CHARACTERISTICS OF PURSE-COWPEA COMPOSITE FLOUR BISCUITS ON DIFFERENT TYPES OF PACKAGING DURING STORAGE

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Abstract

Purse (*Xanthosoma sagitifolium*) is one type of tubers that have the potential for an alternative as a food source. Innovation for product needs to be done to exploit the potential of the purse. One form of the products that can be an alternative is purse biscuit. It is expected that purse biscuit will have a higher economic value. To improve nutrition in high-carbohydrate purse then added cowpea flour to increase the protein content in biscuits. Based on this background, this study aims to determine the character of the purse-cowpea composite flour biscuits, as well as knowing the shelf life's biscuits in various types of packaging materials. Results showed treatment-selected purse-cowpea composite flour in the composition 50% purse flour and 50% cowpea flour. While the flour formula to made biscuit products are selected on composite flour of 60% purse-cowpea flour and 40% wheat flour. While that's flour formula have characteristics, namely: 2,790% Moisture content, 1,627% ash content, 50,080% carbohydrate content, 6,580% protein content, fat content 35,113%, and 210,030% raise power. Based various types of packaging (polypropilene plastic, polyethilene plastic, and aluminum foil) during product's storage, the selected treatment results obtained using the storage of aluminum foil with a total expected value 7,06 with assessment criteria are moisture content, ash content, carbohydrate content, protein content, fat content, and TPC.

Keywords: purse, cowpea, biscuits, composite flour

1. Introductions

Indonesian rice consumption rate of 130 kg/ person/year has made Indonesia as the highest consumers of rice in the world, far exceeding Japan (45 kg) and Thailand (90 kg). Indonesia's population of 212 million need rice for domestic and industrial use for more than 30 million tons per year. The demand for rice will continue to increase along with the increase of the population (Husodo and Muchtadi, 2004) [4].

In terms of potential resource areas, Indonesian natural resources has a diverse food supply. Food sources of carbohydrates are usually derived from cereals, tubers, and fruits (Widowati, 2003). As an alternative food source of carbohydrates instead of rice, those food raw can be served in a day-to-day menu, as long as the food enriched with high protein resources (Dhesaliman, 2003) [3].

As one type of tubers, *Kimpul* (purse) have a great opportunity to be developed as it has many benefits and can be cultivated easily. Purse can be developed as a potential non-rice-producing carbohydrates (Azwar, 2010) [1]. Purse (*Xanthosoma Sagitifolium*) is one type of taro known as Belitung's Taro. Such as tubers in general, starch from purse tubers is also serve the carbohydrates which would require other materials to provide additional nutrients such as protein. One attempt to do to increase the protein content of processed products from purse flour is with the addition of nuts to produce a composite flour. One type of nuts that have the potential to be developed in addition to green beans are cowpea (*tolo* beans). In terms of price, cowpea quite cheap compared to other types of beans, but it has a higher protein content than green beans.

In fact the utilization of purse is still limited to chips, and no further food processing done based on purse flour into consumption products. Purse's product development needs to be directed to create a new product that is both practical and easy to get. One type of product that meets the criteria is biscuits. However, the main raw material of biscuit from wheat flour generally derived from imported raw materials. Therefore, in an effort to increase the utilization of local potential well as providing food products that are practical and easy to find, so in this study will be aim to make biscuits with purse-cowpea composite flour.

The research objective are optimization of biscuits processing using purse-cowpea composite flour; to determine the shelf life of biscuits using purse-cowpea composite flour, and analysis of financial aspect of business feasibility on biscuits using purse-cowpea composite flour.

2. Methodology

2.1. Research Methodology

Shelf life test on the previous studies alternative selected with a composition of composite flour and wheat flour factor with 5 levels items, namely K1: 100% composite flour + 0% wheat flour, K2: 90% composite flour + 10% wheat flour, K3: 80% of composite flour + 20% wheat flour, K4: 70% composite flour + 30% wheat flour, and K5: 60% composite flour + 40% wheat flour. Based on the selection chosen alternativ K5 treatment (60% of composite flour + 40% wheat flour) to continue testing the shelf life of the various types of packaging materials. The product is stored in a storage area with room temperature conditions. The experimental design used was randomized block design (RBD) with one factor, namely the type of packaging (P): P1 = Polyethylene Plastic (PE), P2 = Polypropylene Plastic (PP), P3 = Aluminum foil (AF). Each treatment is done in three replications, in order to obtain 9 experiments. Observations were made every 5 weeks for three times the observations.

