APPLICATION OF GMP AND SSOP IN BALINESE TRADITIONAL FOOD SAFETY 'PEDETAN' SARDINE FISH (*Sardinella Sardine* Bleeker)

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Abstract

Sardine Processing Industry 'Pedetan' is one of the traditional Balinese Processing Industry conducted by the people of Jembrana Regency in Bali. The community cultivates Sardine fish with low sanitation and hygiene and unsafe food security levels. Technology processing and management are still very simple. This study aims to analyze the quality and safety of Sardine associated with the application of GMP and SSOP in an effort to produce quality and safe traditional food consumed. Research is done by analyzing GMP and SSOP which have been done by the manufacturer and make the model of application of GMP and SSOP in processing process. Test Model of GMP and SSOP implementation that has been implemented to produce the product of Sardine fish that according to SNI 8273-2016 standard on Quality Requirement and Safety of dried salted fish, including moisture content, salt content, acid soluble ash content, microbial contamination including Total Plate Count, *Escherichia coli,* and sensory.

Keywords: *Escherichia coli*, GMP, SSOP

BACKGROUND

Traditional fish processing has better prospects and development opportunities. Traditional fish processing is very complex and is based largely on inherited hereditary conceptions. One of the traditional processed fish products is 'Pedetan' sardine fish. 'Pedetan' is a food product of a kind of dried spicy traditional Balinese fish processed by the community in Jembrana District of Bali Province. 'Pedetan' is made from sardine fish that is widely produced in the coastal area of Jembrana Regency (Singapurwa et al., 2014). In the process of traditional fish processing, the type, quality of raw materials and auxiliary materials vary widely, uncontrollable environmental conditions, as well as endpoints of uncertain processes. Traditional fishery product technology is characterized by an ill-defined, traditional product processed with low levels of sanitation and hygiene, using raw materials with low levels of quality or freshness, unsafe food security, technology used for generations, and the company is managed By families with inadequate levels of management skills.

Different 'pedetan' processing processes in each village make distinctive features for 'pedetan' producing villages. It also affects the quality and safety of different foods. Therefore,

the resulting product is not uniform quantitatively or qualitatively (Singapurwa et al., 2014), with varying durability so it is difficult to standardize. Therefore it is necessary to develop traditional processing with some improvement efforts with the application of basic feasibility in food processing. Aspects of quality management and safety of raw materials and products need to be assessed for business development, and product marketing development (Suharna et al., 2006).

The existence of various problems of sardine fish processing process, it is necessary to conduct research for the development of the basic feasibility model of GMP (Good Manufacturing Practice) and SSOP (Sanitation Standard Operating Procedures) in order to produce 'drag' of quality sardine fish and safe to eat (Rodmanee and Huang, 2013) An effective system should be determined based on commitment and efficiency on all aspects of processing to distribution. Implementation of GMP and SSOP to ensure product safety, increase consumer confidence in the product, and provide good product quality (Rauthan et al., 2015).

METHODS

The research was conducted in Jembrana District by taking samples in 3 coastal villages that used to make pedetan that sell them to traditional markets. Identified GMP, SSOP, microbiological and organoleptic analyzes, and determine the model of GMP and SSOP implementation for sardine fish cake processing. And tested the implementation of GMP, SSOP, and HACCP with microbiological and organoleptic testing, in order to improve food safety

Improvement and application of basic feasibility (GMP and SSOP) and hazard analysis and critical point control (HACCP) based on quality standard in Indonesian National Standard Decree of Minister of Maritime Affairs and Fisheries RI No 52 A / KepMen-KP / 2013 on Requirements of Quality Assurance and Security of Results Fisheries in Process Production, Processing and Distribution. The results of the analysis on organoleptic and microbiology will be based on the quality and safety of dry fish food based on SNI 8273-2016.

RESULTS

The implementation of GMP and SSOP

The implementation of GMP (Good Manufacturing Practice) and SSOP (Sanitation Standard Operating Procedures) covered all of steps of Sardine '*pedetans*' processing procedure.

