

Product Development Analysis on Special Snack from Nganjuk “Dumbleg” as an Effort to Increase The Image Product

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Abstract

Abstract: Food and special snack are kind of meal and snack which become the identity of a region. The example of special snack from Nganjuk is Dumbleg. Along with the time, this special snack from Nganjuk is less known by the public and the production gets decreasing in market. This condition is caused by Dumbleg's quality that is getting down product is not durable and less interesting. Therefore the role of product development is needed. The objective of research is to analysis business place condition of dumleg from Nganjuk, formulates the product development strategy of dumbleg from Nganjuk and formulates the improvement of aesthetics value to increase the image of product to consumer. This research is descriptive that is analyzing the problem in the field and then solve it. Taking of sample is implemented by sampling technique that is method of Systematic Random Sampling. The result of research shows that condition of Dumbleg business needs the improvement and development, especially in the process of production. The improvement in the process production of Dumbleg is done by paying attention in the consumer desirability parameter about product quality and aesthetics value. The improvement about product quality is done by applying Hazard Analysis Critical Control Point (HACCP) and hygiene sanitation on the right food processing, while the improvement in aesthetics value is implemented by making the perfectness in physical appearance of Dumleg that includes the improvement of size, way of packaging, labeling, and trademarks.

Keyword: HACCP, hygiene sanitation, product development

1. INTRODUCTION

A typical street food or food type is an identity of an area. According to [1], food and drink are closely related to the traditions of a community. Food and snacks available at the Nganjuk's area have a slight hint of a sweet flavor, not too spicy, and savory. One example of the typical snacks is Dumbleg. Dumbleg Nganjuk is made from rice flour, palm sugar and coconut milk. Dumbleg is processed simply by manual tools and is packed with jambe's midrib.

Along with the times, typical Nganjuk's street snack is less known by the public, either people in Nganjuk itself and even outside the city. Based on the data from the Department of Industry, Trade and Cooperatives District. Nganjuk 2012, the number of Dumbleg's makers lowers from 8 units of UKM in 2008 to 5 units of UKM in 2011. The decrease is caused by the lowering quality of the products (non durable) and the lowering demands as well. Aside of the non durable factor, another reason is because the product is not interesting and it can't attract consumers to buy it. Then again, the product doesn't have any

identity or trademark so that it's hard for the consumers to recognise. Therefore a product development is needed to improve the quality and enhance product's appearance.

This research is intended to analyze the condition in the place of business (UKM) of Dumbleg in Ngajuk, formulate the strategy to develop Dumbleg Nganjuk, and formulate the improvement of aesthetic value to the consumers so that they can widely acknowledge Dumbleg Nganjuk once again.

2. RESEARCH METHOD

The research has done on Dumbleg Nganjuk business units started from October 2013 till January 2014. Data collection has done by interviewing owners, workers, and consumers and by filling up questionnaires helped by samples. Samples were obtained by using sampling technique, Systematic Random Sampling. Questionnaires are used to obtain consumer's needs data with samples of 34 consumers and product's success data after improvement with 162 consumers as samples.

Consumer's needs data is used to find the identification of the needs of Dumbleg's consumers and product specifications determination.

The forming of concept is started by collecting several methods which are assumed

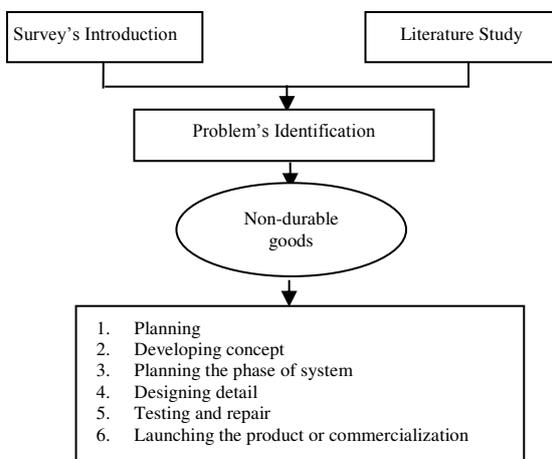
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can improve and enhance the quality of products. The collected methods are selected through two steps, started by brainstorming and ended by counting using Pairwise Comparison method, which is scored 5 by experts. The result of concept decision is used as a base of the incoming product development. The result of concept count with pairing method which has the highest value is the concept will be executed to help improving Dumbleg’s production’s process and products improvement. Product improvement has done by improving size, shape, and package of the product. Procedures can be seen in Picture 1.



