

## **Cold Chain System Application in Certificate Preparation of Fish Processing Small and Medium Scaled Enterprise in Lamongan, East Java Indonesia**

Wahyu Sulistyowati\*), M.A. Sofijanto\*), Budi Rianto\*\*), Bimo Darmadi\*\*\*)

\*) Study Program of Fisheries, Hang Tuah University

\*\*) Magister Study Program of Public Administration, Hang Tuah University

\*\*\*) Study Program of Engine Technique, Hang Tuah University

Corresponding Author: Wahyu Sulistyowati

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**Abstract:** *The purpose of this research is the empowerment of home business of fish processing industry home business Fish Processing at trading business (UD). Duta Nelayan in Paciran, Lamongan District. The method used is action research with the development of Cold Chain System Application for the realization of Good Manufacturing Practices (GMP) in processing units of processed fish with frozen value, to obtain certification of free sales license in the market, in accordance with the applicable standards of the Drug Control Agency and Food. So the home industry products from UD. Duta Nelayan: like surimi, fishball, and nuggets, can be marketed freely and compete with other fish products. Such conditions are carried out as an alternative problem solving in SMEs that do not yet have adequate standardization and product quality certification, but product diversification has not fully met market demand, and business management has not run well from regional markets.*

*The results show that GMP Implementation in SMEs primarily to manage the production unit layout follows the regulations, and applies the Standard Operating Sanitation Procedure (SSOP) to production processes in cold chain system applications to produce standard products. The certification process reflects a lack of information and understanding to get certified. For that need the existence of government assistance program to empower the home industry business, to get the certificate in accordance with applicable provisions.*

**Keywords:** *cold chain system, certification, Duta Nelayan, Lamongan*

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### **I. Introduction**

Fisheries Processing Small and Medium Enterprise (SME) gives contribution to fisheries product marketing, beside large-scaled fish processing industries that have exported products or conducted domestic marketing in a big volume. Data indicate that east Java is the largest contributor to fisheries product marketing in Indonesia done by either big industries or the SMEs. It means that the dynamics of SMEs in east Java greatly affects the national fisheries product selling. The SMEs are distributed in several cities and regencies where most of them are still selling their products in east Java or outside the island, but have not done any export.

East Java province is one of the national fisheries production and industry centers since there are about 130 fish processing units, 63 of which have been export oriented. It reflects that fisheries products in east Java have sufficiently high competitiveness so that they can compete in export market as well. National export value of Indonesian fisheries products in 2011 was US\$ 3.5 billion, rose 22.95% the export value in 2010, in which approximately 24% of the total export value was the contribution of east Java, US\$ 827 million in 2011 (Dinas Perikanan dan Kealutan Jatim 2013).

Lamongan regency is known as agricultural and fisheries commodities producer that possesses diverse areal specification, where the north part is coastal region of Java Sea well-known with marine fish production landed in Nusantara Fisheries Port (NFP) Brondong, and the central area is rained paddy fields. The economic growth of Lamongan reached 7.08% in 2012, higher than that of national level. In 2011, total fish production in Lamongan reached 107,922.63 tons, and this production was the largest of total fisheries production in east Java reaching 1.3 million tons.. Regional government's attention in local government budget for Fisheries and Marine Services is implemented through various programs, such as coastal community economic empowerment program, community empowerment program in monitoring and controlling marine resources, fisheries aquaculture empowerment program, and fishing fisheries development program, optimization program of

production management and marketing, and infrastructural extension development program (Bappeda Jatim, 2015).

One of the SMEs developed by the local Marine and Fisheries Services producing value-added product (VAP) is Duta Nelayan in Paciran, about 20 km from Lamongan city. This group works to form and nurture the community group. It was established in 2010 that was led by Mr. Akhmad Dzulfiqor who had previously worked as fish supplier in Lamongan to Surabaya. Main products are surimi and fishball, while the byproducts are fish fillet, sousage, and dumplings. Mean production volume reaches 100 kg.day<sup>-1</sup>, with mean turnover of IDR. 50 million.mo<sup>-1</sup>. The fillet and value-added products are sold in Lamongan, Gresik, Tuban, Sidoarjo, and Surabaya under Kingball trademark.