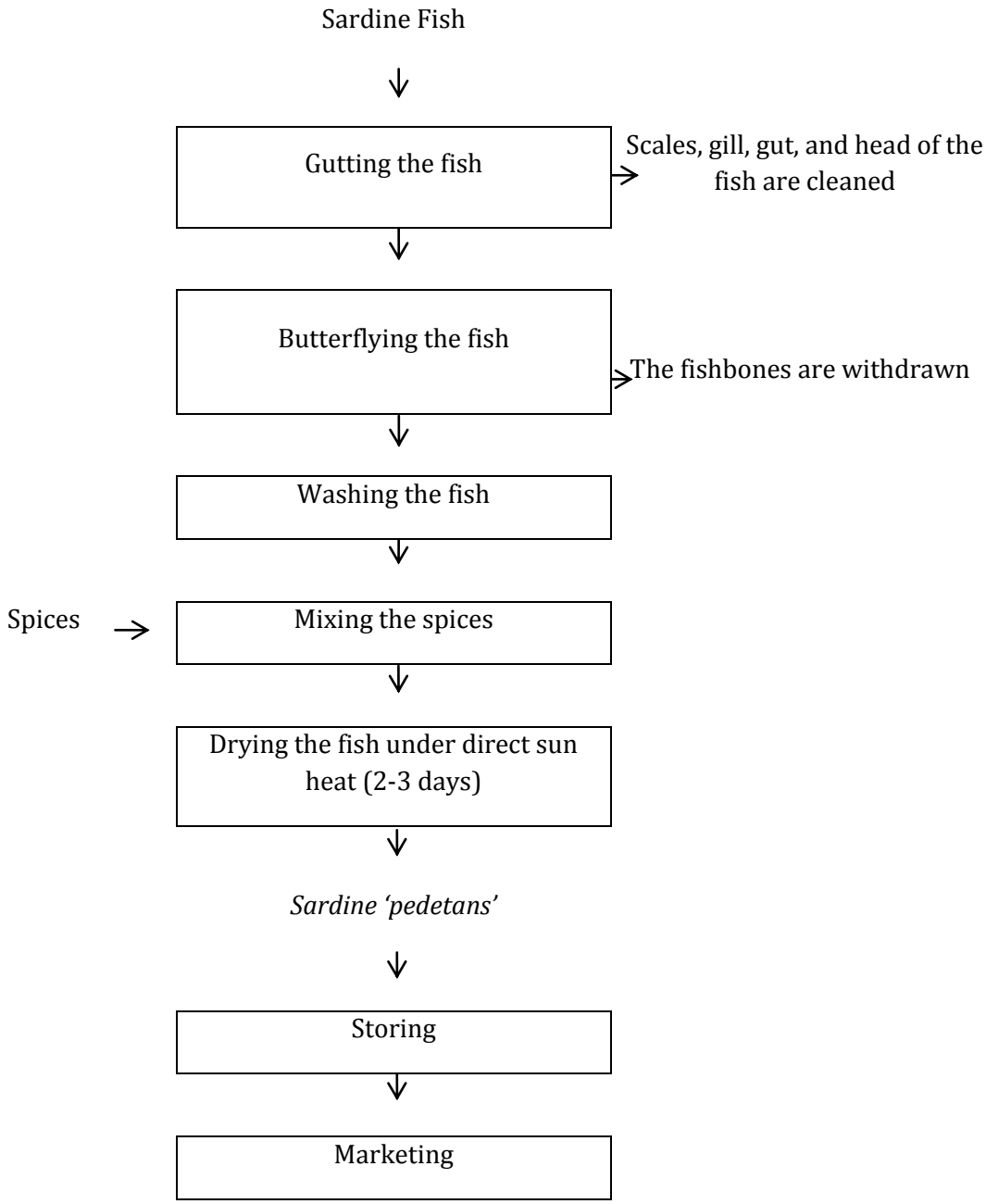

Fig.1. Processing Process of Sardine *Pedetan*

Singapurwa et al. (2017a) reported that people in Jembrana district treated sardine fish into pedetan starting from the receipt of raw materials, then the fish was cleaned and split into the shape of the butterfly then washed. Furthermore the fish is mixed with traditional Balinese spices and dried in the sun for 2-3 days (Figure 1). Storage of sardine fish product is done with plastic wrap and container box in closed condition. Packaging aims to prolong the shelf life and avoid the occurrence of contamination by microbes (Malhotra, 2015). Singapurwa et al. (2017b) reported that packing pedetan with vacuum plastic packaging,

plastic polypropylene plastic and mica plastic can extend the life of shelf pedetan for the sixth month with objective and subjective assessment results still meet the requirements of SNI 2721 1: 2009. Singapurwa et al. (2017c) reported The results showed that the SNI 2721: 1: 2009, for the value of the Total Plate Count with an average of 1.56 107 CFU / ml exceeds the limit required, which is 1.0 105 (CFU / ml). While the value of the microbial contamination for E. coli, Salmonella, V. cholerae, and Staphylococcus aureus as required with the SNI requirements are negatives. The result research (Singapurwa et al., 2014) was water contents 15.398%, protein contents 55.5704%, fat contents 1.2361%, ash contents 8.5731%, and total microbial count 11.76 103, also based on organoleptic valuations, the product was preferred by Panelists.

