



EFFECT OF SALT CONCENTRATION WITH ADDITION OF LACTIC ACID BACTERIA TO PREFERENCE LEVELS OF NON-SALTY PEDAS

Miko Kun Maliki¹, Eddy Afrianto², Evi Liviawaty², Iis Rostini²

Student of the Faculty of Fisheries and Marine Science, Padjadjaran University, Indonesia. E-mail: mikomaliki@yahoo.com
Lecturer at the Faculty of Fisheries and Marine Science, Padjadjaran University, Indonesia

KeyWords

Lactic Acid Bacteria, Pedas, Salt

ABSTRACT

This research aims to find out the best salt concentration and soaking time in the best lactic acid bacteria to the level of preference for non-salty pedas. The research was conducted from April to October 2018 at the Fisheries Product Processing Laboratory of the Faculty of Fisheries and Marine Sciences and Test Services Laboratory of the Faculty of Agricultural Industrial Technology, Padjadjaran University. The method used in this research is the experimental method with four treatments of salt concentration, roomates here 15%, 20%, 25%, and 30%, and 3 treatments of soaking time in lactic acid bacteria for 1 hour, 12 hours, and 24 hours. The parameters observed include organoleptic, salt content, pH level, and total plate count. Based on the results, the highest salt content was found at the salt concentration of 20%, but the production of non-salted pedas was stopped at the 8th day fermentation process due to the decay.

Introduction

Peda is one of the products traditionally processed fish prepared by salting and then followed by the fermentation. Common types of fish that made impositions include Mackerel (*Rastrelliger* sp.) and Flying Fish (*Decapterus* sp.) (Paparang 2013). Common in general have the characteristics of colored meat is red, with specific texture, and has a salty taste, this is due to the making of peda with high salt concentration.

The salting process in making peda aims to get certain condition (controlled) so only halophilic microorganism that can live and produce enzyme proteolytic that will react to product so produce food product with certain characteristics. Salt concentration that used in determine the quality of peda fermentation produce. Salt is bacteriostatic material for several bacteria including pathogenic bacteria and decay (Desniar *et al* 2009).

The low concentration of salt that use in produce peda will made the microbe of decay still growth, so it needs to be prevented by adding lactat acid bacteria (LAB) as a microbe antagonist to inhibit growth of decomposing bacteria in fermented fish (Nafianti 2016). Addition of lactat acid bacteria in form isolates pure peda fermentation can improve the quality of peda, like nutrition, color of the peda, aroma, texture, and also taste (Adawyah 2006).

Addition of lactic acid bacteria, aims to create taste the acidity from fish fermentation product, and give effect of preservation (Afrianto and Liviawaty 1989). One of the source lactic acid bacteria from cabbage fermentation (Nafianti 2016). Cabbage fermentation could produce lactic acid bacteria like *Lactobacillus plantarum* (Yusmianti *et al* 2013). *Lactobacillus plantarum* could inhibit the growth process of decomposing bacteria.

One of the causes lack of interest society consume salted fish is too much total concentration salt given to the fish so that fish tasted very salty (Yusra 2017). Based on that problem, to produce non-salty peda need to reduce salt concentration but it will make the process become decay, so need to addition of lactic acid bacteria.

Methods of Research

Place and Time Research

The research is conducted in from April until October 2018. The process of making peda and made Lactic Acid Bacteria (LAB) from cabbage located in Technology Processing of Fisheries Product Laboratory, Fisheries and Marine Sciences Faculty, Padjadjaran University. Testing salt content in the peda located in Test Services Laboratory, Technology Industry Agriculture Faculty, Padjadjaran University.

Tools and Materials

The tools used in this research is knife, digital scales, cutting board, assessment sheet hedonic test, petri disk, incubator, graduated cylinders, rope, paper, beaker glass. The materials used in this research is Indian Mackarel, cabbage, salt, aquadest, NaCl physiologic, MRS Agar.

Methods

The method used in this research is experimental method that is making the non-salty peda with four different treatments salt concentration (15%, 20%, 25%, and 30%) based on weight of fish, and with three different treatment of soaking in lactic acid bacteria (1 hours, 12 hours, and 24 hours). Observation of this research is organoleptic (skin color, meat color, aroma, and texture) of peda, salt content peda, pH test. The analysis of this research using descriptive comparative.

