International Journal of Oceans and Oceanography
ISSN 0973-2667 Volume 13, Number 1 (2019), pp. 73-80

http://www.ripublication.com

Healthy Environmental Management Strategyin the Industrial Processing of Patin Fish

SYAHRUL[*], DEWITA, B ISYANDI dan SUWONDO

Department of Aquatic Product Technology, Faculty Fisheries and Marine Science, University of Riau, Riau Province, Indonesia.

ABSTRACT

In Kampar District there are numerous catfish processing industries which produce salt, and fillet fish as derivative products. The processing activities can be ascertained to produce large solid waste ranging from 20% to 67% in the form of meat, bone, fat, and viscera. Fish processing industry owners need to understand that the waste of these animals can have a negative impact on the environment if not properly managed. Similarly, it can be of great benefit to the economy if correctly processed. This study aims to obtain a healthy environmental management strategy through the application of clean production methods in handling solid waste produced by the catfish processing industry. The research method used is the survey and experiment approach. It is observed that the existing conditions used in handling the solid waste is concentrated on internal and external factors which influences the preparation of healthy environmental management strategies. An experiment is carried out to determine the economic values of the psolid waste through the application of clean manufacturing techniques. The results show that the products manufactured from the solid waste are surimi, fish oil, bone meal and innards have quality that meets SNI standards. Furthermore, the results of the SWOT analyses recommend a strategy based on the SWOT matrix with a 3.3 score. This technique utilizes clean production methods to produce economic value products.

Keyword: Healthy environmental management, processing strategies solid waste, and clean production,

[*] Corresponding author : syahrul_roel59@yahoo.com

INTRODUCTION

One of the freshwater fish commodities that have been widely cultivated in Indonesia, especially in the province of Riau is Catfish (Pangasius hypopthalmus). According to IKKP, "National catfish production in 2016 amounted to 604,587 tons. ([1]KKP 2017) and Riau province amounted to 89 thousand tons ([2]BPS Riau, 2017), out of which around 70% came from Kampar district.", In connection with this, the Indonesian Ministry of Maritime Affairs and Fisheries has established several regions in Sumatra as a cluster for the development of catfish culture, including the provinces of Riau and Jambi. Kampar District in Riau was chosen, which means that there are many catfish processing industries (29 units) with a total production of 3,284.68 tons per year ([2]BPS Riau, 2017),. The solid waste obtained, generally comes from the traditional fish processing technique (fumigation, salting, scanning and fermentation) and modern processing (fish fillets and derivative products) such as nuggets, sausages and burgers, and others.).

This activity generally leaves waste in the form of tetelan meat, bones, stomach fat and innards. Solid waste can be defined as a secondary or additional product produced as in the course of manufacture, in addition to the principal product. If the waste produced is not properly managed, it can negatively affect the surrounding environment, owing to the presence of organic matter, a nutrient source for decomposing microbial growth. Catfish processing industries in Kampar district (especially Koto Mesjid village) are still associated with poor management of the by-product generated and the poor knowledge of the entrepreneurs on good and healthy environmental management.

In the era of industrialization, the demands for proper waste management cannot be overemphasized; this is because with an increase in volume of waste products produced, there is an increase in adverse environmental effect on the community. Therefore the utilization of solid waste can have a positive impact on enhancing the economy of the community, considering the fact it can be used as a source of food and industrial raw materials. Based on the inconsistencies associated with cat fish processing, it is necessary to conduct a study on the right ways to handle these solid waste in order to reduce the cost, and damages to the environment, thereby, generating tremendous profit for the businesses. This study aims to identify solid waste produced by the catfish processing industry and determine the impact of the application of clean production methods as well as develop a healthy environmental management strategy in an effort to achieve an environmental friendly and sustainableof the industry.

MATERIALS AND METHODS

The main raw material used in this study is the by-product of catfish (*Pangasius hypopthalmus*) cultivated in Koto Mesjid Village, Kampar Regency, Riau. This study uses survey and experimental methods, with several stages in accordance with the objectives of the study, namely: Input stages which include observing the existing

condition of the generation of by-product produced by catfish processing. Some of these include: the type and amount of solid waste produced in the processing stage during the clean production methods, and the output stage. Data processing and analysis methods used are strategic management concept approaches and it was carried out qualitatively and presented in descriptive forms.