The value added products and other frozen processed fish are more preferred with time since in global era people spend less and less time in the kitchen, but at the same time they need high nutritious food. Such a convenience product is ready to eat of need only about 10 minutes to prepare. Fig. 1 shows the increased need for the convenience products.

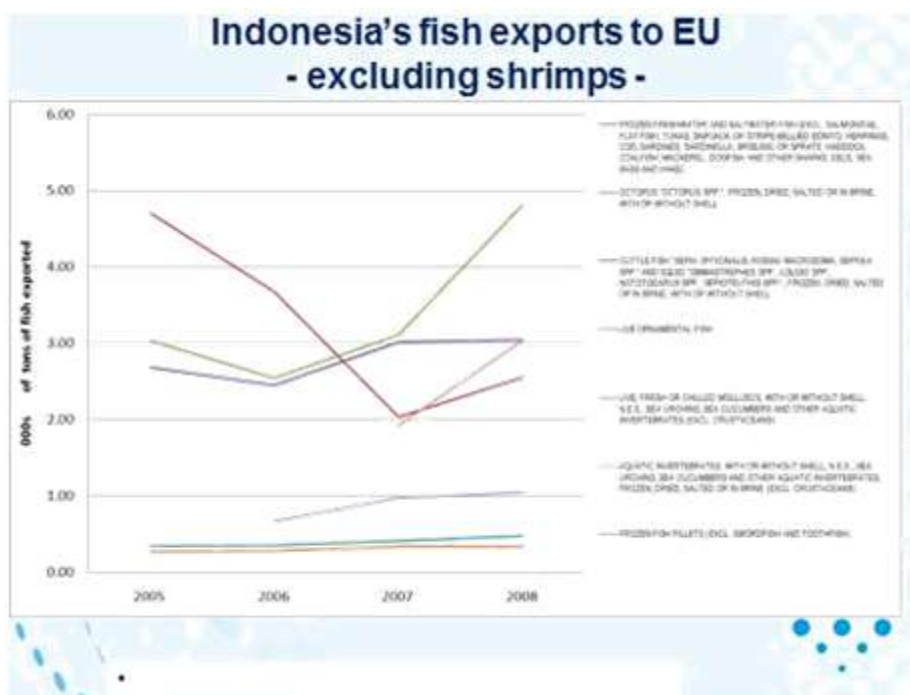


Figure 1. Consumption development of Convenience Products (Bank, 2011)

Before this study was done, the empowerment activities of SME “Duta Nelayan” had been conducted by Hang Tuah University, Surabaya, in collaboration with the Directorate of Higher Education – Ministry of Education & Culture. One of the program output was the development of 5 tons-mini-coldstorage in order to respond to problems of raw material and product vulnerability to temperature so that cold chain system application was needed. There are problems in standardization and certification of product quality and company management for regional marketing. Therefore, this study was aimed to know the GMP implementation in the SME ‘Duta Nelayan’ in order to obtain the circulation eligibility certificate.

## II. Method

This study used descriptive method in which the researcher observes the object condition without giving any treatment. Data were collected, analyzed, and presented to describe the object condition. The selected object was SME Duta Nelayan, because:

- It has been operated for more than 5 years, and based on interviews with the owner and the local Fisheries Services, this SME is considered as the most consistent in doing the business. Hence, the empowerment program or research in this SME is expected that a pilot project could be developed for other surrounding SMEs.
- SME Duta Nelayan has had some certificate needed, such as home industry and Halal – LPPOM MUI. Also, this SME is prepared to add its capital for GMP implementation so that the researcher will have more opportunities to obtain needed data for certification.

This study used primary and secondary data. The former was collected using questioners to direct the topic discussion with the respondents. The latter was obtained from the SME's data in relation with local Fisheries Services and other national data. Data collection was done through direct observations and participation in the activities of SME Duta Nelayan from March to July 2016. These covered the following aspects:

- GMP implementation process in the production unit (the old production layout was changed to the better new one, sanitation facility and hygiene preparation for production process and employees;
- Company's legal certificate preparation;
- Product circulation eligibility certificate preparation process.