2.2. Parameter

Observations made include: moisture content, protein content, carbohydrate content, raise power, TPC, and organoleptic test (taste, color, flavor and crispness).

2.3 Data Analysis

Organoleptic test data analysis as an ordinal data is done using the Friedman test. While the data analysis of water content, protein content, carbohydrate content, and raise power, TPC done with the analysis of variance, if there are significant differences continue with Duncan test with a 95% confidence level.

3. Results and Discussion

3.1 Moisture Content

The observation of moisture content during storage, 1st observation (0 week) to 5th observation (12th week) can be seen at Figure 1. Based on the results of analysis of variance, the observation 0 week and 3th week there was no effect of treatment on the moisture content parameter. Product's moisture content from type of packaging treatment to significant effect at 6th week, 9th week, and 12th week. Duncan test was used as a continuation of the analysis of variance to find out more about the differences between treatments. Results of Duncan test with 5% confidence level indicates AF packaging has significant different compare with PP and PE packaging. The graph in Figure 1 shows that AF packaging can maintain the moisture content of the product compared with PP and PE packaging. This is due to differences in the ability of the permeability of each package is different and will affect the water vapor transmission rate. The lower the water vapor transmission rate of the packaging, the less the amount of water vapor that can penetrate the packaging. According Chuansin *et al.* (2006) [2], aluminum foils packaging have protective properties against water better than polyethylene.

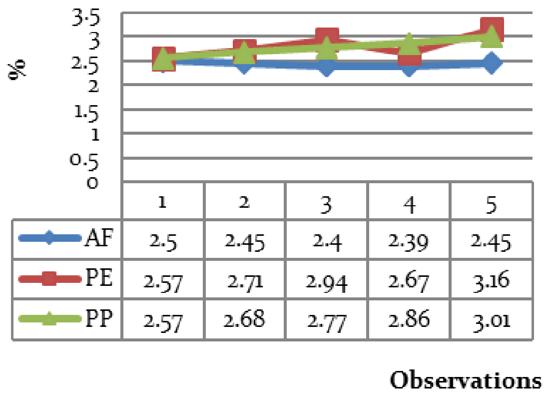


Figure 1. Graph of Moisture Content Average during Storage

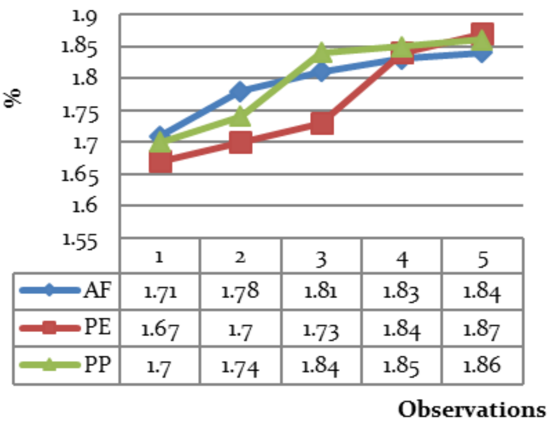


Figure 2. Graph of Ash Content Average during Storage

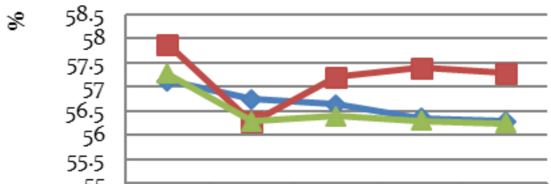
3.2. Ash

According Winarno (1997) [6] an ash content of foodstuffs showed residual inorganic material remaining after a substance is burned to carbon-free. The ash content can roughly describe the mineral content of a food. The observation of ash during storage, 1st observation (0 week) until the

5th observation (12th week) can be seen at Figure 2. Based on the results of analysis of variance, the observation 0 week, 3th week , 6th week, 9th week and 12th week, there was no effect of packaging types treatment on ash content parameter.