RESULTS AND DISCUSSION

The results obtained showed that the solid waste from catfish processing (fillets and fumigation) were 35% fish bones (head, bone-tail and fins), 7% abdominal fat (stomach), 6 % meat trimming (meat remaining filet meat slings) and stomach contents or innards of about 11%, with a total waste of 59%, which means that it is not much different from the results of the study carried out byZuta et al. (2003), which amounted to a percentage above 50%. The solid waste has not been widely used, especially as a food supplement and feed.

Solid waste from processing catfish

Olid waste produced from processing catfish (fillets and fumigation) are tetelan meat, bones, stomach fat and contents (innards). Each of these raw materials is explained as follows.

Fish fillets

This is the flesh of a fish that has been cut away from the bone and used in preparing fish-based food products such as meatballs, nuggets, burgers, and much more. During the filleting process, about 35 - 41% fillet of the total weight of whole fish is obtained, though this amount dependent on the technique adopted. This means that about 59-65% of the solid waste produced consists of head, coccyx and fins (35%), tetelan meat (6%), stomach contents (11%) and fat (7%). and it has not been widely used, especially for food and feed raw materials.

Smoked fish processing

Similar to fish fillet, this also leaves by-products in the form of innards (jeron) and abdominal fat of around 18%. Both wastes are simultaneously released, resulting to a mixture of stomach contents and fat. Therefore, there is adequate need to first have them separated in such a way that each waste is properly utilized. According to research, the ratio of these wastes is 2:8, which means that in every 2 parts of the abdominal fat, 8 stomach contents are found.

Clean production methods

Meat is any flesh attached to the bone resulting from broiling and which can be used as fish meal. During processing, most of the water and fat are lost, resulting in dry

products with high protein content. The results illustrates that the proximate composition of catfish flour produced contains 57.68% protein, 9.84% fat, 21% ash, 3.92% fiber and 7.56% water. Furthermore, it also contains all essential amino acid with high lysine.

Abdomen fat

Abdominal fat waste is about 7% of the total waste. According to [6]Astarini et al (2010), the fat content in catfish (9.84%) consists of 36.21% meat, 26.51% abdominal fat, 13.10% coccyx, 11.20% head, 7.90% skin, and 6.63% lean meat. The body part contains oil and it is extracted by boiling, cooking or frying the fish. The oil obtained is lustrated using a purifier connected to a vacuum filter. This purification process comprises of the heating process, addition of adsorbents (bentonite) and vacuum filtration. The chemical analysis of the pure oil produces an acid number of 0.37 mg KOH / gr fat, 8.23 meq/kg peroxide,, 5.78 g/100 g iodine, saponification number of 186.4 mg KOH/g fat and free fatty acid of 0.65% w/w. This was an indication that the fish oil produced is still good and not totally oxidized.

Pyloric caeca (innards)