### III. Results And Discussion

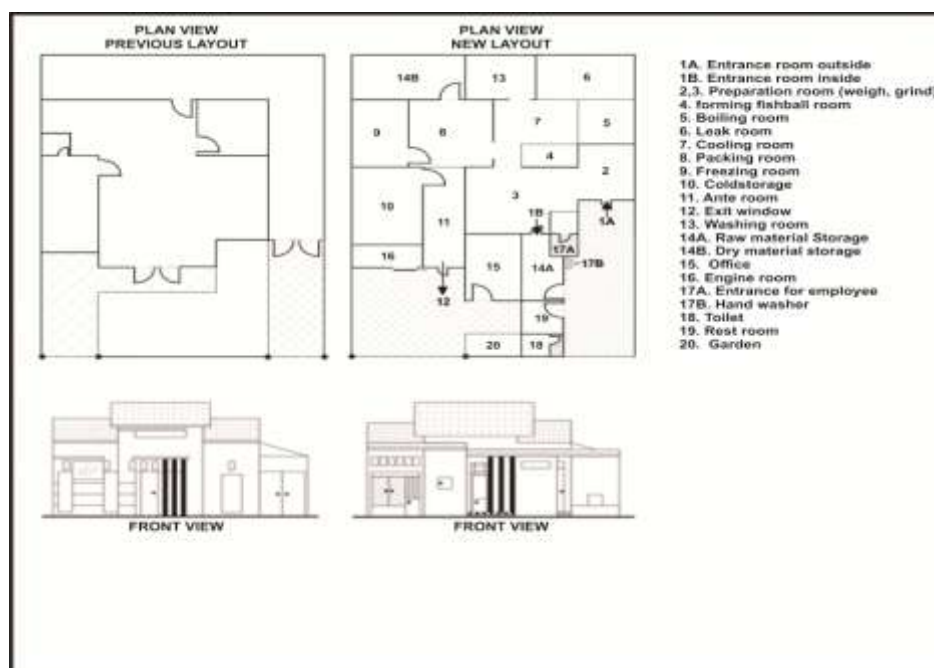
#### GMP implementation process in production

Good Manufacturing Practices (GMP) are a manual prepared by Food and Agriculture Organization (FAO) as a guide to good food production and can protect the consumer's health. This manual has been adopted a reference by numerous circulation eligibility certificate issuing institutions for food and drink As a company that wants to get the circulation eligibility certificate of Domestic Food – National Food and Drug Agency, in Indonesia called MD-BPOM certificate, the SME 'Duta Nelayan' has also implemented the GMP in the company.

MD – BPOM is domestic food certificate issued by the National Food and Drug Agency to indicate that the food, drink, and drug are eligible to distribute in Indonesia. This certificate must be held for the high risk food materials to human health, for instance, the use of flesh (fish, chicken, beef) as raw materials or because one of the consumers is infant.

In the past, SME 'Duta Nelayan' produced the frozen seafood under simpler techniques that were not entirely consistent with the GMP. Hence, the product could not go into modern markets under circulation eligibility certificate requirements. In this study period, SME 'Duta Nelayan' has entirely and consistently started implementing the GMP, such as conversion of old production layout to the new one as required, and sanitation and hygiene facility preparation for production process and employees, and development of mini coldstorage for frozen product storage.

The company's layout is one of the GMP components as the most difficult part the company must do. The layout renovation conducted by Duta Nelayan referred to the layout correction consulted with the auditor of Processing Eligibility Certificate (PEC) of Fisheries and Marine Services of East Java Province. Fig. 2 shows the new manufacture layout based on the consultation results. In this condition, GMP is easier to implement and the SME 'Duta Nelayan' will be more prepared to propose the certification process.



**Figure 2.** . SME layout before and after renovation

The layout renovation works included no toilet in the production room, preparing new toilet, dressing room, bio-security facility in front of the manufacture, ceramic wall and floor along the production room, drainage from the production room, separation of production room from the office. Several renovations are presented in Fig. 3 and 4.