Results and Discussion

Organoleptic

Appearance is one of the parameters in determining acceptance product by customers. Difference treatments of salt concentration in this research does not affect the apperence of peda that is clean, intact, and bright skin, it is because before dry salting, the fish was washed thoroughly with running water so there is not dirt attached on the surface of the fish skin. Next sighting is meat color of peda, fourth treatment in this research has a brownish red meat color, it happens because of the higher concentration of salt added in making the peda will increase the protein and fat content on peda so that the oxidation process the fats contained in fish body is getting higher and will be more easily formed red color in peda (Ira 2008). Peda appearance after salt treatments can be seen in Figure 1.

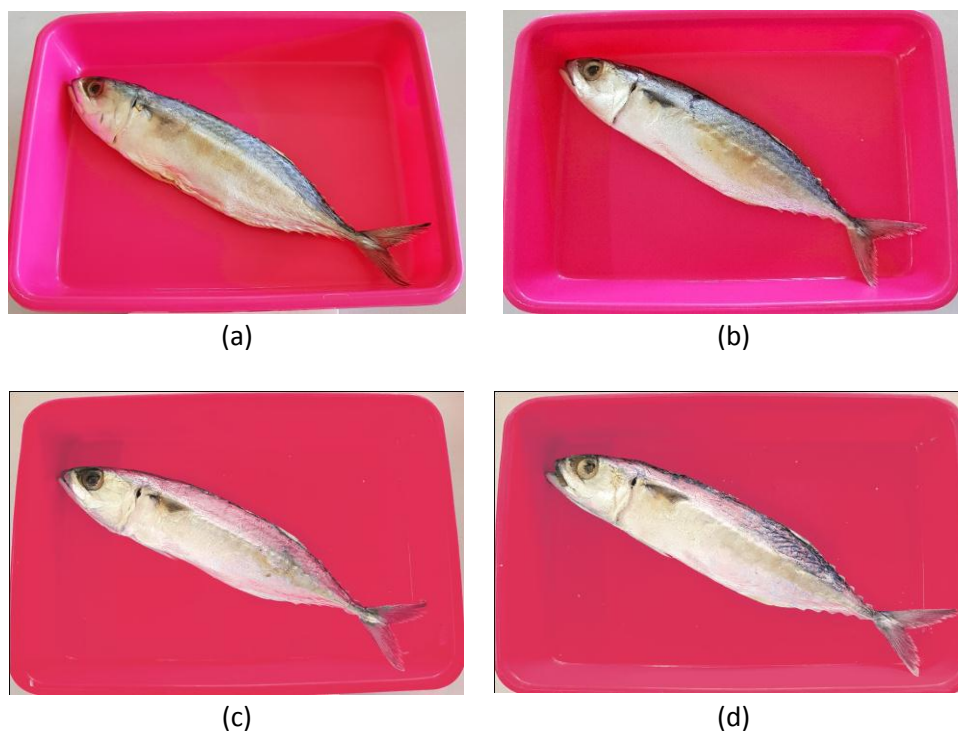


Figure 1. Appearance of Indian Mackerel After Salting (a) Treatment of 15%, (b) Treatment of 20%, (c) Treatment of 25%, and (d) Treatment of 30%

Aroma is an overall state that is felt visually through the sense of smell (Thariq dkk 2014). The aroma produced in the treatment of 15% and 20% salt concentration showed the distinctive aroma of fermented and slightly rancid, while the difference with 25% and 30% salt concentration was the typical aroma of fermentation and rancidity. The distinctive aroma is caused by degradation of protein and fat during the fermentation process (Adawyah 2006). The rancid aroma of peda produced by this research occurs because the mackerel used are mackerel that have been weeded, Irianto (2012) said peda fermentation product which is processed using fish entrails that have been weeded out will result in a more rancid aroma due to the disposal of the fish entrails provide more surface area for oxidation processes that produce rancid smell.

The texture produced in the salt concentration treatment is 15% and 20%, which is less dry, while the salt concentration of 25% and 30% has the texture of the meat masir. The meat texture is influenced by the water content and water activity in fish meat and the protein and fat content of fish meat (Rahayu dkk 1992). Masir texture is a sandy texture that is typical of salted fish caused by a reaction between lipoproteins contained in fish meat and salt that enters the meat (Fellows 2000).

