




Education on Packaging Techniques to Increase the Quality of Healthy Food Products made from Growol (*Fermented cassava*)

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Abstract: Growol is traditional fermented cassava from Yogyakarta. Previous studies found that growol has the potential to be developed as a healthy food product mainly for diabetics. Growol products were proven as a source of dietary fiber with a low glycemic index. Hilirisation of the research product was effective through micro and medium enterprises (UMKM). However, appropriate packaging techniques are needed to keep the quality assurance of these healthy products. Objective: This study aims to evaluate the effect of education on packaging techniques on the knowledge of entrepreneurs of micro and medium enterprises in Nomporejo, Galur Subdistrict, Kulonprogo District. It was a quasi-experimental study with one group pre and post-test design. Education on packaging techniques was used, and the discussion lecture continued with a demonstration of the vacuum packaging technique. The effectiveness of the lecture was evaluated with pre-test and post-test questionnaires. Scores were analyzed by using the Shapiro-Wilk test to describe the distribution of data and continued with the Wilcoxon test to describe differences between post-test and pre-test. Distribution data of post-test and pre-test scores were not normal with $p < 0.001$ and $p = 0.002$ respectively. Education on packaging techniques significantly increased the knowledge of participants ($p = 0.007$). Education on packaging techniques with a discussion lecture continued with a demonstration of these techniques were effective in increasing knowledge. We expect that this finding can be put into practice to increase the quality of healthy products made from growol. We also have expectancy it will support promoting the hilirisation of growol-based products mainly as alternative products for diabetic patients effectively.


1 INTRODUCTION

Growol is Indonesian traditional fermented cassava specifically from Kulonprogo district, Yogyakarta province. It was considered as a functional food due to its functional properties. Fermentation processes on cassava were proven to decrease sugar and sucrose levels, as well as increase carbohydrate, insoluble dietary fiber, soluble dietary fiber, and dietary fiber (SB *et al.*, 2023); (Puspaningtyas *et al.*, 2019). It also had potency as a source of prebiotics that indicate a positive prebiotic score in vitro

(Sari and Puspaningtyas, 2019). Therefore, it has the potential to be developed as a healthy snack for obesity. The development of growol to be a cookies product also reduces its glycemic index (Puspaningtyas *et al.*, 2020). Modification of growol cookies with inulin addition increased the potency of growol products to be an alternative snack for diabetic patients. Previous studies have proven that growol cookies modification with inulin had a low glycemic index and low glycemic load (Puspaningtyas, C. D. Nekada and Sari, 2022) as well as increase dietary fiber and didn't decrease the acceptability of sensory properties of growol

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cookies (Puspaningtyas, C. D. Y. Nekada and Sari, 2022). Other alternatives of growol products are growol chips, growol flour (Sari and Puspaningtyas, 2020), and another form of product with growol flour.

Increasing the potential of growol as a functional food can be increased through the downstream process. The marketing strategy of functional food can be done by Small and Medium Enterprises (UMKM). The role of UMKM or Small and Medium Enterprises (UKM) in the economic growth of a country is very important. UMKM has made a large and crucial contribution to the Indonesian economy. The role of UMKM and UKM in the Indonesian economy can be seen from (1) their position as main players in economic activities in various sectors, (2) the largest providers of employment opportunities, (3) important players in the development of local economic activities and community empowerment, (4) creators of new markets and sources of innovation, and (5) their contributions in maintaining the balance of payments through export activities. In facing competition UMKM needs an integrated strategy that can anticipate the impact of an event and be innovative to maintain and improve competitive capabilities (Ninsix *et al.*, 2018).

The quality of growol as functional food product is one of the factors that influences the success of developing growol. Important quality criteria or components for food commodities are safety, health, flavor, texture, color, shelf life, convenience, halal, and price. The safety of instant products cannot be separated from a long series of tests and analyses which include critical points, shelf life, packaging, and other factors (Ninsix *et al.*, 2018). An effort is needed to improve product packaging. One of those efforts can be done by providing education and training on vacuum packaging and packaging of growol product design with complete information on the packaging. Vacuum packaging aims to protect the product from various causes of damage so that the product lasts longer (Maherawati, Rahayuni and Hartanti, 2023). Apart from that, attractive packaging designs accompanied by complete information can be used as a promotional tool to increase the selling power of growol products (Pangan, Di and Tengah, 2023). According to several studies, education regarding packaging and labeling techniques for food products is very necessary for UMKM to support successfully promotion of Growol products as a functional food. This study aims to evaluate the effect of education on packaging techniques on the knowledge of entrepreneurs of micro and medium enterprises in Nomporejo, Galur Subdistrict, Kulonprogo District.

