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Quality Control with Scoring Methods in the Production Process of Peas in the Bean Industry

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Abstract. This study aims to determine the production process of peas, by observing the quality control management in the production process running well. The design of this research was carried out by observing and interviewing each process which was assessed according to the quality control aspect using the scoring method. Furthermore, the data obtained is interpreted in the form of a histogram which is then compared with company standards, if it does not meet the standards, improvement efforts are made. The results showed that the implementation of quality control in the production process of peas in the pea industry greatly affected the quality of the product produced quite well with a score of 87.63% and the production process was carried out with good sanitation and hygiene.

INTRODUCTION

Peas are one of the plants in the *Leguminosae* family. Peas contain 23-25% protein, 20-25% starch, 4-10% sugar, fat and minerals. The protein content is quite high and the nutritional content is quite suitable for use as food products. Processing of peas by the community is used as a snack food which is not only influenced by the taste and crunchy texture, but also contains nutrients that can meet the nutritional needs of the body. The processing of pods is influenced by how many factors affect the resulting product.

The raw material used is peas with conditions that do not have long durability will affect the quality of the resulting product. So that a system is needed to guarantee and test quality starting from the safety of raw materials, production processes, to the products produced that are related to quality standards [1]. Quality control in this case plays an important role in the material processing process to minimize damage and defects in the product to ensure the safety and quality of the product until it reaches the consumer. Quality products and in accordance with what consumers want are the priority of an industry in seizing the existing market [2].

Quality control in food products can be viewed from the physical and chemical properties of the product where both of these properties affect the quality and safety of the resulting product. Quality control applied to a good processing process will obtain a final product with quality [3]. Peas contain chemical nutrients and physical properties that not only affect the shelf life of the product but also affect the acceptance and level of consumer preference for the product.

This study aims to make direct observations about the success in the application of quality control in the production process of peas in the industry. The benefit of this research is to evaluate the quality control in the production process of Mas Peas so that there are no deviations that affect the resulting product.

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MATERIAL AND METHODS

This research was carried out from January 2021 to February 2021 in one of the peanut industries in Central Java.

Material

The material observed in this study is all aspects related to quality control in the production process of peas.

Method

The research method that will be used is the scoring method. The scoring method is a data analysis method by assigning a score or value to each parameter value to determine the level of ability of the tested parameters with an assessment based on predetermined criteria. The method used is using a Likert scale by using a questionnaire containing an answer score in the range of 1-5 then the score obtained is condensed into an interval of 0-100%. The answers obtained are scored in total using the following formula:

$$\text{Total Score} = T \times Pn$$

$$\text{Index } \% = \frac{\text{Total score}}{Y} \times 100$$

The research phase begins with observations and interviews conducted for each process which includes the quality of its human resources, specifications of the machines used, the raw materials used, as well as the workings and environmental conditions of the pea production. The data obtained based on the results of scoring and observational data are then compared with the quality standards set by the company and if they do not meet the standards, improvement efforts are made.

Data analysis

Data analysis in this study used a descriptive test. The results of observations which include moisture content, texture, etc. resulting from the production process are then compared with company standards, if they do not meet the standards, efforts are made to improve the SOP of the production process. The data obtained were tabulated using computer aids with the Ms. Excel. Quantitative data from the test results of moisture content, texture, color, taste, smell, “ngocop”, broken, and “blentong” were analyzed for range, averaged, then presented in the form of tables and graphs and then analyzed descriptively. The data from the scoring results of the implementation of quality control were then analyzed descriptively.

RESULT AND DISCUSSION

The respondent's questionnaire was given to employees who work in the peanut industry, especially in the grain division. Aspects assessed include quality control consisting of the production function, factory physical facilities, and product quality. Assessment of quality control by scoring method on all aspects of the peanut industry can be seen in Table 1.

TABLE 1. Results of Quality Control of Peas

No.	Aspect	Interval Value	Criteria
Aspect of Quality Control			
1.	Production Function	86.76	Strongly agree
2.	Factory Physical Facilities	83.73	Strongly agree
3.	Product Quality	87.62	Strongly agree
	Average	87.63	Strongly agree

Based on Table 1, it is known that the total score of quality control assessment in the production process of peas in the peanut industry is 87.63% so that the level of quality control is in accordance with the correct principles and

procedures. The level of implementation of quality control that is in accordance with the aspects that have been determined, the company is expected to continue to fulfill, maintain, and improve the implementation of quality control in order to produce products that are safe, quality and respected by consumers. Aspects of the production function carried out are quite good with a written production schedule, a production process that is in accordance with SOPs, physical inspection and recording of materials, the use of appropriate machines and periodic maintenance, as well as analysis of inappropriate production processes. Standard operating procedures are guidelines in the industry that are used to ensure the efficiency of aspects in an industry [4]. Then for aspects of the factory facilities used are adequate with the availability of water and electricity sources, layout of production machines that support the smooth production process, availability of warehouses and security equipment, as well as factory locations close to several suppliers. Considerations in choosing an industrial location include the location of raw materials, labor, water sources, electricity, transportation facilities, as well as support from the community and also from the government [5]. Then for the quality aspect of the product that has been carried out is good with periodic checks, quality control and quality assurance, analysis of deviant products and corrective actions taken to ensure the quality of the products produced. Quality control is important for an industry as an effort to suppress defective products and to analyze the causes of product defects and determine improvement efforts [6].