Table 1. Product Description Sardine Fish Pedetan

Specification	**Information**
Product name	Pedetan Sardine Fish
Product Composition	Sardine Fish, Spices
Methods of Preservation	Drying and spice use
Product Characteristics	The product is dry and fried
Age save	2-3 months
Storage Conditions	Room temperature, dry room
Use of Product	Frying process before consuming
Distribution	Transportation by Car Box

In Table 2 it can be seen that the application of SSOP and GMP in the manufacture of fish pedetan products still use traditional and conventional production system (Pupitas et al., 2016). The existence of deviations in the application of SSOP and GMP this poses a potential danger in terms of biological, physical and chemical (Yuniarti et al., 2015). Potential hazards can occur in the production stages, among others, at the stage of cutting the head and disposal of the contents of the stomach, the division of fish into a butterfly, the manufacture and provision of spices, drying, packaging, and storage process sardine fish. In the research study of the application of GMP and SSOP on the processing of Nila Tilapia fish (Oreochromis niloticus) by Yusra (2016) it was found that the producers have not applied the basic eligibility procedures of GMP and SSOP. While the small industry of fishery and marine product processing Wida Mantolo able to apply aspects of GMP independently with the value of 52.9 or enough category (Wardanu et al., 2016).

Tabel 2. Deviation of Implementation of SSOP and GMP on Sardine Fish Pedro Processing

Aspects of SSOP and GMP	**Deviation of Implementation of SSOP and GMP On Sardine Fish Pedetan Processing**
Water and ice for processing	Need selection of alternative sources of water used
Building	The processing place in the open space without doors and ventilation so that contamination is easy
Space, tools, and work equipment	The processing place is still traditional and the floor is sober. The processing room is still open so it is easy to contact the source of contamination.
Sanitation facilities	The toilet facilities are adjacent to the processing room
Cross-contamination of not	The product may cross contamination from raw materials, spices, work equipment, equipment, flooring, and others
Cleanliness of workers	There are no uniforms for workers and workers still use accessories
Health control workers	No supervision of workers' health
Hand / Foot Laundry Facility	No special hand-washing and foot were provided near the processing room.

Table 3 shows that although there are some deviations in the application of SSOP and GMP, but the results of the sardine pedetan test still meet the requirements of SNI 8273-2016 concerning the Quality Requirements and Safety of Salted Fish, as in the research conducted by Marrifah et al. (2015) on the Conformity Implementation of Quality Management Preserved Milk to the Indonesian National Standard. In Susianawati et al. (2007) the application of GMP and SSOP in the processing of dried fish with sensory, TPC and E.coli have fulfilled the requirements of SNI.

The results of this study are also in line with the application of GMP pindang fish results Thaheer et al. (2016) obtained the factors that are considered not meet the requirements of hygiene, the use of work attributes, layout and the arrangement of buildings and pest control, the arrangement of water use, and security of finished products. However, Suttreni et al (2016) said that the Fish Processing Unit at the port of Benoa has well implemented GMP and SSOP and HACCP.

Tabel 3. The results of Sardine Pedetan Fish Test were compared with SNI 8273-2016 regarding Quality Requirement and Safety of Salted Fish

	Type of Test	Unit	Terms (Salted fish)				Pedetan Sardine Fish
a	Sensori		Minimal 7*				8
b	Chemistry						
	-Water content	%	Maximal 40				15.25
	- Salt content	%	12.0 - 20				1.4
	- Ash content insoluble in acid	%	Maximal 0.3				0.1
b	Microbial contamination		n	c	m	M	
	- TPC (3 sampling classes)	Kolony/g	5	2	10^5	10^6	5.50×10^4
	-Escherichia coli (3 sampling classes)	MPN/g	5	1	<3	3.6	0

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References

Badan Standarisasi Nasional. (2016). Standar Nasional Indonesia. SNI 8273:2016 mengenai Ikan Asin Kering

Masrifah, E., B. P. Noorachmat, A. Sukmawati. (2015). Kesesuaian Penerapan Manajemen Mutu Ikan Pindang Bandeng (*Chaos chaos*) Terhadap Standar Nasional Indonesia. MAnajemen IKM 10(2): 163-172

Malhotra, B., A. Keshwani and H. Kharkwal (2015). Antimicrobial Food Packaging: Potential and Pitfalls. *Frontiers in Microbiology.* 6: 1-9.

