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Research Article

The Using of Kepayang Seed Powder (Pangium Edule Reinw) for Natural Preservatives of Cuko Pempek

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Abstract

The purpose of this study was to determine the effect of Kepayang seed powder concentration on the storability of Cuko Pempek. To carry out the study used a non-factorial randomized block design, the percentage of Kepayang fruit seed powder as a research factor was divided into 5 levels, namely B_0 (without Kepayang seed powder), B_1 (Kepayang seed powder concentration 1%), B_2 (Concentration 2%), B_3 (Concentration of 3%), B_4 (Concentration of 4%), and B_5 (Concentration of 5%). The treatment was repeated four times. Observation parameters consisted of chemical analysis including pH and total acid. Microbiological analysis using the Total Plate Count (TPC) test and organoleptic tests including aroma and taste. The results showed that the concentration of Kepayang bji powder did not significantly affect total acid and pH before 12 days of storage. The highest total acid at B_5 was 0.604% and the lowest at B_0 was 0.596%, while the highest pH at B_0 was 4.80 and the lowest at B_5 was 4.93. After storage for 12 days the treatment has a very significant effect on total acid, pH, and total microbes (TPC). The lowest total acid, highest pH and lowest total microbes are found in B_3 with an average of 0.805%, 4.63 and 0.90x102 cells / g. While the highest total acid, lowest pH, and highest total microbes are found in B_0 with an average of 1.427%, 3.10 and 2.60x102 cells / g. Cuko Pempek with B_3 treatment concentration of Kepayang 3% seed powder had the highest level of preference for the aroma and taste of Cuko Pempek after 12 days storage with an average value of 4.05 and 4.25 (Preferred criteria).

Keywords: ***Cuko Pempek, Kepayang seed powder.***

INTRODUCTION

Cuko Pempek is a sour, sweet, spicy and flavorful liquid produced from a mixture of sugar, tamarind, vinegar, chili, garlic, salt, and water with a certain composition. This pempek cuko is important as a friend to eat pempek, a Palembang cuisine (Muchsiri *et a*l., 2016).

Some of Cuko pempek producers, in their production, add dried shrimp or ebi and tongcai. Cuko pempek at room temperature only lasts for three days, on the 4th day of the oroma and the taste changes to become very dominant acid (Arabidi, 2012).

Cuko Pempek like other food products is perishable, especially since water is the main component, microbes easily pollute it. Rahayu *et al*., (2000) explained, food products that have been contaminated by micro-organisms will experience decomposition so that nutritional value and delicacy can be reduced, even pathogenic to those who consume them. Destructive bacteria that are found in traditional food products include *Pseudomas* sp, *Escherichia coli*, *Stapylococcus typhirium*,

Vibrio cholerae, *Stapylococcus aureu*s, *Lactobacillus monocytogene*s, *Clostridium perfringen*s, *Bacillus cereus* and from the type of *Aspergillus flavus spi*l and *Stapylococcus*.

Natural shelf life of Cuko pempek including short katogeri, becomes a problem when marketing requires the development of distribution and transportation between cities and provinces, especially between countries. The choice is to take preservative steps to extend the shelf life of Cempo Pempek by adding preservatives. Sultana *et a*l., (2014) stated the use of nitrate, benzoate, sulfate, sorbate and formaldehyde provides benefits as a preservative. Campelo *et al*.,(2019) noted that BHA (buthylhydroxyanisole) and BHT (buthylhydroxytouluene) successfully controlled fat oxidation in fat-containing food products, but the accumulation of residues was dangerous for food products and the environment. Meanwhile, Bondi *et a*l., (2017) introduced the term "green foods", which are food products in processing where the steps to reduce pathogenic micro-organisms or spoilers to increase shelf life of products using natural ingredients. The use of natural ingredients to increase the shelf life of food products is increasingly important because chemical preservatives are proven to damage health, including acetic acid proven to damage tooth enamel (Featherstone and Rodgers, 1981). Acetic acid damages teeth twice as strong as lactic acid (Hoppenbrouwers and Driessens, 1988). Acetic acid accumulatively can poison the body (Naufalin *et a*l., 2010).