**Figure 3.** Production unit entrance



**Figure 4.** Production room

Most renovation materials were paid by Duta Nelayan, reflecting that a group of young entrepreneurs have good will to make their products be able to go to modern market. Other funds were obtained through collaboration program with Hang Tuah University, Directorate General of Higher Education-the Ministry of Research and Technology of Indonesia, and local Fisheries Services. Besides, the SME 'Duta Nelayan has prepared a hygienic meat grinder to support clean production process. The mixer has a capacity of 5 kg batter made of stainless steel.

This layout renovation enables to promote the implementation of cold chain system in the processing from the raw material acceptance to the frozen storage. The raw materials came using ice cube cooling, and these were immediately processed with more ice cubes to maintain the fish temperature. The fish meat milling was also mixed with ice cubes, and to keep the evenness of the batter formulation, the ice cubes were weighed. After the products had been packed, these were in the ante room for 2 hours, then moved to the mini coldstorage of air blast freezer as shown in Fig. 5. The fishball products of Duta Nelayan are shown in Fig. 6.



**Figure 5.** Mini coldstorage door



Figure 6. Fishball products of SME before and after certification

### Legal certification preparation process

In the past, the SME 'Duta Nelayan' did not have any legal requirement at all, except only business permit signed by local notary. The legal requirements for SME are Business Permit Document (SIUP), Industrial List Document, and Company List Document which of all are released by the local District of Trading and Industry. The document preparation requires a building permit (IMB) document and neighborhood agreement (HO). Holding these legal requirements is absolutely needed to prepare any type of circulation eligibility certificate. Duta Nelayan is always delayed to prepare the document due to the company's position in the residential area. To solve the problem, the officer of Fisheries and Marine Services helps mediating it. After nearly 6 months, in August 2016 the documents needed have been issued:

- Business Permit numbered: 1617/13-18/SIUP-K/V/2016 (Fig. 7)
- Industrial List Document numbered: 1621/13-18/ILMEA/I.Z.00.01/V/2016
- Company List Document numbered: 13,18,5,10,11108

**PEMERINTAH KABUPATEN LAMONGAN**  
**BADAN PENANAMAN MODAL DAN PERJINAN**  
 Jl. Dr. Wahidin Sudirohusodo No. 57 Lamongan Kode Pos 60214  
 Telp (0322) 323365 Fax (0322) 313857 E-Mail : gpm@lamongan.go.id  
 Web Site : www.lamongan.go.id

**SURAT IZIN USAHA PERDAGANGAN (SIUP) KECIL**  
 NOMOR : 1617 /13-18/SIUP-K/V/2016

NAMA PERUSAHAAN	: UD DUTA NELAYAN	
NAMA PENANGGUNG JAWAB DAN JASATAN	: AHMAD DUA/FOOR	
ALAMAT PERUSAHAAN	: PERUM GRAHA BICAH PACIRAN BLOK B1 NO. 11, DESA DUAJAT KECAMATAN PACIRAN KABUPATEN LAMONGAN	
NOMOR TELEPON	: 08133171368	FAX : -
MODAL DAN KEMAYAN BERISIH PERUSAHAAN (sisa termasuk tanah dan bangunan)	: Rp. 200.000.000,- (Dua Ratus Juta Rupiah)	
KELEMBAGAAN	: PEDAGANG SULA KECIL	
KEGIATAN USAHA (KBLI)	: PERDAGANGAN BARANG DAN JASA (K72) SESUAI DENGAN KBLI TAHUN 2009	
BARANG/JASA DAGANGAN UTAMA	: BAKSO, TEMPURA, SOSIS, DLL.	

IZIN INI BERLAKU UNTUK MELAKUKAN KEGIATAN USAHA PERDAGANGAN DI SELURUH WILAYAH REPUBLIK INDONESIA, SELAMA PERUSAHAAN MASIH MENJALANKAN USAHANYA DAN MELAKUKAN DAFTAR ULANG TANGGAL 31 MEI 2021

Ditetapkan di Lamongan,  
 Pada tanggal : 04 Mei 2016

  
**WIDIYANTO**  
 KEPALA BADAN PENANAMAN MODAL DAN PERJINAN  
 KABUPATEN LAMONGAN  
 NIP. 19500021 196003 1 017

**TEMBUSAN:**  
 1. Dik. Kepala Dinas Koperasi, Industri, dan Perdagangan Kabupaten Lamongan,  
 2. Dik. Camat Paciran Kabupaten Lamongan.