Organoleptic observation is then performed on day 8, but peda have experienced decay marked by the appearance of maggots and so can not be observed further organoleptic. Peda appearance can be seen in Figure 2.



Figure 2. Appearance Fish Peda Day 8

According to Swastawati et al (2014) research on water content tests with salt concentrations of 20%, 30%, and 40% having a moisture content of 57.09, 56.85, and 53.83. The higher the salt concentration will reduce the value of the water content where the function of salt in fermentation aims to reduce the water content in the material so as to increase protein content (Bahalwan 2011). Maggots are an indicator of the resulting declining quality. Flies are thought to have the opportunity to lay their eggs at the time after observing the 1st day, because the condition of the container opens so that it allows flies to perch on the surface of the body. The optimum activity of flies to perch occurs at a temperature of 20-25° C (Sayono et al 2005) and added Indrianti et al. (1991) that poor humidity in storage and air circulation will increase the possibility of physical damage to salted fish due to insects such as flies and beetle.

Salt Content

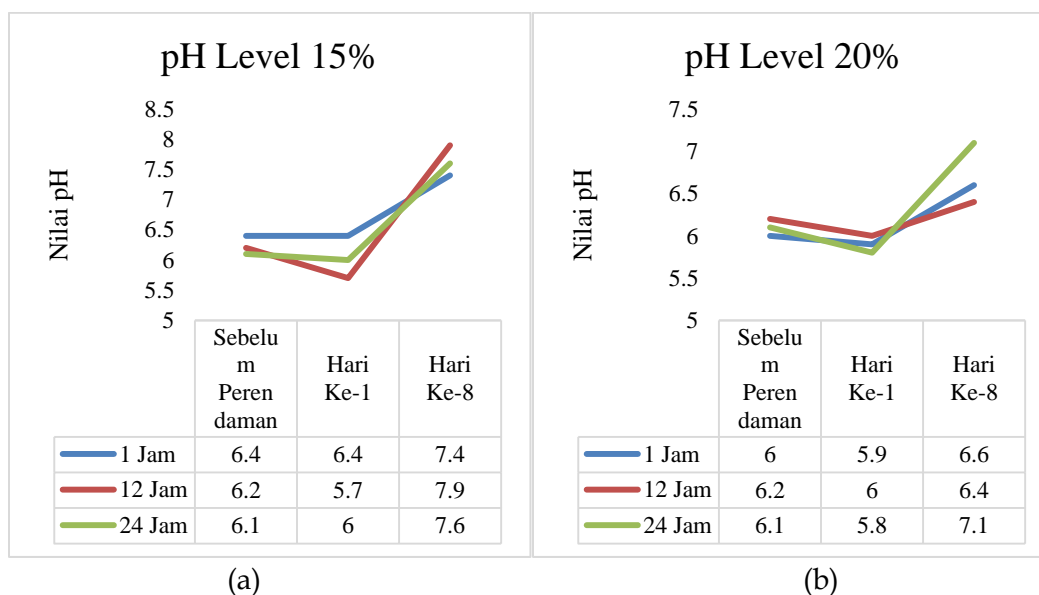
Testing of salt content in fish meat was carried out on the 7th day after the salting process. The results of testing the salinity of fish meat are presented in Table 1.

Table 1. Salt Content Results

No.	Perlakuan Penggaraman	Hasil Analisis
1	15%	0,66%
2	20%	0,69%
3	25%	0,68%
4	30%	0,66%

The percentage of salt content in each treatment was not significantly different, ranging from 0.66% -0.69%, and the treatment with the highest salinity at 20% salt treatment was 0.69%. Salt content that does not reach 1% indicates that the sample is not able to select halophilic bacteria optimally. The use of salt concentration and salting time is very influential on the salt content that permeates the reduced meat. Salting process will result in a change in texture and taste of the food (Paparang 2013) but salt content do not significantly affect the pH value, according to research (Nur 2009) on the processing of fermentation mandai (*Artocapus integer*). Very low salt content is caused by the meat has experienced salt burn. salt burn is the surface hardening of fish meat due to the absorption of salt that is too fast and because of the use of salt with crystal size that is sufficiently smooth so as to accelerate the entry of salt into fish meat and inhibit the release of liquid from the meat, while the outer surface has undergone hardening (Budiman 2004).

