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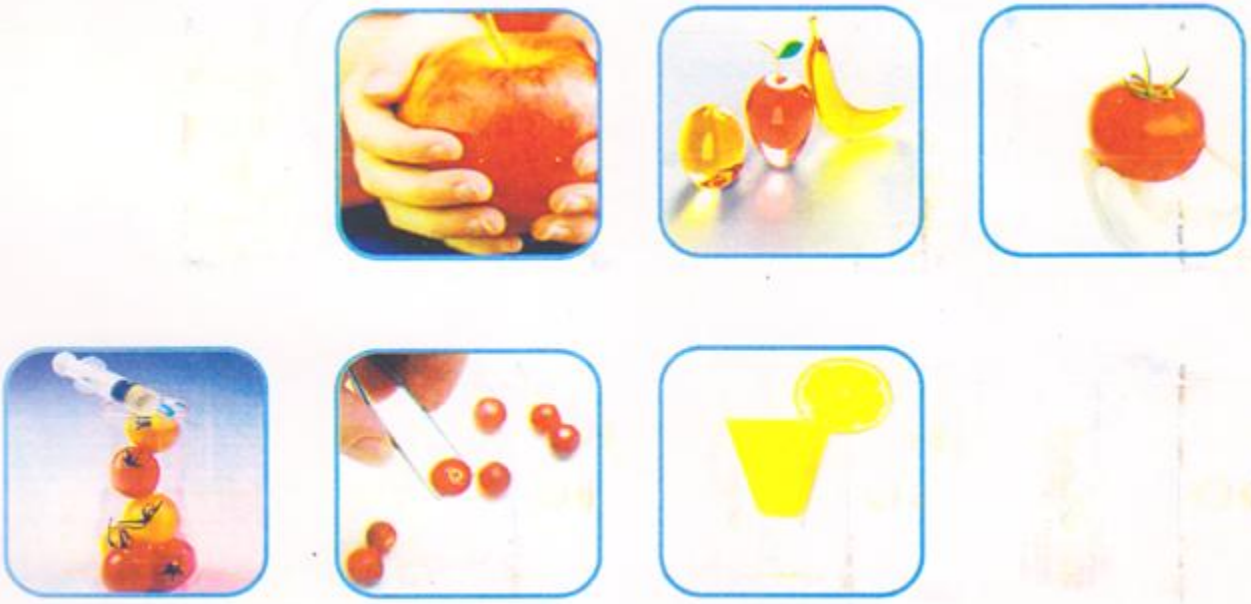

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AJFST as the premier international publication of articles that publish cutting-edge high quality original papers concerning fundamental research in the fields of food Science, Food chemistry and Toxicology, biochemistry, food Microbiology and safety, Food Engineering and Physical Properties technology Sensory and Nutritive Quality of food from the beginning of the food supply source to the dinner table of the consumers.
These subject areas include food safety and quality, raw material composition of food, food laws and regulations, ingredients and ingredient functionality, nutraceuticals, product formulation, sensory science and strategies, quality assurance, statistical process control and its contribution to food processing operations, food chemistry and toxicology, food engineering, Food microbiology, food authenticity and food traceability, nutritive qualities of food, Food storage, food distribution and marketing that associated to practical experiments designed to improve technical processes and impact our understanding of health.
The work described should be innovative either in the approach or in the methods used. The significance of the results either for the science community or for the food industry must also be specified.

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Research Article

The Use of Water Seal Fermentor in Fish Fermentation of Bekasam

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Abstract: Fermentation of fresh water fish using water seal fermentor was studied. In the experiment, 3 concentration of salt were applied, namely, 2, 4 and 6%, respectively. The sample of products was observed every week until week 4. The result showed that the lowest final pH was at salt concentration of 4%. At the end of fermentation at concentration of 4%, *Lactobacillus plantarum* had been predominantly to grow. However, less salt concentration tended to be less selective of Lactic Acid Bacteria. Probably other than lactic acid bacteria also had been grown, inhibiting the growth of *Lactobacillus plantarum*. At the concentration of 6% there was predominantly growth of *Leuconostos mesentroides* and less *Lactobacillus plantarum* had been grown. At low pH such as at salt concentration of 4%, the pH value was 4.12 will be much more preserved comparing to other two salt concentrations. The use of water seal fermentor would keep the temperature about 18°C. The temperature which lower than ambient temperature along with certain salt concentration would be the best way to select LAB microorganisms.

Keywords: Bekasam, fermented fish, lactic acid bacteria, *Lactobacillus plantarum*, *Leuconostos mesentroides*

INTRODUCTION

In the province of South Sumatera, Indonesia much of the seasonally available fish is preserved by fermentation and fermented foods are consumed daily. Eating large quantity of rice is a cheap source of vegetable protein, amino acids and energy. Therefore, a vital individual foodstuff is either a salty side dish or a condiment that facilitates rice consumption. Fermented products are well suited for this, since they are simple to produce and cook, have a long shelf life (Caplice and Fitzgerald, 1999). It is no coincidence that the the region where fermented fish products are consumed overlap with the region of rice cultivation (Essuman, 1992).