Gambar 7. Company's permit certificate (SIUP)

The model of Business Permit Document (SIUP) is demonstrated in Fig. 5. The problem of SME location in the residential area is solved through an agreement between SME and surrounding communities to process the product from the intermediate goods to make the product so that air pollution and disposals could be reduced

### **Product circulation eligibility certification preparation process**

Producing food product only is not enough for the SME, but to reach the final consumers there are still many requirements to fulfil, such as legal documents. Market requirements, according to Bank (2011), are market demand of the product to go in. In the context of fisheries product market requirements cover product quality and product certification, such as product quality, product facility, and company layout. For these purposes, the developed countries through WTO create various certification instruments, such as HACCP, EU Appr number, BRC, and others. Certification is a certificate issuance process done by the official authority. The circulation eligibility certificate needed by Duta Nelayan are Processing Eligibility Certificate (PEC) issued by the Fisheries and Marine Services of local MMAF and MD – BPOM certificate issued by BPOM (Controlling Agency for Drug and Food). Field survey found that other SME also highly needed the MD-BPOM certificate. This group is UD. Mitra Abadi, located in Laren district, about 9 km from Duta Nelayan location. It also produced value-added fish products as Duta Nelayan, and even Mitra Abadi and Duta Nelayan had good collaboration, in which the former often rented the coldstorage of Duta Nelayan, and Duta Nelayan often sold their products through Mitra Abadi that has had market access in east Java, Bali, and Mataram.

Classical problems of the food processing in Indonesia often appear are capital limitation and product marketing. Nevertheless, there are many other aspects that do not support the SME's performance in production and product marketing. For instance, product standardization, product certification, formation of marketing unit and system in SME group, brand image formation, and etc. These even become unnecessary inhibition when the certification has to go through several different institutions, such as processing eligibility document through Marine Affairs and Fisheries Services, home industry product through Health Department, Business Permit (SIUP) and Trademark through Trade and Industry Services, MD-BPOM through BPOM, Halal through LPPOM-MUI. Such a condition will alarm the SME's mobility, especially in competition with the SMEs in other ASEAN countries (Sulistiyowati, 2015).

Present observations indicated that many SMEs producing frozen products have not held the circulation eligibility certificate in the form of Processing Eligibility Document-MMAF or MD-BPOM, and only had home industry certificate that is not enough for products stored in frozen form and or produced using meat as raw material and or milk. It does not mean that the SMEs do not understand the faults done, but they are inhibited by the magnitude of costs for the renovation of the production unit room in order to meet the requirements in the GMP. As a result, many SMEs have to terminate their business or produce for local market despite violating the law. The uncertified products do not have official guarantee that they are healthy and good for human consumption.

Interviews with the provincial Fisheries and Marine Services and BPOM, as circulation eligibility certificate issuing institution found that the certification preparation process was not difficult as long as all requirements, such as Sanitary Standard Operational Procedure (SSOP) and GMP implementation, were fulfilled, despite at the minimum standard. Having one of the certificates will ease other certification preparation, since the evaluation principle is the same, based on GMP regulation fulfilment in processing the raw materials to be a product.

Nevertheless, it cannot be denied that good inter-institutional coordination has not been established yet to ease the SME to prepare the permit and certification in a single institution, whereas the SME must, in fact, arrange the legal business permit in the District of Trading and Industry, certificate in the District of Marine Affairs and Fishery, and MD - BPOM certificate in BPOM as non-department institution. Also each certificate has an expiration date and thus, needs to be renewed at the expiration date. Such a condition is considered to be difficult for SME development in many big and small cities, particularly in east Java.

It is also interesting that the requirements needed for processing eligibility document and MD – BPOM document are the same, the implementation of SSOP and GMP, and the food product has passed the accredited laboratory test in line with the SNI. The processing eligibility document is used for fish processed product and the MD - BPOM certificate for food product and cosmetics in general. If the requirements are relatively the same, holding the processing eligibility document is enough for fish product processors. However, it is not true, so that government policy is needed to reduce this ego sectoral phenomenon.

