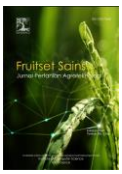
Fruitset Sains, 11 (1) (2023) pp. 34-41
Published by: IOCSCIENCE

Fruitset Sains : Jurnal Pertanian Agroteknologi



THE GMP CONCEPT ON THE PRODUCTION OF EEL CHIPS IN "XYZ" SMALL MEDIUM ENTERPRISE, KARANGLO, POLANHARJO, KLATEN

Rahmania Nur Afiah[1*], Niken Kundari[1], Rizky Brisha Nuary[1], Lativa Lisya Maghfira[1]
[1]Agricultural Product Technology, Vocational School, Universitas Sebelas Maret, Indonesia
Email: rahmaniana@staff.uns.ac.id

Abstract

Eel chips have a dry, crunchy texture and long shelf life, making them easy to consume as a healthy snack. This study aimed to determine and evaluate the application of the GMP concept in the production process of eel chips in the "XYZ" SME and to recommend the appropriate GMP concept for this SME. The results showed that the eel chips had moisture, FFA, protein, and TPC values of 1.787%, 0.367%, 25.509%, and 2.2x10^3 colonies, respectively. In addition, the sensory test showed that the eel chips were favourable to the panelists. It can be concluded that the analysis complied with the National Standards. Based on the observations, it was found that there was 1 element for the minor level, 2 elements for the major level, and respectively 7 and 4 elements for serious and critical levels. The result showed that the SME was on level 4, meaning that it is recommended that they had to perform daily internal audits.

Keywords: Eel Chips, GMP, SME, Quality Evaluation

Abstrak

Keripik belut memiliki tekstur yang kering, renyah dan umur simpan yang lama sehingga mudah dikonsumsi sebagai camilan sehat. Penelitian ini bertujuan untuk mengetahui dan mengevaluasi penerapan konsep GMP dalam proses produksi keripik belut di UKM "XYZ" dan merekomendasikan konsep GMP yang tepat untuk UKM ini. Hasil penelitian menunjukkan bahwa keripik belut memiliki nilai kadar air, FFA, protein, dan TPC masing-masing sebesar 1,787%, 0,367%, 25,509%, dan 2,2x103 koloni. Selain itu, uji sensori menunjukkan bahwa keripik belut disukai panelis. Dapat disimpulkan bahwa analisis memenuhi Standar Nasional. Berdasarkan pengamatan, ditemukan bahwa terdapat 1 elemen untuk level minor, 2 elemen untuk level mayor, dan masing-masing 7 dan 4 elemen untuk level serius dan kritis. Hasil penelitian menunjukkan bahwa UKM berada pada level 4, artinya direkomendasikan untuk melakukan audit internal setiap hari.

Kata Kunci : Keripik Belut, GMP, UKM, Evaluasi Mutu

1. Introduction

Eels have been very popular since 1979 in Indonesia, there are many eels cultivated and included in export commodities. According to Irawan et al., (2020) and eels belong to the class of freshwater fish that contain high protein. In 2008, the number of eels exported was around 2.676 tons, which increase compared to 2007 with 2.189 tons. At the end of 2009, it increased by 77.2% from 2008 to 4.744 tons. Until 2013, its exports were around 6.092 tons. China is the leading producer of eel that supplies 70% of the world's needs. Eel is a beneficial source of animal protein for the fulfillment of daily intake and as a medicine. Eel's protein

content is almost similar to beef protein, which is 18.4 g per 100 g (Winarno FG, 2020). In addition, eels alsocontain omega three unsaturated fattyacids. Eels also contain energy of 330 kcal per 100 g (Erwin, 2011).

Eels are potential freshwater fish that can be processed into various products to improve public consumption (Budiarti et al., 2016). According to Rahman et al. (2021), eel is one of the high-albumin freshwater fish. The nutritional content of eel can be processed into various foods, one of which is chips. In general, chips are the favourite snack in Indonesia. Chips have dry and crunchy properties, and their properties disappear if it absorbs liquid (Tunjungsari. M.R, 2001). Eel chips are processed by mixing the raw materials with seasoned flour and fried. This production process is performed manually, and produces high protein products, favourable and dry. The freshness, size, and type of raw materials determine the quality of the chips produced (BPOM (Food and Drug Supervisory Agency), 2012).

"XYZ" is an SME that produces eel chips in Karanglo Hamlet, Polanharjo, Klaten. Production works daily, but sometimes chips are still found that are not intact, have inconsistent colours and sizes of chips, and they go rancid quickly. So, to improve the quality of eel chips in that SME, it is necessary to have quality control at all stages of production, from controlling raw materials to finished products. It is hoped that the quality of the chips produced in that SME must be required with the quality standards by BPOM.

Good Manufacturing Practices (GMP) is a guide that explains how to make high-quality food fit for consumption. According to Deliana et al. (2018), GMP is a crucial indicator to complement quality standards or criteria determined for food. Through GMP, food businesses can create food that is not harmful to health, suitable for eating, and good in quality (Sukmiwati et al., 2019).A suitable production must meet several criteria, as stated by Latief et al. (2018). GMP requires several requirements that must be fulfilled by all industries involved in the whole production chain, from raw materials to the final product.