Pudjiastuti, S. (2016). Rencana Pengelolaan Perikanan Ikan Sardine di Wilayah Pengelolaan Perikanan Negara Republik Indonesia. Keputusan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 68/kepmen-kp/2016.

Pupitas, D., V. Santoso, M. Rahardjo, J.D. Tjahyono, M.T. Sirenden, M.M.Seilatuw. (2016). Prosiding Seminar Nasional Pengabdian kepada Masyarakat. Pp 363-372.

Rauthan, A.S., H. Saxena, B.S. Rawat, M. Kuma, and H.S. Chauhan. 2015. A Systematic Review on Health and Hygiene in India. Asian Journal of Multidiscliplinary Studies, Vol 3, No 2, pp 29-35.

Rodmanee, S and W. C. Huang. 2013. Hygiene and Manufacturing Practices, Interagency Collaboration, and a Proposal for Improvement: A Case Study of Community Food Enterprise in Thailand. International Journal of Social Science and Humanity, Vol. 3, No. 3, pp. 222-229.

Singapurwa, N.M.A.S., N. M. Darmadi, A.A.M. Semariyani. (2014). Characteristics of Traditional Food *Pedetan* in Jembrana Regency. *International Journal of Advanced Science Engineering Information Technology*. 4(2):68-74.

Singapurwa, N.M.A.S., Semariyani, A.A.M., Candra, I.P. (2017a). Identification of the Implementation of GMP and SSOP on the Processing of the Balinese Traditional Food Sardine Pedetan. *International Research Journal of Engineering, IT and Scientific Research* 3 (3): 17 – 26.

Singapurwa, N.M.A.S., Semariyani, A.A.M., Candra, I.P. (2017b). Characteristics of Balinese Traditional Food Pedetan with Plastic Packaging in Storage. *J. Biol. Chem. Research* 34 (1): 256 – 266.

Singapurwa, N.M.A.S., Semariyani, A.A.M., Candra, I.P. (2017c). Microbial Contamination in Tradistional Food Processing Pedetan. Prosiding The International Conference on Bioscience "Advancing Biodiversity for Sustainable Food Security. 135-140.

Suharna, C., L. Sya'rani, T.W. Agustini. 2006. Kajian system Manajemen Mutu Pada Pengolahan Ikan Jambal Roti di Pengandaran kabupaten Ciamis. Jurnal Pasir Laut. Vol. 2 No.1. tahun 2006. Hal 13-25

Susianawati, R., L. Sya'rani, T.W. Agustini. (2007). Kajian Penerapan GMP dan SSOP pada Produk Ikan Asin Kering Dalam Upaya Peningkatan Keamanan Pangan di Kabupaten Kendal. Jurnal Pasir Laut. 2(2):40-53

Sutreni, N. M.S. Mahendra, I W. R. Aryanta. (2016). Penerapan Hazard analysis Critical Control Point (HACCP) Pada Proses PEngolahan Produk Ikan Tuna Beku di Unit Pengolahan Ikan Pelabuhan Benoa Bali. JUrnal Ecotropic. 10(1):41-45

Thaheer, H., S. Hasibuan, F.S. Mumpuni. (2016). Model Resiko Keamanan Pangan Poduk Pindang Pada UMKM Pengolahan Ikan Rakyat. JUrnal PASTI. IX(3):275-285.

Wardani, A.P., M. Anhar. (2016). Penerapan Good Manufacturing Practice (GMP) Pada Kelompok Usaha Bersama (KUB) Wida Mantolo Kecamatan Benua Kayong. JUrnal Teknologi Pangan. 7(1):8-16.

Yuniarti, R., W. Azlia, R.A.Sari. (2015). Penerapan Sistem Hazard Anazysis Critical Control Point (HACCP) pada Proses Pembuatan Keripik Tempe. JUrnal Ilmiah Teknik Industri. 14(1):86-95.