Meanwhile Thielmann *et a*l., (2017) stressed the importance of getting natural preservatives derived from plants so that they can replace the role of chemical preservatives to maintain shelf life and ensure their safety for the food industry. Natural preservatives have been widely researched, including the use of Mayana leaf ethanol extract (Coleus atropurpureus [L] Benth) as an anti-bacterial (Mpila *et a*l., 2012); Extracts of various types of oranges (*Citrus* sp.) Prevent spoilage fungi (Mohanka and Priyanka, 2014); Essential oils from Rosemary (*Rosmarinus officinalis* L,) and Mint (*Thymus vulgaris* L.) plants for food preservatives (Tzima *et a*l., 2015); Kecombrang (*Nicolaia spesiosa* Horan) flour flour for preservative Cuko pempek (Muchsiri and Alhanannasir, 2018). Interesting research by Manuhutu (2011) to apply kluwek seeds for preserving Cakalang fish. This Kluwek is in Palembang and South Sumatra Province, commonly known as Kepayang. Therefore, researchers are interested in examining the application of Kepayang seed powder as a Palembang culinary preservative, namely is Cuko pempek.

RESEARCH METHODS

Preparation of Kepayang Seed Powder

Preparation of Kepayang seed powder with the following steps; 1). Kepayang Seed is broken hard skin; 2). Separation of flesh from the skin; 3). Reducing the size becomes relatively uniform by cutting; 4). Weighed 250g for each treatment, the study was carried out with a non-factorial randomized block design of 6 levels and was carried out four times (Montgomery, 1991); 5). Drying at 40^{o}C for 2 hours and 50^{o}C for 10 hours; 6). Blending to get Kepayang seed powder.

Making of Cuko Pempek

Making according of Cuko Pempek Muchsiri et al., 2016 as follows: 1). Chili and salt blended, fermented for one week (7 days) in a container; 2). Brown sugar, garlic and salt are mashed; 3). Then the water and sugar are heated to boiling, added to the acid, removed and filtered; 4). Then, the fermented chili is put into a mixture of filtered sugar and acid water, plus fine garlic; 5). The mixture is heated to 50oC and cooled, then pempek cuko is produced.

Observed parameters

Observation of research parameters was carried out by chemical analysis of total acid and pH; sensory analysis of aroma and taste. Then, microbiological analysis to calculate the total microbes by the *Total Plate Count* (TPC) method according to AOAC, (2005).

Data analysis

Data on pH and total acid and total microbes from microbiological analysis were performed data analysis using diversity analysis to test the effect of treatment on parameters if it was significantly affected by further testing using the BNJ test (Montgomery, 1991). Sensory test of aroma and taste to compare different test samples with standard samples (Pratama, 2013).

RESULTS AND DISCUSSION

Total Acid of Cuko Pempek Before Storage

The results of the analysis of diversity that the concentration of Kepayang seed powder as a natural preservative did not significantly affect the total Cuko pempek acid before storage for 12 days. The highest total acid was found in B5 (Kepayang seed powder concentration 5%) with an average value of 0.604% and the lowest was in B0 (without Kepayang seed powder) with an average value of 0.596%). This is due to the source of acid in Cuko Pempek coming from the sour source of components of Cuko Pempek and a little from Kepayang seed powder. In this case the acid content is only slowly being released because there has not been a further release reaction either fermentatively or chemically. The initial release of acids from Kepayang seed powder as explained by Samudry *et al*., (2017) was due to the fermentation process and size reduction until it became powder when preparing Kepayang seed powder.

Total Acid of Cuko Pempek After 12 Days Storage

The results of the diversity analysis showed that Kepayang's bji powder had a very significant effect on total Cuko pempek acid after 12 days of storage. The highest total acid in B_0 (without Kepayang seed powder) with an average value of 1.427% and the lowest in B3 (Kepayang seed powder concentration 3%) with an average value of 0.805% (Figure 1).