The SMEs that have the Processing Eligibility Certificate (PEC) will be easier to prepare the Hazard Analysis & Critical Control Points (HACCP) certificate for export products, since one of the HACCP certificate preparation requirements is PEC certificate holder. The HACCP certificate should be internationally acceptable if a fisheries product will enter other country.

Study on fisheries SMEs in relation with government's or private company's support was Triyanto A, et al. (2012) found that the aid was mostly working capital (60.56%), with the highest aid (48.59%) given by the government. I was also found that 41.84% SMEs did a partnership in market aspect, and 35.71% did it in the form of providing raw materials or merchandizes. Only 1.02% SMEs did it in the form of guidance/training, whereas guidance and training are highly needed by the SMEs to obtain access to the capital, technology, and business network. Most SMEs obtaining financial support and doing the partnership (66.67%) received the support in the form of money/capital. The combination of both was 27.08% SMEs did the partnership for marketing and working capital; and 18.75% did it in the form of raw material supply and financial aid. There is an overlapping beneficiaries as much as 14.58%. The present finding indicates significant difference between control (SME without treatment) and the SME with financial aid. There was also significant difference between the SME financially supported and the SME doing the partnership, but no significant difference between the combination of financial aid and the SME with partnership.

Similar study on the fisheries SMEs in the developing countries, such as Croatia, East Europe (Radas *et al.*, 2014) found that the 2 instruments are important for innovation development to encourage the local government to provide financial subsidy. Present observations in this reasearch in Lamongan and surrounding demonstrated that the SMEs got very good services from the government institutions for consultation. It could be seen in Trading and Industry Department, MMAF, and Controlling Agency for Drug and Food (BPOM). The consultation services were free of charge, but there was some money paid by the SME for the certificate issuance. In Surabaya, the Trading and Industry Department does not take any charge for the business permit (SIUP). In addition, this institution periodically run a collective certificate preparation program for free or under low cost practice. For example, the Health Services often does preparation program of PIRT certificate for free of Trading and Industry Services of Surabaya did Halal certificate preparation of LPPOM - MUI for free, or Trading and Industry Services of Lamongan provided the SME Duta Nelayan with laboratory examination program for product certification (in process).

As mentioned by the BPOM that this laboratory examination will greatly determine the further certification process. Although the facilities audited by BPOM have passed the rerequirements, but the laboratory testing output indicates inconsistency with the SNI standard, the circulation eligibility certificate cannot be issued. Unfortunately, such an information is not well-socialized among the SMEs, so that several SMEs have failed to get the certificate due to more focusing on production facility development.

Norwegian and American researchers, Asche Frank, Marc F. Bellemare, Cathy Roheim, Martin D. Smith and Sigbjorn Tveteras, in their paper "*Fair Enough? Food Security and the International Trade of Seafood*" (Asche *et al.*, 2015) who studied the relationship between food security and seafood international trade conducted by developing countries and developed countries. They found that number of seafood exported from developing countries and de eloped countries were not significantly defferent from that imported from developed countries to developing countries. In this case, the developing countries exported high quality food in exchange with low quality food. Moreover, the total value of the seafood exported by the developing countries to the developed one increased but did not give negative impact on the food security for the developing countries. It is in line with Bennett Law that people exchange the cheaper food with higher income reflecting how the market system allocates the most valuable resources in the highest ability to pay.

However, the researchers could not conclude on whether the developing country can use the income from exporting seafood to (i) replace the loss of seafood resource with other food, (ii) use the export fund for other beneficial need, such as infrastructure or education, or (iii) do they are controlled by the strong elite. In fact, the developing countries obtain good compensation from the number of food exported, and increase their income more than enough to replace the low export seafood. Thus, the seafood deficit trade of developing countries should not always contribute to declined food security of the country. The researchers confessed that there is always winner and the lossier, so that there is always a poverty resulting from international seafood trade. They just want to demonstrate that the developing countries are being facilitated to increase the community's prosperity despite the international trade of seafood being able to be violated. In free trade, increase in people's prosterity is required. This journal confirms that only high quality seafood can be exported by the developing countries. Also, unbalanced export and import activities of the developed countries do not threat the food security of the developing countries. However, the developing countries should give attention on the sustainability of the resources and the poor communities.