3.3. Carbohydrates

The observation of carbohydrates content during storage, 1st observation (0 week) until the 5th observation (12th week) can be seen at Figure 3. Based on the results of analysis of variance, the observation 0 week, 3th week , 6th week, 9th week and 12th week, there was no effect of the packaging types treatment on carbohydrate content parameter. It is suspected that the carbohydrate content during storage is more stable than the vitamins and proteins (Mudjajanto, 1991). Carbohydrate content of purse-cowpea composite flour biscuits obtained by different ways of cutting all nutrient levels (considered 100%) and protein content, moisture content, ash content, and fat content.



	1	2	3	4	5
AF	57.12	56.75	56.64	56.35	56.28
PE	57.88	56.27	57.2	57.39	57.28
PP	57.27	56.28	56.39	56.3	56.24

Observations

Figure 3. Graph of Carbohydrat Content Average during Storage

3.4. Protein

The observation of protein content during storage, 1st observation (0 week) until the 5th observation (12th week) can be seen at Figure 4. Based on the results of analysis of variance obtained at 0 week, 3th week, 6th week, and 12th week there was no effect of packaging types treatment on protein content. At 9th week of obtained F count = 6.099 > F table = 5.1433, which means there is the effect of packaging types treatment on protein content. Duncan test was then performed to determine differences between treatments. By Duncan test is known that protein content in AF packaging type has significant difference compare with PP and PE packaging types. Decrease in protein content during storage occurs due to the influence of microbial activity that causes protein degradation during storage. This is supported by the increase in TPC observations.

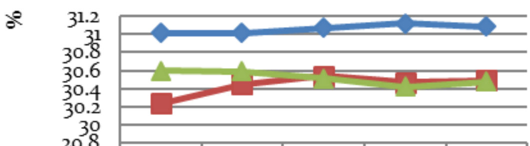
	1	2	3	4	5
Series1	7.66	7.28	7.58	6.14	6.09
Series2	7.68	7.62	7.58	6.96	6.18
Series3	7.86	7.67	7.57	6.87	6.06

Observations

Figure 4. Graph of Protein Content Average during Storage

3.5. Fat

The observation of fat during storage, 1st observation (0 week) to 5th observation (12th week) can be seen at Figure 5. Based on the results of analysis of variance, the observation 0 week, 3th week , 6th week, 9th week and 12th week, there was no effect of the packaging types treatment on fat content parameter.

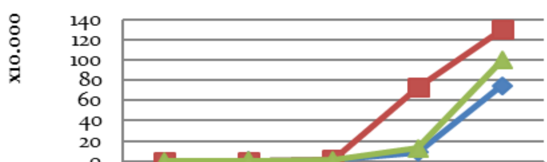


	1	2	3	4	5
AF	31.01	31.01	31.07	31.12	31.08
PE	30.24	30.45	30.54	30.47	30.49
PP	30.6	30.59	30.51	30.42	30.48

Observations

Figure 5. Graph of Fat Content Average during Storage

3.6. TPC



	1	2	3	4	5
AF	0.001	0.8	2	9	75
PE	0.003	0.25	1.5	73	130
PP	0.004	0.73	1.1	13	100

Observations

Figure 6. Graph of TPC Average during Storage

The observation of TPC during storage, 1st observation (0 week) until the 5th observation (12th week) can be seen at Figure 6. Based on the results of analysis of variance, the observation 0 week, 3th week, 6th week, 9th week, and 12th week, there was an effect of treatment on TPC parameter, so followed by Duncan test. Duncan test was used as a continuation of the analysis of variance to find out more about the differences between treatments. Results of Duncan test with 5% confidence level. Duncan test results showed differences between AF, PP, and PE packaging types treatments. Differences TPC showed differences in the microbial material. TPC difference may be caused by the packaging or on the processing and sterilization products. In this study, thought TPC differences to be caused by permeability differences of each packaging material.

4. Conclusion

After shelf life test of three types of packaging treatment, namely AF (Aluminum Foil), PP (Polipropilene), and PE (polyethylene), obtained by selected treatment of packaging type is AF with a total expected value of 7.06.

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