in the short term is usually only to save the harvest and stabilize the distribution or consumption of needed commodities.

Medium term storage

Medium-term storage is storage that lasts more than one season to two years. However, this usually lasts for a period of two seasons. This medium-term storage intends to stabilize supply, and distribution, particularly price stability and general economic stability. Security of national food by having national stock in medium-term storage of about one to two years that every year or a maximum of once every two years old stock is thrown into the market and replaced with new supply.

Long-term storage

Long-term storage is storage that has a period of more than two seasons or more than two years. This long-term storage is often for backup in case of an unforeseen need. These unexpected events, for example, are natural disasters, security disturbances, and war events.

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Temporary storage

In daily activities, many commodities or foodstuffs from agriculture, especially those fresh ones, need to be stored for a short time. For example, foodstuffs such as vegetables, fruits, meat, fish, and the like need to be displayed and are generally kept at low humidity to maintain their shelf life and freshness. The duration is about one to a few days. Then, there is transit storage applied to agricultural foodstuffs in the form of grains and the like that will experience a stop for some time while being transported and distributed to other places. These foodstuffs undergo brief storage in specific areas such as collection terminals, wholesale warehouses, inter-island traders, export/import warehouses, ports, or retailers. This transit storage period lasts from a few days to a few weeks but is generally less than a month.

Different storage periods adapted to this type of food could maintain the food quality. When food is stored at the right time, the food will not be damaged and spoiled. The foodstuffs' shelf life affects the food quality consumed by the community. Therefore, we should not take it lightly and must do it according to the proper standards.

CONCLUSION

Based on this research, the shelf life of foodstuffs influences food quality. It must adjust differences in shelf life to the type and variety of food ingredients. Each food ingredient has its own shelf life and different effects in the storage process. Therefore, it is necessary to ensure that the stored food is according to the correct shelf-life so that the food produced or processed can be of good quality, and importantly it will not cause disease for those who consume it.

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