Picture 1. Procedures

3. RESULT AND DISCUSSION

3.1 Consumers’ Need Identification

The result of consumers’ need from 34 consumers samples is grouped into primary needs and secondary needs, which are later on will be examined about its interest rate. Secondary needs are parameter from consumers’ primary needs (Table 1).

Table 1. Table of Primary and Secondary Needs

Primary needs	Secondary needs
Quality and durability	- Made of safe material - Not using dangerous material - Durable
Aesthetic value	- Product is interesting, neat, and clean - Practical - Secondary packaging is interesting
Economical value	- Cheap - Product is easy to find

Table 1 shows that Dumbleg consumers’ primary needs are about product’s quality and durability. And then comes aesthetic value and economic value behind them as relative importance needs. The result of relative importance grouping is quality and durability have the highest rank, 52 %, or is equivalent with 18 consumers. Aesthetic consumers has 41% or is equivalent with 14 consumers, and economical value has 7% or is equivalent with 2 consumers (Picture 2).



Picture 2. Importance of Consumers Needs

This shows us that consumers don’t think about price, but rather about the quality and aesthetic value. According to [2]; [3], quality and price have a strong connection and have been an international phenomenon, where a good quality also means high price. Product quality, price, distribution, and promotion against consumers satisfaction also have a significant effect, where there’s a positive connection between product quality, price, distribution, and promotion with the improvement of consumers satisfaction [4].

However, in fact, Dumbleg has poor quality. It’s not durable as the consumers wanted. Even though Dumbleg has poor quality, the raw materials are actually adequate to the standard.

Table 2. Comparison Between UKM’s Raw Material with SNI

Ingredients	UKM Standard	SNI ⁹
Rice flour	No odor, clean, white, no clumping	No strange objects, the color is normal, clean
Brown sugar	Red colored, clean	Brown colored, no strange smell and taste
White sugar	Whita	White, clean, no clumping
Coconut	Old, fresh, no odor	Old, no odor, clean

Source: [5]

Table 2 shows that between UKM standar and SNI about raw materials is matched, so that we can conclude that the cause of poor quality is not the raw material. It’s from how they produce.

3.2 Concept

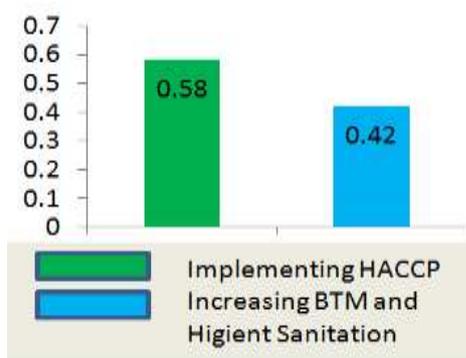
a. Concept Forming

The problem in the UKM is that the product quality is poor, so that in order to improve product quality to fulfill consumers need is to improve production process. Production process improvement can be executed by several ways or concept, such as applying quality management by applying HACCP principle, adding BTM or using any other methods such as Failure Models Effect Analysis (FMEA) or Lean Manufacturing method. Both methods are assessed as hard to apply in UKM, so that both methods, through brainstorming and study from several literatures, are eliminated from the concept. Combined concepts between HACCP, hygiene sanitation are also eliminated because is assessed as complicated to apply because we have to do quality management first then followed by combining BTM control.

The most likely concept to be adopted is to apply the principles of HACCP quality management and the addition of BTM. According [6], if the SMEs are able to apply the correct hygiene sanitation and taking appropriate action on the critical stages of the process can help improve the quality of the product. But the addition of BTM is allowed as long as the dose to help maintain the quality of products that are not easily damaged. The addition of the BTM can be propionate acid that can sustain the durability of products Dumbleg Nganjuk, the addition of the maximum recommended dose is 0.32% or 3.2 g / kg of material [7]. So the concept will be used in the improvement of the production process is to apply the principles of HACCP quality management and the addition of BTM.

b. Concept Selection

Selection of concept was conducted using pairwise comparisons were assessed by five experts. Assessment results using pairwise comparison method is shown in Picture 3.



Picture 3. Result of Concept with AHP Selection

Figure 3 shows that the value of decision-making with the application of HACCP and sanitation has the greatest value that is equal to 0.58 because of the risk of the application of HACCP concepts and proper sanitation are not at high risk, the entire production process can be monitored and controlled as a whole so that the result is maximum. In contrast to the application of the concept of addition of food preservatives as the recommended dosage with value of 0.42, a risk if one preservative is added to the batter over the limit. This is corroborated by the opinions [8], which states that food additives added to food even in small quantities will still pose a danger to human health.