2 METHODS

It was a quasi-experimental study with one group pre and post-test design. Education on packaging techniques was carried out at entrepreneurs of micro and medium enterprises in Nomporejo, Galur Subdistrict, Kulonprogo District. There are 24 respondents that contributed to the discussion lecture continued with a demonstration of the vacuum packaging technique. The effectiveness of the lecture was evaluated with pre-test and post-test questionnaires. Scores of pre-test and post-test were analyzed by using the Shapiro-Wilk test to describe the distribution of data. Differences in scores between post-test and pre-test were analyzed with the Wilcoxon test. Analysis of the topic education aspect was describe by analysis of question items.

3 RESULTS AND DISCUSSION

This research begins with the design of pre-test and post-test questionare, consisting of five questions related to the accuracy of vacuum packaging techniques. Educational material is provided in a discussion lecture with powerpoint slides with the topics consisting of: 1) Definition of product packaging; 2) product packaging function; 3) Requirements for Food Product Packaging Materials; 4) Choose packaging according to the logo; 5) choose packaging according to product type; and 6) vacuum packaging technique. The activity continued with a demonstration of the vacuum packaging technique.

Table 1: Characteristic of respondent

Respondent age	n
13-19	2
20-39	4
40-60	13
>60	5
Total respondent	24

Respondents answered the pre-test before the discussion lecture session and after the demonstration of the vacuum packaging technique. Characteristics of respondent served in Table 1. Most of the respondents are women in the range 40 to 60 years old. Scores of pre-test and post-test were served in Table 2.

Table 2 : Score of pre-test and post-test

pre-test Median (min-max)	post-test Median (min-max)	<i>p-value (Wilcoxon test)</i>
6 (4-10)	8 (4-10)	<i>p= 0,007</i>

Table 3 : Analysis of question items

No	Question	Pre-test (correct answer)	Post-test (correct answer)
1	Colored plastic or black plastic is safe to use for packaging food	24	24
2	One type of plastic that is allowed for packaging food products is aluminum foil	21	24
3	The packaging technique with a sealer is superior to the vacuum packaging technique	12	16
4	The principle of packaging by creating a vacuum to prevent damage is called the sealer technique	8	15
5	Packaging techniques for wet products such as cakes/brownies using vacuum techniques do not need to be followed by freezing	8	16

The average post-test score was 7.92 higher than the pre-test average score of 6.08. However, based on Shapiro wilk test, distribution data of post-test and pre-test scores were not normal with $p < 0.001$ and $p = 0.002$ respectively. Therefore, analysis of differences between the post-test and pre-test continued with the Wilcoxon test and served as the Median (minimum-maximum) in Table 2. Results found that there were significant differences between post-test and pre-test ($p = 0.007$). The results of this research are in line with other research which shows that education carried out can improve farmers' knowledge and ability regarding tea packages and that improve the ability of farmers to make tea packages into vacuum (Puspaningtyas, Sari and Utari, 2019). Vacuum packaging followed by low-temperature storage has proven to be effective in improving the quality of food products (Herawati, 2013).

Based on an analysis of question item, known that education with discussion lecture following with demonstration of vacuum packaging technique increase the knowledge of question aspects number: 2) a type of plastic packaging that is safe for food; 3) advantages of vacuum packaging technique; 4) principle of vacuum packaging; and 5) the principle of product packaging with vacuum followed by freezing method. The effectiveness of education using the lecture method followed by demonstration was proven to be effective in increasing respondents' knowledge in line with other research that used the same method (Oktavia, 2023).

4 CONCLUSIONS

Education on packaging techniques with a discussion lecture continued with a demonstration of these techniques were effective in increasing knowledge. We expect that this finding can be put into practice to increase the quality of healthy products made from growol. We also have expectancy it will support promoting the hilirisation of growol-based products mainly as alternative products for diabetic patients effectively.

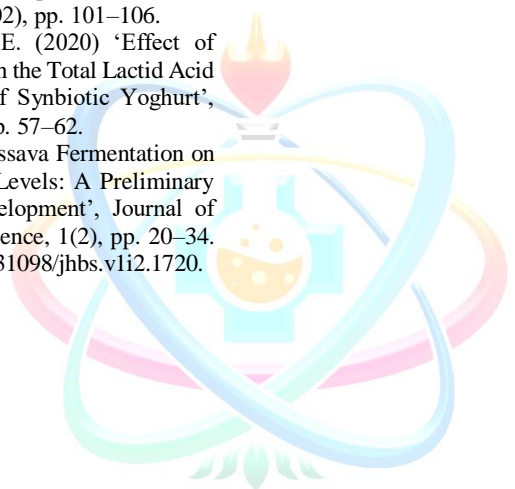
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