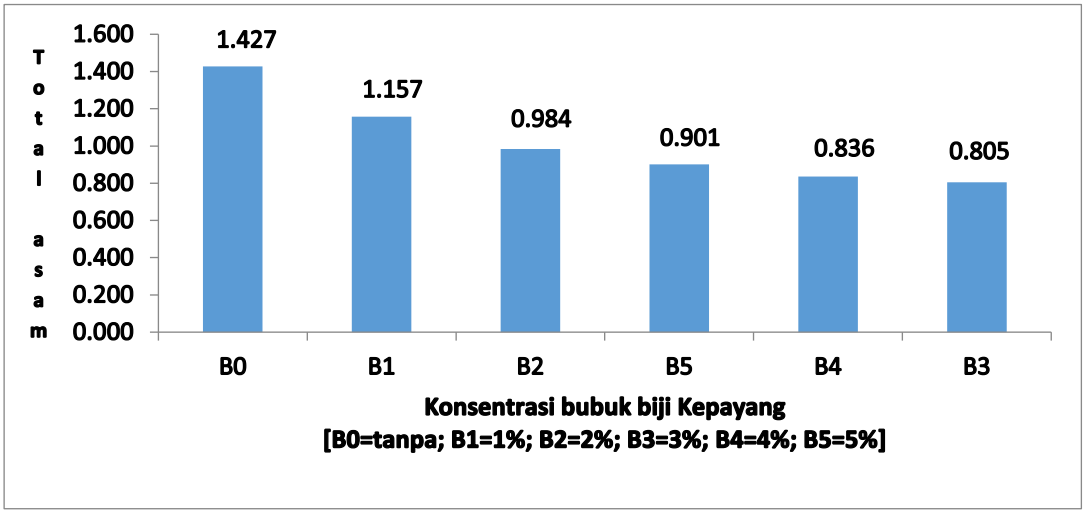

Figure 1. Relationship between the concentration of Kepayang seed powder and total Cuko pempek acid.

B_3 treatment (concentration of 3%) is the optimal limit for the use of Kepayang seed powder as a natural preservative that has the lowest total acid. Low total acid content indicates anti-microbial content is still very effective to inhibit the rate of lactic acid metabolism by microbes. This means that the breakdown of glucose into lactic acid is lower and this reduces the total acid accumulated in B_3, compared to other treatments. The components of anti-microbial compounds in Kepayang seeds are alkaloids, flavonoids, tannins and cyanides (Apriyanti, 2011). Furthermore Manuhutu (2011) states, the group of flavonoids that have anti-bacterial functions include cyanide acid, hydrocarpat acid, khulmorgat acid, gorlat acid, and tannins. Whereas Makagansa *et al*., (2015) described phenolic compounds and tannins as anti-bacterial compounds in Kepayang seeds.

pH of Cuko Pempek Before Storage

The results of the diversity analysis showed that the concentration of Kepayang seed powder had no significant effect on the pH of Cuko Pempek before storage for 12 days. The highest pH at B_0 (without Kepayang seed powder) an average value of 4.93 and the lowest at B_5 (Kepayang seed powder concentration 5%) an average value of 4.80. This is because the pH is determined by the acid component contained in the Kepayang seed powder concentration in this case the acid component, therefore the higher the concentration the more acidic or the pH scale decreases. As Sibuea (2015) explained, the content of Kepayang (kluwek) micro-compounds included vitamin C, iron ions, β-carotene, cyanide acid, hydrocarpat acid, khulmograt acid, gloric acid and tannins.

pH of Cuko Pempek After 12 days storage

Analysis of the diversity of Kepayang seed powder concentrations had a very significant effect on the pH of Cuko Pempek after 12 days of storage. The highest pH at B3 (Kepayang seed powder concentration 3%) average value of 4.63 and the lowest at B0 (without Kepayang seed powder) average value of 3.10 (Figure 2).