The results of the calculation of the decision making is valid. Because according to [9]; [10], or the AHP pairwise comparison method is an effective decision-making tool because it is done by expert so that the results are accurate. The mark of feasibility decision result is the value of CR <10% as the alternative selection process improvements to increase the efficiency of the production process with the value of consistency ratio of 9.1%.

3.3 Product Improvement Process

Product development process is carried out on the product Dumbleg is by improving the production process with the concept of HACCP sanitation and hygiene. In the process of product development and industrial design there are manufacturing design. Industrial design that includes efforts to improve product quality and increase the aesthetic value of the HACCP and sanitation hygiene. While the design of the manufacturing technology needs required to support the product development process.

a) Industrial Design

Industrial design process improvements by using the concept of HACCP and sanitation hygiene requires several stages of the process hazard analysis, hazard analysis on the entire production process and determine the critical control points and critical point and further improvement of the production process is done according to the concept of correct HACCP and hygiene sanitation.

1. Risk of Danger Analysis

Dumbleg products is including the risk of harm II, which contains two dangers, the danger of "B" and the danger of "D". Danger group "B" contains material that is sensitive to the dangers of biological / chemical / physical. It is seen in

coconut milk which is the raw material of Dumbleg. Coconut milk contains oil, grease, and water, very easily become rancid if given less precise handling. According to [11], coconut milk has similar traits with cow milk, if not treated immediately will quickly stale. Simple processing of coconut milk is pasteurization. Group danger of "D" or dumbleg has contamination after processing.

2. Danger Analyzation

Hazard analysis performed on the raw materials and the production process of Dumbleg. The results of hazard analysis on the raw material, the danger that arises is on rice and rice flour. The danger is a musty smell. Musty smell that can arise due to lack of proper storage rooms so moist rice that will be processed into rice flour becomes damaged. According to [12], which appears on the musty smell of rice and rice flour because due to damp storage place that trigger the growth of mold. Mold is a living fungus *Aspergillus* types and *Penicillium*. Molds easily arise on the storage conditions of 260C-300C temperature and room humidity above 63%.

Stage of the Dumbleg production process is appearing various hazard. The danger that arises is the most physical hazards like dust, insects, hair, sand, gravel and others are found in nearly all stages of process-ing. Physical contamination also comes from workers caused by workers not using a complete sanitation hygiene such as gloves, aprons, masks and headgear.

The use of masks is done to avoid contamination of the workers due to sneezing, coughing, or even chatting while doing the production process. The use of headgear is done to avoid any contamination such as hair loss, hair or other dirt that go in during the production process. While the use of gloves is done to avoid contamination from dirty hands of workers, minimize the accessories that released during the production process. Current conditions in UKM is hygiene sanitation workers do not use sanitation tools at all. This is supported by [6], that the UKM do not heed the sanitation process, sanitary fittings such as aprons, masks, headgear and gloves even particularly to workers and less product handlers perform the appropriate action on critical process in the production process.

The results of the hazard identification of raw materials and production processes used to help establish critical control points or CCP (Critical Control Point) and the critical point or CP (Control Point) of each stage of the process is

done. If CP is not controlled then the final product will be disabled while the CCP if not controlled would be harmful to the product and the consumer. Here are the determination of CP and CCP on Dumbleg production process (Table 3).

Table 3. Determination of CP and CCP on Dumbleg production process

No.	Stage of Process	CP (Control Point)	CCP (Critical Control Point)
1	Raw Material selection	√	
2	Making of rice flour	√	
3	Coconut shredding	√	
4	Making of coconut milk	√	
5	Mixing the ingredients	√	
6	Printing and packaging	√	
7	Cooking		√
8	Cooling		√
9	Sealing		√

Stage of the cooking process, cooling and packaging closures into CCP or critical control point because if the cooking is complete the product will not be broken, which is caused by microbial contamination does not die completely so that when the cooking process is completed and the product will be re-cooled microbial vandal damage the product and the product will quickly stale, moldy or quality is declining.

3. Sanitation

Hygiene sanitation in business unit, whether it is small scale business or corporate must be paid a good attention especially for those which produce food product. It must be implemented in the area of building, worker, and utensil sanitation.