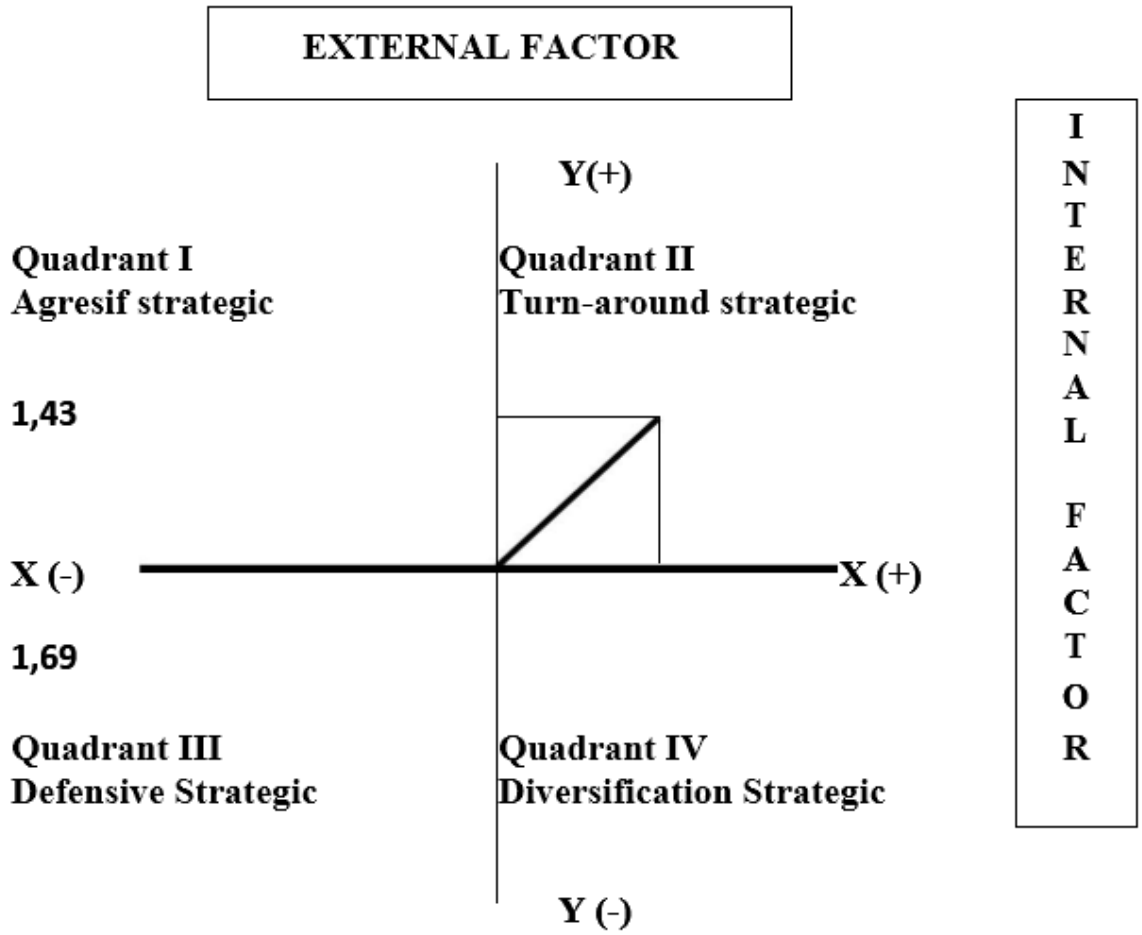
The contents inherent the pyloric caeca are obtained from processing and smoking the fish fillets. This siege process includes washing, boiling, pressing, drying and sanding. The results of the proximate composition analysis of innards were 60.21% protein, 29.48% fat, 2.84% ash, 2.14% fiber and 6.39% water.

Fishbone

Similar to stomach contents, fish bones are also obtained from processing its fillets, with the flourobtained from processing its waste. This siege process includes washing, boiling, pressing, drying and sacking ([7]Wini Trilaksani. 2006). The results of the proximate analysis of innards flour were 12.08% protein, 1.86% fat, 67.80% ash, 35.33% calcium and 5.13% water

SWOT Analysis

This research is carried out to encourage healthy environmental management strategies in catfish processing industry in Kampar District. After calculating the weights of each internal and external factor, they are analyzed. This formula is used to determine the area of the fish waste processing business strategy. The results obtained from the arrangement of the internal and external factors as outlined above, produces a series of scores as follows : Strenghts/S (3.63), Weaknesses/W (-1.94), Opportunities/O (3,48), and Threats/T (-2.05). The position of the coordinates can be seen in the following Cartesian coordinates.



From the results of the internal-external matrix, the total weighting score extracted from the internal factors is 1.69 which is the difference between the strength and weakness where the value of the former is bigger. For external factors, it is worth 1.43 which is the difference between opportunities and threats.

Based on the SWOT analysis there are four types of strategies that can be recommended for the management and processing of fish solid waste these are:

1. S-O Strategy (Strengths-Opportunities)

This consists of achievement strategies, used to pursue opportunities suitable for the internal strengths. The steps that can be taken for the management and processing using the following strategies:

a. Cooperate with fish processing business owners.

b. Make business investment using adequate and capable processing technology as well as resources.

c. Expand the marketing network of production to acquire more income.