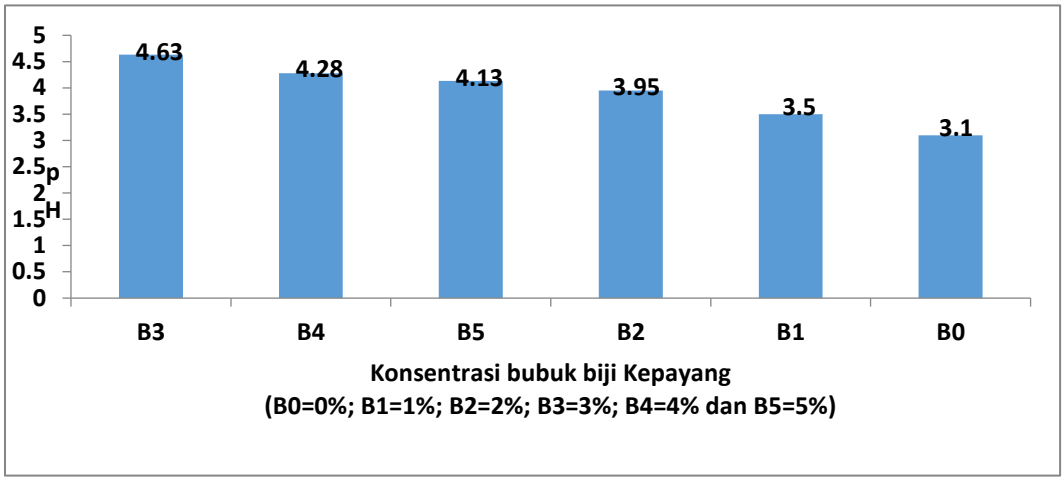

Figure 2. The relationship between the concentration of Kepayang seed powder and the pH of Cuko Pempek

12 days storage for B3 (Kepayang seed powder concentration 3%) is the optimal limit marked the highest pH. This means that glucose breakdown occurs less than others, making B_3 has the highest pH than the others. Decomposition of glucose which supplies H + ions can be done chemically or enzymatically by microbes such as bacteria that enter the Cuko Pempek due to the natural preservative Kepayang seed powder which hindered the process of decomposition of glucose. As explained by Bondi *et al.*, (2017) that a number of natural preservatives including extracts of thyme, cinnamon, rosmery have excellent anti-bacterial activity and are able to stabilize the oxidation process in food preservation.

Total Microbial of Cuko Pempek After 12 Days Storage

Analysis of the diversity of Kepayang seed powder concentration significantly affected the total microbial of Cuko pempek after storage for 12 days. The highest total microbes (TPC) at B_0 with an average value of 2.60x102 cells / g and the lowest at B_3 (Kepayang seed powder concentration) with an average value of 0.90x102 cells / g (Figure 3).