The end of the study period found that SME 'Duta Nelayan' has carried out preliminary laboratory examination on the fishball product. It indicated that the product was eligible for some parameters, except heavy metals and microbiology. Thus, the SME should reevaluate the production process using good quality fish as raw material and increasing the processing facility hygiene. The facility audit as preliminary certification stage was done by BPOM auditor, and Duta Nelayan passed with grade B for facility test. The certificate is presented in Fig. 8. Then, the SME Duta Nelayan went to the standard product quality test.



**BALAI BESAR PENGAWAS OBAT DAN MAKANAN  
DI SURABAYA**

Jl. Karangmenjangan No.20 Surabaya 60286  
Telp. (031) 5020575, 5022815, 5048833 | Fsx. (031) 5015486  
e-mail : bpom\_surabaya@pom.go.id : ulpk\_sby@yahoo.co.id | website : www.pom.go.id

Nomor : PN.06.01.955.08.17, 8095  
Lampiran : 1 (satu) berkas  
Perihal : Rekomendasi Pendaftaran Produk Pangan MD

Surabaya, 30 Agustus 2017

Yth.  
Direktur Inspeksi dan Sertifikasi Pangan  
Badan Pengawas Obat dan Makanan  
Jl. Percetakan Negara No. 23 Jakarta Pusat

Sehubungan dengan surat UD. Duta Nelayan tanggal 25 Juli 2017 perihal Permohonan Audit Sarana, telah dilakukan pemeriksaan sarana produksi dalam rangka pendaftaran produk pangan pada tanggal 09 Agustus 2017 terhadap :

Nama Perusahaan : UD. Duta Nelayan  
Alamat : Graha Indah Paciran B-11, Kec. Paciran, Kab. Lamongan

Nama dagang dan jenis pangan:

No.	Nama Dagang	Jenis Pangan (Sesuai Perka BPOM Nomor 21 Tahun 2016 tentang Kategori Pangan)
1.	King Ball Mahkota	09.2.4 Ikan dan Produk Perikanan Termasuk Moluska, Krustase dan Ekinodermata yang Dikukus atau Rebus dan atau Goreng/Panggang; Bakso Ikan, Otak-otak Ikan
2.		09.2.2 Ikan, Filet Ikan dan Hasil Perikanan Termasuk Moluska, Krustase dan Ekinodermata Berlapis Tepung yang Dibekukan; Naget Ikan

Berdasarkan hasil pemeriksaan dan laporan hasil perbaikan terakhir yang kami terima pada tanggal 22 Agustus 2017, sarana tersebut telah menerapkan Cara Produksi Pangan Olahan yang Baik (CPPOB) dengan nilai Baik (B) sehingga layak mendapatkan rekomendasi persetujuan pendaftaran produk pangan.

Kami sampaikan juga berita acara pemeriksaan dan form 166 sebagaimana terlampir.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.



Kepala Balai Besar Pengawas Obat dan Makanan  
Surabaya  
Budi Hidayat, Apt., MHSM.

Tembusan Yth.  
Pimpinan UD. Duta Nelayan di Lamongan

Figure 8. Circulation eligibility certificate-BPOM at phase 1

#### IV. Conclusion

In order to obtain the circulation eligibility certificate of the frozen fish product of SME Duta Nelayan in Lamongan, the SME should firstly prepare the legal document completion in the local Trade and Industry Agency. Parallel to the activity, the SME implemented Good Manufacturing Practices in the production unit, such as production site layout alteration, sanitation facility preparation for raw materials and employees. Then the SME proposed certification to Marine Affairs and Fisheries Services and Controlling Agency for Drug and Food (BPOM) to obtain the circulation eligibility certificate in that the product quality must follow the Indonesian National Standard (SNI) through laboratory examination.

#### Acknowledgment

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