TABLE 2. Results of Average Moisture Content, Organoleptic, "Ngocop", Broken, and "Blentong" on Peas

Sample	Moisture content	Organoleptic			Texture		Ngocop*	Broken	Blentong**
		Color	Taste	Smell	Normal	Stiff			
1	1.92	N	N	N	80	20	26	18	2
2	1.99	N	N	N	80	20	26	16	2.2
3	1.76	N	N	N	80	20	27	15	1.9
4	1.82	N	N	N	80	20	28	14	2.6
5	1.79	N	N	N	80	20	26	14	3
6	6.25	N	N	N	80	20	28	12	2
7	1.65	N	N	N	80	20	28	16	3.5
8	2.05	N	N	N	80	20	30	18	2.5
9	2.06	N	N	N	80	20	32	7.77	-
10	1.92	N	N	N	80	20	38	14.7	-
Average	2.32	N	N	N	80	20	28.9	14.6	1.8

Information:
N : Normal
Ngocop* : The appearance of oily products on the surface which indicates that the oil cannot be drained after frying
Blentong** : Subsequent other items such as green peas, corn, charred produce, black in peas

Based on Table 2. It is known that the average water content contained in peas is 2.32%, where this figure is in accordance with the maximum standard set by the company, namely the maximum water content in the product is 2.5%. The low water content is caused by the frying and oven processes to evaporate the water contained in the ingredients. The finding of water content in the sample that exceeds the limit is due to a discrepancy in the engine in the form of an inappropriate engine setting and the occurrence of an overload so that the heat obtained is uneven. Exposure to temperatures that are too low in the frying process will result in lower water evaporation [7]. The cause of the high-water content in the product is also due to the energy system used, namely coal, which has decreased, so that the engine temperature cannot reach the optimal temperature. The drop in coal system will cause the oil temperature in the frying machine to become unbalanced so that the water content of the product increases [9].

Based on Table 2. The results of organoleptic testing on pea products consist of color, taste, smell, and texture testing and the results obtained from these four parameters are normal. The test results obtained for the organoleptic of peas are in accordance with the achievement quality standards set by the company, namely normal taste, aroma, and odor, as well as normal texture, not stiff, and not hard. The normal organoleptic properties of peas are due to the use of raw materials in accordance with the standard of acceptance of raw materials and the existence of trials to adjust the quality of the ingredients with additional materials and a series of processes. The application of the first in first out (FIFO) system in the operational use of goods will help in maintaining the condition of the product in good condition [9]. In addition, it is also influenced by the length of storage of raw materials, namely pods which have a

maximum shelf life of 3 months with the aim of not causing an aftertaste that is not suitable for the product, namely the taste of "sepo". Length of storage time for this type of grain is no more than 3 months to maintain its quality [10].

Based on Table 2. The results of the "ngocop" test for pea products obtained an average yield of 28.9%. The sample test results obtained have met the quality standard limits set by the company, which does not exceed 35%. However, there are still deviations in the sample data taken, namely the finding of the percentage of "ngocop" that exceeds the maximum limit, the causative factors of which can come from the use of too long oil, low water content in raw materials, and not draining after the pods are soaked. The use of oil that is too long will cause an increase in the value of free fatty acids (FFA) and affect the appearance of the resulting product. Oil that is used for too long will increase its viscosity which is an early sign of oil damage which affects the increased absorption of oil in the product [11]. The low water content in the product will cause the absorption of more oil during the frying process so that the resulting product will look oily. oil absorbed in the product is influenced by the shape of the material, where the material with broken seeds will absorb the oil faster when frying [12]. Another factor that causes "ngocop" is not draining after the pod soaking process which will cause the water to mix with the oil in the frying machine so that the oil is not durable and produces an oily product. Mixing water with oil that occurs during the frying process will cause an increase in the water content in the product so that the oil will also be easily absorbed into the product [13].

Based on Table 2. it is known that the average number of broken pea products is 14.6%, which means that it meets the quality standard limit set by the company, which is a maximum of 30%. This shows that the quality of the products produced is quite good, especially in handling the quality of raw materials which are checked according to the company's quality standards so that the materials used are ensured of quality materials. The initial process in the form of checking and preparing raw materials greatly determines the quality of the product whether it is suitable for consumption or not, so it is necessary to carry out checks related to organoleptic quality and also laboratory analysis of the raw materials to be used [14]. Then the average sample test results for "blentong" obtained results of 1.8%, which means it has met the product quality standards that have been determined by the company, namely "blentong" a maximum of 4%. If a high percentage of "blentong" is found, it is due to the large number of other product mixtures left in the production machine. There is a mixture of other objects in the product, a sorting process needs to be carried out and if after sorting there is still a mixture of other objects, it needs to be re-sorted [15].

CONCLUSION

Based on the results of the study, it can be concluded that the application of quality control of the pea production process in the pea industry has been carried out quite well with a total score of 87.63% and a good product quality is produced which proves that quality control greatly affects the quality of the peas. Quality control that is well implemented in the production process produces products with low moisture content that are still in accordance with company quality standards, normal product organoleptic, as well as "ngocop", broken, and "blentong" which are still within safe limits.

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