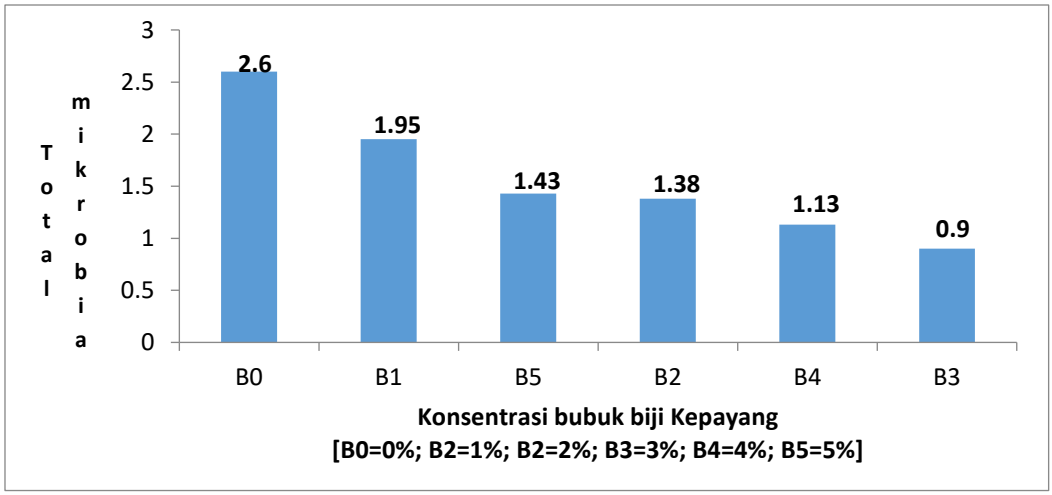

Figure 3. Relationship between Kepayang seed powder concentration and total microbes (cells / g)

B_0 (without Kepayang seed powder) has the highest total microbial content because there are no anti-microbial compounds that have an inhibiting role. B_3 (Kepayang seed powder concentration 3%) is the most optimal treatment, it is proven that when the concentration is increased to B4 (concentration 4%) and B_5 (concentration 5%) does not increase the inhibitory power even though the value is not significant. As stated by Koswara (2009) that the Kepayang seed flavonoid group which has anti-bacterial activity are cyanide acid, hydrocarpat acid, chamulmorgic acid, gorlat acid and tannin. Furthermore Robinson (1995) states that alkaloids interfere with the constituent components of peptidoglycan in bacterial cell walls, causing lysis and death. Meanwhile Supardi and Sukamto (1999) explained that the effectiveness of preservatives is determined by the concentration and type of preservatives.

The Smell of Cuko Pempek After 12 Days Storage

The results of Conover test concentration of Kepayang seed powder on the aroma of Cuko Pempek after storage for 12 days are shown in Figure 4. The highest value of panelists was in B3 (Kepayang seed powder concentration 3%) was 4.05 (Preferred criteria) and lowest in B_0 (without treatment of Kepayang seed powder) of 2.45 (Not preferred criteria).

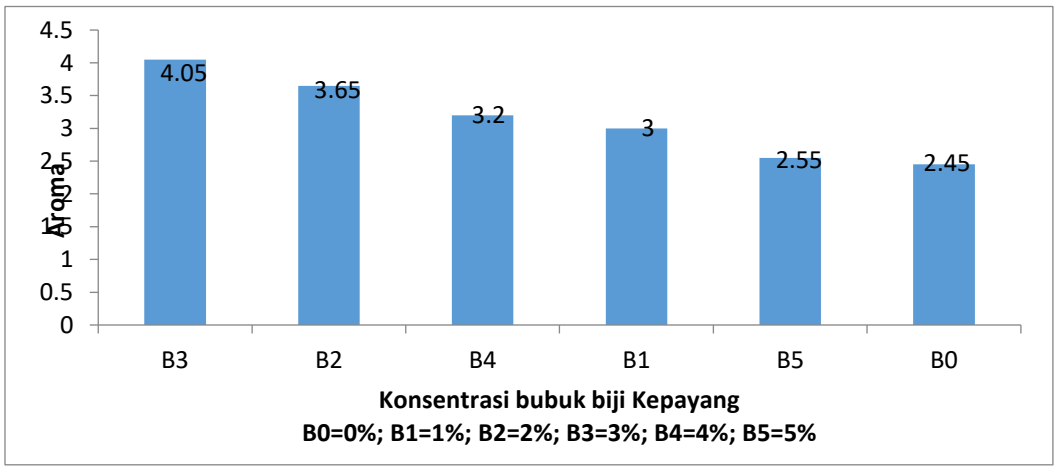

Figure 4. Relationship between the concentration of Kepayang seed powder with the aroma of Cuko pempek

The B_3 treatment produces the aroma of Cuko Pempek with the highest level of preference. This is related to the acid content of Cuko Pempek where B_3 provides the lowest total acid due to the decomposition rate of sugar which is inhibited by preservatives of Kepayang seed powder as a natural preservative. Low acid is more favored by panelists, as confirmed by Zuhra (2006) that the aroma is composed by a mixture of four main odors namely fragrant, sour, rancid and scorched.