Building sanitation covers indoor and outdoor area including good flow of disposal, adequate tap water, enough amount of toilets which cover 2 toilets for 12 workers, washing facility along with the soap so that the workers are sterile. This is appropriate with idea [13], that production area overall must be equipped by disposal facility, adequate water for the production and every activity within the small scale industry, washing facility for the workers, appropriate building, swift airflow supported by ventilation and toilets for the workers. The ideal amount of the toilets is 1:5, which means one toilet for at

most 5 workers and it is placed in separated area from dodol pro-duction.

Worker sanitation in Dumbleg small scale industry implements rules which prohibits the workers to use jewelry such as bracelets, necklaces, rings, or earrings and they must wear face masker, aprons and head covers. The workes nails must be always clean short. Based on [14]; [6], the majority workers bring the biggest contamination source, that is why they have to be equipped with gloves, maskers and the other *hygiene sanitation* utensils to avoid product contamination. The industry also must always supervise the workers to keep their body and environment clean and also prohibit them to wear any accessory while touching with the product.

Utensil sanitation is done by doing a cleaning every, before, and after the utensil is used so that the raw materials and the products are not contaminated. This is supported with [15] idea, that sanitation is not implemented by those who touch the food only, but also to the utensils which are used in production process. Dirty stuffs or the stuffs which are kept outdoor contain several kinds contaminations such as fungi, mold or yeast. Therefore the utensils must be clean all the time.

4. Production Process Improve-ment and Refinement

The production process improvement is based on HACCP terms or guide either for the raw materials and the production process.

a. Production process and raw materials treatment improvement

Dumbleg raw materials are rice flour, palm sugar, and coconut. Rice flour and sugar have the appropriate treatment which is being kept in dry and clean place so that they are durable. The coconut still don't get good treatment.

The coconuts which come from the supplier will be directly skinned from the shell and are kept to be grated and squeezed later for the milk. However, basically, coconut contains oil which if it is kept for too long then it will make the coconut dry (decreasing oil), smells bad and change color. Based on [16], fresh coconut is able to produce healthy coconut milk and it is good to use it for additional material for any processed food because the milk has not been degraded by the surrounding air and heat. The statement shows that good coconut milk is obtained from fresh coconut, so that the good treatment is the coconut is skinned from its shell just in case it is about to be used as needed for production

process in order to keep the content of the milk and the milk itself maximum.

b. Improvement of Processing Production

Process

Dumbleg production process now is seen to be inappropriate because it doesn't treat the raw materials properly based on HACCP and hygiene sani *tation* aspect, so if the manufacturer wants to obtain good quality Dumbleg as expected both by itself and the consumer then the process must be improved by applying a new production process. Below is a comparison between production processes before the improvement (Picture 4) and after the improvement (Picture 5).

1. Coconut Milk Production

Coconut milk produciton within small scale industry is done by grating the coconut using grater machine and pressing the result using presser machine. The milk which is obtained is put into a big bucket and is left to wait the other batter is ready. Sometimes the milk contains some dirt such as some leftover. The treatment is seen as improper. [11], stated that coconut milk has similar characteristic with cow, so that if it is not processed immediately then it will be spoilt. The appropriate treatment to avoid it not to spoil immediately before it is used is to use pasteurization. Based on the state-ment then before the coconut milk mixed with the other ingredients it should be pasteurized and filtered in order to to avoid the coconut milk from degrading and to keep it clean.