South Sumatera province has various indigenous traditional fermented food products such as tempoyak, rusip, pedah and bekasam. Bekasam is a fermented fish product using fresh water fishes as main material. Cooked rice functions as substrate for the microorganisms, whereas salt is used as selective agent. The anaerobic fermentation takes place, traditionally, at least for one week in ambient temperature (Kimizuka *et al*., 1992). The resulting bekasam has the following superior characteristics, including excellent nutritive values, typical and pleasant sensory properties and safe to consume (Rahayu, 2010).

In the fact, bekasam is consumed by limited people in a few districs in South Sumatera province. Its surface is still smeared by rice rest, gives unhygienic impression. Consequently, the total acceptance of bekasam by consumer decreases. Traditional, local trader put bekasam fishes in open containers. This explains why contamination by molds occurred in high frequencies and shortened shelf life of bekasam.

Several investigations concerning microbiological aspects of bekasam have been carried out. A number of 28 Lactic Acid Bacteria (LAB) isolates were collected, purified and screened as well as partially, phenotipically identified. They were characterized by cell morphologies (cocci or rod), Gram positive and catalase-negative. A differential analysis suggested 5 genera of predominant LAB namely *Lactobacillus*, *Streptococcus*, *Pediococcus*, *Enterococcus* and *Tetragenococcus* (Wijaya *et al*., 2008).

The term Bekasam is used here to describe the product of fresh water that are processed with salt to cause fermentation and thereby to prevent putrefaction. Although the same phenomenon occurs with salted fish product. In the fermentation of Bekasam, fresh water fish is used and addition of some salt usually about 10%, the addition also of boiled rice, the put in the big dish made from dried mud earth. In this research, the fermentation of fish using water seal fermentor, instead.

MATERIALS AND METHODS

Fresh water fish is used as mainly material. Salt is added in the percentage of 2, 4 and 6%, respectively (w/w basis) and also cooked rice is added as much as 2%. The water-sealed fermentor set up is shown in Fig. 1.

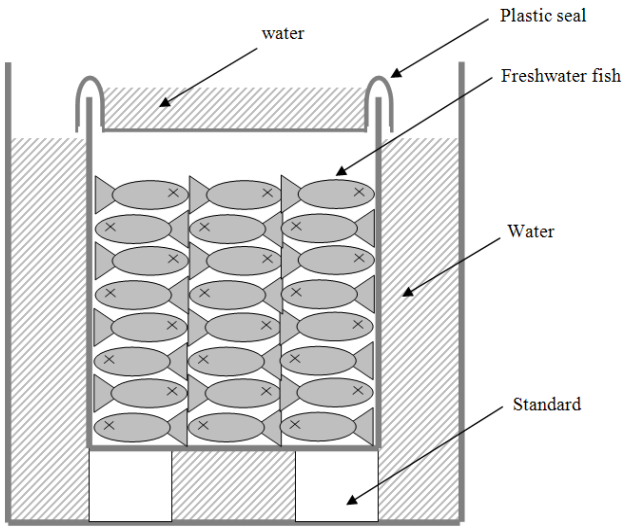

Fig. 1: Bekasam fermentor with water seal set up

Table 1: pH observations during 4 week fermentation using different salt concentrations

Salt concentration (%)	Observation			
	Week 1	Week 2	Week 3	Week 4
2	6.82	6.01	5.91	5.62
4	6.15	5.43	4.12	4.12
6	6.05	5.65	5.34	5.03

Sample of fish fermentation products were taken every once a week until 4 weeks. The parameter observed was pH oh the samples.

RESULTS AND DISCUSSION

The result of this study is shown in Table 1. The data showed that all three salt concentration the pH decreases as the fermentation continued until week 4. Salt concentration of 2% had pH of 6.82 (week 1), 6.01 (week 2), 5, 91 (week 3) and 5.62 (week 4). At salt concentration of 4% had pH of 6.15 (week 1), 5.43 (week 2), 4.12 (week 3) and 5.62 (week 4). And at salt concentration of 6% had pH of 6.05 (week 1), 5.65 (week 2), 5.34 (week 3) and 5.03 (week 4). The lowest final pH was at salt concentration of 4%. At the end of fermentation at concentration of 4%, *Lactobacillus plantarum* had been predominantly to grow. However, less salt concentration tended to be less selective of Lactic acid bacteria. Probably other than lactic acid bacteria also had been grown, inhibiting the growth of *Lactobacillus plantarum*. At the concentration of 6% there was predominantly growth of *Leuconostos mesentroides* and less *Lactobacillus plantarum* had been grown. Ay low pH such as at salt concentration of 4%, the pH value was 4.12 will be much more preserved comparing to other two salt concentrations. The use of water seal fermentor would keep the temperature about 18°C. The temperature which lower than ambient temperature along with certain salt concentration would be the best way to select LAB microorganisms.

CONCLUSION

The use of water seal fermentor along with the addition of salt concentration of 4% had been the best way to preserve fish fermentation of Bekasam at least for 4 weeks with the final pH of 4.12.

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