Taste of Cuko Pempek after 12 Days Storage

The Conover Test of Kepayang seed powder concentration on the taste of Cuko Pempek after 12 days storage (Figure 5) showed that the highest taste preference value at B_3 (kepayang seed powder concentration 3%) with a value of 4.25 (Preferred criteria) and lowest at B0 (without powder Kepayang seeds) of 2.45 (Not preferred criteria).

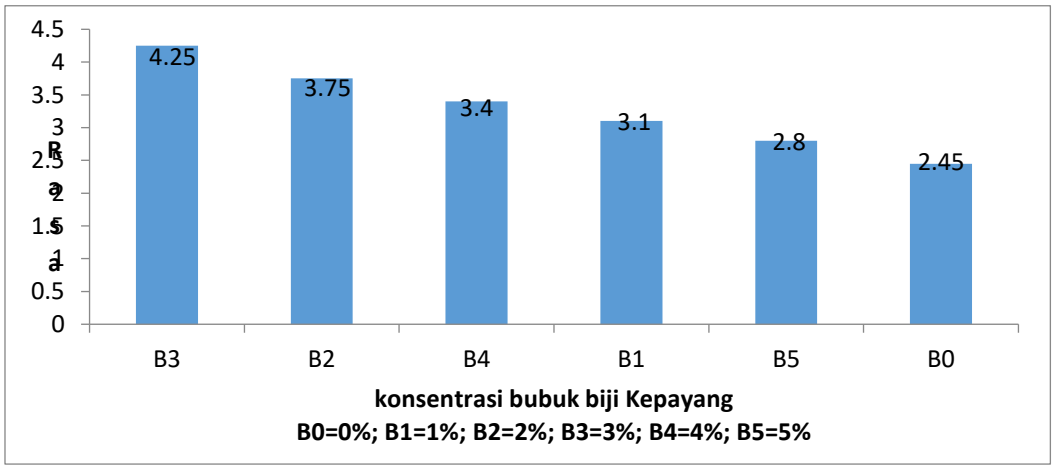

Figure 5. Relationship between the concentration of Kepayang seed powder on the taste of Cuko pempek

B3 is the optimal treatment for 12 days storage because the natural preservative content is able to inhibit the breakdown of sugars that occur both microbiologically and chemically so as to produce low total acid. Low total acid turned out to build the composition of Cuko Pempek which was favored by the panelists. As explained by Muchsiri et al., (2016), Cuko Pempek is a liquid, sweet and spicy solution with a distinctive and pungent flavor and aroma. However Deman (2007) states, panelists may experience differences in assessing the sense of meaning as panelist acceptance of the flavor or taste produced by a combination of food ingredients.

CONCLUSION

Based on the results of the study concluded that the concentration of Kepayang seed powder as a natural preservative did not significantly affect the total acid and pH of Cuko Pempek before storage for 12 days the highest total acid value and the lowest pH at B_3 (Kepayang seed powder concentration 3%) of 0.604% and 4.80 . While the lowest total acid and highest pH at B_0 (without Kepayang seed powder) were 0.596% and 4.93. The concentration of Kepayang seed powder had a very significant effect on the total acid, pH and total microbes of Cuko Pempek after 12 days of storage. The lowest total acid value, the highest pH and the lowest total microbial level were found in B_3 (Kepayang seed powder concentration 3%), respectively 0.805%, 4.63 and 0.90x102 cells / g. While the highest total acid, lowest pH and highest total microbes are found in B_0 with sequential values of 1.427%, 3.10 and 2.60x102 cells / g. Sensory treatment of B_3 (Kepayang seed powder concentration 3%) had the highest level of preference for the aroma and taste of Cuko Pempek after 12 days storage of 4.05 and 4.25 (Preferred criteria).

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