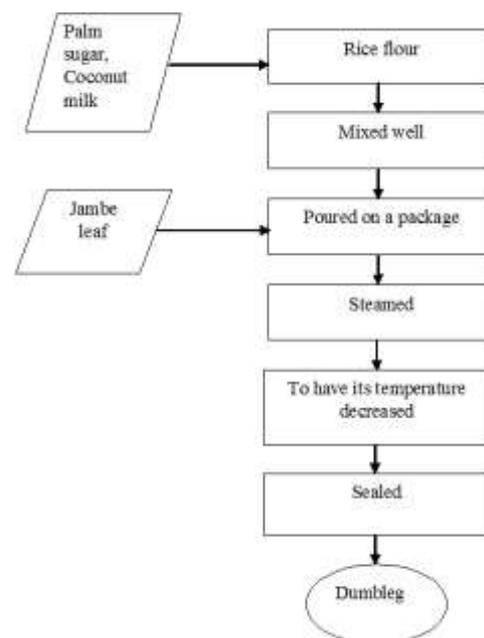


Figure 4. Production process before improvement

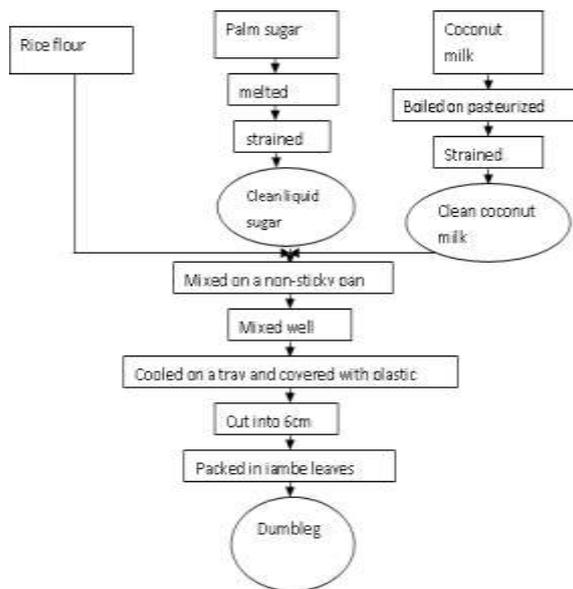


Figure 5. Production process after

2. Batter Mixing

The mixing of batter which consists of coconut milk, palm sugar, and rice flour is as follow. Liquid palm sugar is mixed directly in the batter. The result is, there is dirt in the batter which come from the sugar liquid. Therefore in the improvement of this step, the sugar is filtered previously to avoid the dirt come to the batter. The mixing process of the batter must be done until the batter becomes homogeneous to provide a quality product and to meet the consumers' need. [13] stated, some things to pay attention to when mixing beside homogeneity is the condition the materials condition which are going to mix. The materials in the production process of dodol contains chocolate must be free of dirt.

3. Cooking

The batter cooking was done previously within 30-45 minutes until the batter clots and dulls. Steaming the cooked won't make it dull because the steaming will leave water in the product. Therefore if the manufacturer wants to get cooked and dull product, the cooking process must be improved by mixing it in a big non-stick wok until the dull looks like porridge. The mixing on the wok can provide spread heat and water steam from the material which can evaporate perfectly. [17] stated, porridge mixing of dodol and other similar food needs time which is relatively long to get maximum result and it allows the materials to mix and get heat spreadly.

4. Cooling

Hazard analysis cooling is classified in CCP. Cooling process previously was only done by putting the cooked food on the table and let the air cool the food on room temperature. Now the process is, putting the food in a pan/ tray and covering it with plastic to make the food cools down faster and to avoid the food to be contaminated by dust and the other dirt. [18] stated, the improve-ment process which is done in taro dodol production is by using tray to place the dodol before it is cooked, which is not done previously. The tray then is covered with plastic to make the food more hygiene and the result is more durable.

5. Packing

Previously, the product is packed directly using jambe leave. After the improvement, the product is covered first with thin plastic which is safe for food as primary packaging to make sure that the product is wrapped perfectly and after that it is wrapped with with jambe leave which have been washed previously using hot water to make it sterile and to extract the epidermis. The epidermis of jambe leave is more flexible so that it does not break or torn easily if it is bend or rolled. By giving primary and secondary packaging, the product will be more protected. [8], stated, the packaging of porridge or any other product must be considered carefully because it will determine the quality of the product. The porridge or product packaging must be wrapped tight and must be within clean condition to avoid health danger to the consumer because of microorganism contamination, insects, and dust.

c. Product finishing

The finishing of the product is done to meet the consumers' need of product's aesthetic value. The values are:

1. Neat product shape, attractive and clean

The size of the product after the improvement is 6 cm it is more attractive. Besides that the product is more clean.



a. Before b. After

Picture 6. The shape and size of Dumbleg

2. Practical

Dumbleg product model nowadays is more practical because the size is smaller. The consumer won't find any difficulties to eat it.

3. Attractive Secondary Packaging

Secondary packaging (jambe leave) which is used now is more interesting for the consumer because it looks more clean so the consumer is encouraged to buy it.

According to [18]; [19], the aesthetic value of a product is the design and packaging which is an emotional trap for the consumer to choose the product.

a) Manufacture Design

Machines and equipments used for supporting the production process are mostly manual. The machine used on this UKM dumbleg is a grater machine that is used for grating coconuts and pressing machine used for gaining an optimum coconut milk. On the long term, this UKM Dumbleg will need a mixer machine to help mixing Dubleg is the production capacity is increasing. A mixing machine is also needed to make the dough more homogeneous. According to [13], a mixer is needed on the process of producing jenang to make the worker easier on mixing the dough and to produce a homogeneous product. A homogeneous product will be enabled to produce a high quality jenang.