2. W-O (Weaknesses-Opportunities) Strategy

This is described as the growth strategies, used to overcome weaknesses in order to pursue opportunities. The steps that can be taken to develop businesses:

a. Conduct legal counseling activities that focus on raising business awareness factors towards the environment followed by action related to learning agencies.

b. Promoting to attract interest and cooperation from investors.

c. Prepare technology and knowledge of human resources that support success.

3. S-T Strategy (Strengths-Threats)

This is a defensive strategy used in identifying ways of conducting business by reducing vulnerability to external threats. The steps that can be taken:

a. Strengthen cooperation with fish processing business owners, relevant government, regulator, and increase investor confidence by maximizing existing potential.

b. Maintaining business by maximizing the technology and resources that are owned so as not to be converted.

c. Minimizing all forms of unimportant expenditure and optimizing the added value of fish.

4. W-T Strategy (Weaknesses-Threats)

This is a diversification strategy, used to cover business weaknesses vulnerable to external threats. The steps that can be taken:

a. Improve the ability of the business actors in terms of the readiness of processing technology, human resources, and equipment to produce innovative products from processing its by-products has competitiveness and prime quality.

b. Increase awareness, concern of the community/business actors with regards to the magnitude of the benefits or benefits of processing solid fish waste.

CONCLUSION

From the results, the following are concluded:

1. The solid waste of catfish identified is an organic waste consisting of pyloric caeca innards**)**, abdomen fat, fish bones and meat (tetelan).

2. The application of clean production methods to the management and processing of

catfish is very effective and efficient. The results of the application produces raw materials in the form of pyloric caeca (innards) flour, fish bone meal, and oil, whose quality meets that of the SNI standards of food and feed raw materials.

3. Based on the recommended SWOT analysis:
   a. S-O (Strengths-Opportunities) strategies, comprises of achievement strategies, and opportunities that are suitable for the strengths that exist internally.
   b. W-O (Weaknesses-Opportunities) strategies, consists of growth strategies, and ability to overcome weaknesses to pursue opportunities
   c. The S-T (Strengths-Threats) strategy, which is a defensive strategy, identifies ways
   d. of carrying out business with the power to reduce vulnerability to external threats.
   e. W-T (Weaknesses-Threats) strategy, which is a diversification strategy, makes other plans to cover business weaknesses that are very vulnerable to external threats

SUGGESTION

Based on the results of the research conducted, the researchers argue that: The business of processing catfish solid waste has the ability to change potential into a better achievement and economic income. So that the right policy direction to be implemented is to increase and enlarge the role of businesses in various activities in accordance with their capabilities as well as to expand their role and take advantage of the various opportunities that exist.

R EFERENCES

[1] Kementerian Kelautan dan Perikanan (KKP), 2017. Berita dalam Liputan6.com, Jakarta

[2] Badan Pusat Statistik Riau, 2017. Riau Dalam Angka 2017. Badan Pusat Statistik Riau.

[3] Adinda Sandra Rosalinda, Dino Rimantho, Masriel Djamaloes, 2014. Aplikasi SWOT pada pengelolaan limbah elektronika: (Studi kasus kota Surabaya). Prosiding *Seminar Nasional Teknik Industri BKSTI.* Fakultas Teknik Universitas 45 Surabaya

[4] Indrasti, N.S. dan Fauzi, A.M. 2009. Produksi Bersih. IPB Press. Bogor.

[5] Zuta et al, 2003. Concentrating PUFA from Mackerel Processing Waste. JAOCS, Vol. 80, no. 9 (2003).

[6] Astarini, F.N.P., Burhan, R.Y.P., Yulvi, Z. 2010. Minyak atsiri dari kulit buah citrus grandis, citrus aurantium (L.) dan citrus aurantifolia (rutaceae) sebagai

senyawa antibakteri dan insektisida. Prosiding KIMIA FMIPA ITS, Surabaya

[7] Trilaksani W. 2006. Pemanfaatan Limbah Tulang Ikan Tuna . Buletin Teknologi Hasil Perikanan Vol IX Nomor 2 Tahun 2006.