Level Acidity (pH)



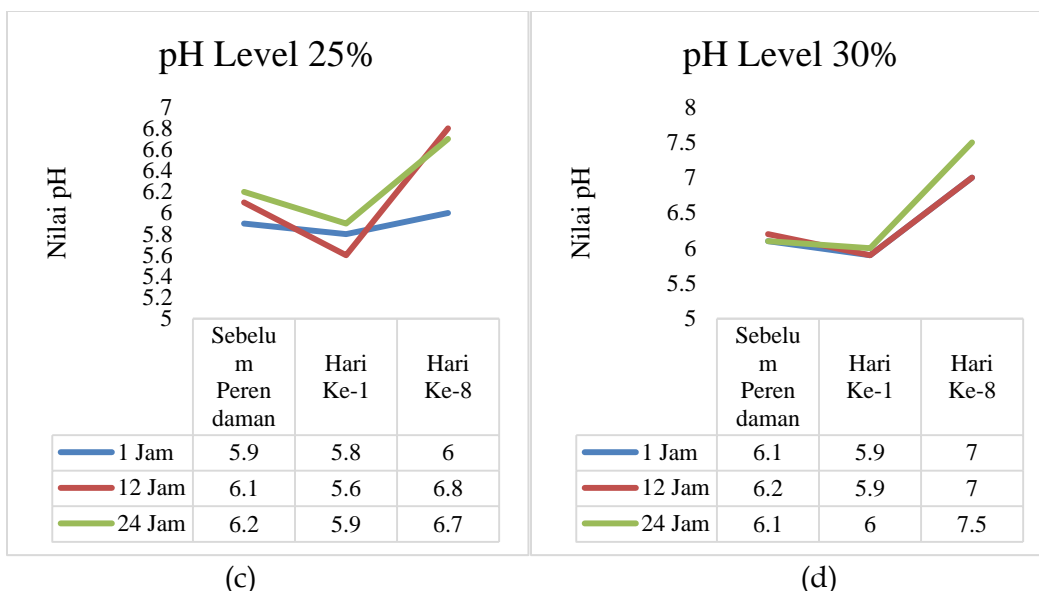


Figure 3. pH Level with Salting Concentration (a) 15% treatment, (b) 20% treatment, (c) 25% treatment, and 30% treatment

Each treatment on the measurement of pH value on day 1 shows a decrease, this indicates that the fermentation process in peda fish is begins. According to Lunggani (2007), changes in pH are a function of the availability of nutrients and metabolites produced during growth contained in the media (fish meat). According to Kilinc et al. (2006), a decrease in pH is due to the increasing number of lactic acid bacteria (BAL), because the decrease in pH is thought to be the presence of a large amount of lactic acid produced by lactic acid bacteria in its metabolism so that the pH of the media becomes acidic. The pH value is one of the factors that determine microbial growth. The measurement of further pH of the meat was carried out on the 8th day where all treatments experienced an increase in pH value. This shows that there is a growth activity of decomposing bacteria by the action of a number of enzymes in fish tissue that produce ammonia (Destrosier 1987 in Pianusa 2016). The increase in pH value is thought to occur due to an increase in the activity of decomposing bacteria in non-protein nitrogen compounds which produce volatile bases (Wibowo et al 2014).

Total Plate Count

The result of the calculation of total lactic acid bacteria contained in cabbage fermentation solution in this study found the number of colonies of lactic acid bacteria for 1.1×10^8 CFU / ml. Total BAL greatly affect the pH value of the meat peda. On the observation of day 1, it can be seen that the pH of the peda fish in each treatment decreased indicating that lactic acid bacteria had begun to ferment in the reduced meat. The amount of BAL was not able to ferment perfectly, because fish meat has undergone salt burn so that the ability of lactic acid bacteria to ferment becomes reduced, it can be seen from the observation of the 8th day that the pH value experienced a very significant increase nearing the base state and beginning to experience a decay process.

Conclusion

Based on the results of the research, the treatment of salting with concentration 20% with soaking time 12 hours is the best difference if seen from characteristics organoleptic in the form of appearance skin bright gray with the color of meat is red-brown, the aroma is specific fermentation and the texture is rather leave. The salt grade in this treatment is 0.69%.

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