Equipments used on UKM Dumbleg are pail, big barrell, and zync for putting coconut milk, plastic tray and a scale, so that an equipment needed for a long term is a shelf. A shelf can be used for cooling down the products which are placed on trays. According to [13], a shelf is essential on industries which produces a big amount of jenangs, because a shelf can minimalize the need of space.

b) Cost Analysis

A properness analysis towards this business is done for counting the properness analysis of dumbleg business with process production after improving and perfecting the product, whether it is saleable or not, to gain the new original price (HPP) and to estimate the profit to be gained by this business. A new pro-perness analysis towards dumbleg business is displayed on table 4.

The previous price of the dumbleg which is Rp. 2000,- seems cheaper compared to dumbleg's price after production process improvement and perfecting the product. The product's price after developing process is Rp. 11.735 per box, which contains 10 dumblegs with 6-cm size for each product. It is estimated that

the profit for the first year is Rp. 79.486.767,65 if 40 dumbleg product can be sold daily, or the monthly profit is Rp 6.623.897,00 for the first year. According to the recent properness analysis, the dumbleg business with this improved product is worth to be done since the NVP value is >0. it is supported by [20] which states that if NVP value is >0 it means that the investment done is beneficial for the company, and this project can be done.

Table 4. Description of needs on improving dumbleg (on the first year)

No.	Needs	Cost (Rp)
1.	Fixed investment	9.881.550
2.	Fixed cost	25.774.300
3.	Tentative cost	73.530.000
4.	Total of production cost	99.304.300
5.	Original Price	8.275,36
6.	Selling price (mark up 5%)	11.734,91

4. Prototype

After Dumbleg is improved by refining the production and perfecting the product, it can stay still for 11 days on a room temperature. A new product can be more interesting with its size which is not monotonous, neat packaging, whether the primary packaging or the secondary one which is equipped with trade mark and logo, product ingredients, nett weight, production date and expiry date, and the factory address.

According to [19], packaging is the main attraction-grabber for consumers that need to be concerned. Label attached on a mica plastic (tertiary package) is in accordance with the decree of Ministry of Trading No.22/M-DAG/PER/5/2013 clause 12 saying that on the main part of the label should mention the name of product, nett weight, and name and address of the manufacturer. This is one of the label concepts of dumbleg Nganjuk product.



- a. Name of the product
- b. Brand of the product
- c. Composition and net-weight
- d. Place of Production
- e. Expiry Date

Figure 6. Example of Dumbleg Product Label

Examining the dumbleg product prototype contains of organoleptic test by experts and product accomplishment on consumers-to-be.

After the dumbleg is developed, it still has its main taste which is sweet, sticky and savory, the smell is better because when processing the Dumbleg, pandan leaves were added. The texture is still soft and not sodden. The color is cleaner because the palm sugar and the coconut milk is strained previously.

Table 5. Organoleptic Test

Parameter	scoring	
	Dumbleg before the development	Dumbleg after the development
Taste	Sweet, sticky and savory	Sweet, sticky and savory
Smell	Sweet	Sweet, good-smelled
Texture	soft	soft
Color	Light brown, a little bit dirty	Light brown, clean

Accomplishment test of this product is aimed for the consumers-to-be, consumers are asked to choose the display, the previous one or the recent one. More than 80% of the consumers agree with the new product after being refined. It is due to the quality of the product can increase after the refining process and it became more attractive after being perfected. According to [21] there are significant relations between the product quality and the product image in the point of view of the consumers. Dumbleg product which has been developed is said to be accepted successfully by the consumers because it fulfills their needs. According to [22], the indicator of this product’s success is if it is acceptable by the consumers due to its in accordance with their needs.

4. Conclusion

1. UKM dumbleg needs an improvement and development, especially on production process. The main problem appearing on the whole UKM dumbleg is that the product has a low quality and endurance.
2. Product development done on dumbleg nganjuk by using production process refining and product perfecting by concerning on the parameter of consumer’s expectation towards dumbleg product, which is the quality of the product and the aesthetics. Refining the priduction for improving the quality and endurance of the product by using HACCP

process and hygiene sanitation for dumbleg production process. Meanwhile refining the aesthetics is done by perfecting the physical appearance of dumbleg.

3. Refining the product’s aesthetics is done by refining the size, packaging, labeling and giving a trademark.

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