Producing excellent and healthy food is one of the goals of food processingindustries in Indonesia, including SMEs. According to Zhang (2018), modernization implies a rational calculation of scale and a mirroring of global trends. However, an alternative interpretation of modernity promoted by civil society has been gaining ground. Establishing good food production through a 'rhizomatic' spread of new practices inspired by world possibilities but deeply rooted in the local context.

According to the journal, China is also developing safe and sustainable food production for its population. Quality control can be done by implementing GMP principles (Sagita et al., 2019). GMP is a rule regulating how to produce food that is not harmful to consumers and high in quality. Indonesia's Food and Drug Administration (BPOM) regulates GMP as one of the criteria for meeting quality standards. Implementing GMP increases competitiveness and ensures these SMEs sustainability. In addition, applying GMP improves product quality, reduces the scale of product damage, reduces the cost of recalling damaged products, and builds the image of SMEs. Quality control is a set of measures and procedures that must be followed to ensure that the product is manufactured correctly. Research by Phillips et al. (2020), the focus of quality control is to ensure that the product manufacturing and services are consistent and in line with customer requirements. The study aimed to evaluate the application of the GMP concept in producing eel chips in "XYZ" SME and to recommend the appropriate GMP concept for this SME.

☼ ISSN 2302-9668 (Print), 2809-1183 (Online)

2. Bahan dan Method

The SME is in Karanglo, Polanharjo, Klaten, Central Java, Indonesia. The testing parameters, such as total plate count, fatty acid, and moisture content, were performed at the Central Laboratory, Sebelas Maret University, Surakarta. Meanwhile, the protein content was performed by CV. Chem-mix Pratama, Bantul, Yogyakarta Special Region.

Application and Evaluation of GMP

The evaluation of the GMP concept was carried out based on BPOM Regulation No. HK.03.1.23.04.12.2206 of 2012. The scope of GMP includes: (a) Environment, equipment, and employee aspects consists of the location and production environment, buildings and facilities, production equipment, water supply, hygiene and sanitation facilities and activities, employee health and hygiene, maintenance and sanitation hygiene programs of employees, supervision by the responsible person and employee training. (b) Production process consists of process control and storage. (c) Final product aspect consists of the results of final product analysis, food labelling, product recalls, and employ yee training.

GMP Assessment

Performed by classifying the food industry level based on BPOM Regulation No. HK.03.1.23.04.12.2207 of 2012.

The indicators include: (a) The "Minor" nonconformity is a mistake in the "can" criteria that can impact the quality of food products. (b) The "Major" nonconformity is a mistake in the "preferably" criteria that can impact the safety and efficiency of food products. (c) The "Serious" nonconformity is a mistake in the "shall" criteria that can impact food safety. (d) The "Critical" nonconformity is a mistake in the "must" criteria that directly affect food safety.

End Product Analysis

The test parameters include moisture, free fatty acid, protein content, total plate count, and sensory. The test used threesamples with a different shelf life of 1, 15, and 30 days.

3. Results and Discussion

Location and Environment

The SME observed in this study was in Karanglo, Polanharjo District, Klaten, Central Java, Indonesia. Its location faces a highway which potentially contaminated by physicalhazards from pollutants. The productionplace was indoors, so smoke and dust did not enter the room. The environmental conditionsaround were relatively clean and far from the landfill, so there was no stench from the garbage pile

Figure 1. Geographical Location
(Source: Google Earth)

The owner constantly cleaned the site and environmental area daily and disposed of the garbage to maintain the cleanliness of the production site. However, the trash can inside the production room was open, which caused potential contamination during production. Based on the evaluation, the trash can needs to follow the GMP concept, it was supposed to have a lid. SME should immediately provide a trash can equipped with a lid in the production room to avoid causing unpleasant odors and insects in the production room. It is best to maintain its condition by keeping the site clean and disposing of garbage daily after production.

Buildings and facilities

The design and layout of the production room can affect the quality and safety of products and make the production process more accessible. Based on the evaluation, the use of space has yet to be maximized following its function, and the room's layout needs to follow the order of the manufacturing process. Incompatibility of the room layout causes potential contamination due to work traffic intersections. The design and layout need to be corrected because it needs to follow the production flow. It should be reorganized so the production process is more effective and minimizes the occurrence of cross-contamination.

In addition, the production space was relatively narrow, so employees were less flexible. The doors in the production room were still one with the finished products' exit and raw materials' entrance. The SME needs to be aware of separating premises in the processing process. The design and layout could have been more effective because several processes must pass through other process areas during production. Hence, a slight improvement needs to be made.

In the other hand, facilities for washing hands were provided in the form of water faucets, buckets, and dippers, as well as hand soap. The place used for washing hands was integrated with the place where to wash the equipment. The overall evaluation showed that it needed to follow the GMP concept. Suggestions to improve such as the hand washing place should be separate from the washing place of equipment and equipped with a hand drying cloth and hand soap.

Production Equipment

The equipment for producing eel chipsincludes pans, scraps, spatulas, basins, spoons, ladles, knives, sealers, and scales. All the tools were robust, and most were made from stainless steel, so they were not easy to rust, were durable, non-toxic, and easy to clean. The equipment is still ingood condition. Production equipment made of wood includes bamboo baskets. The bamboo baskets are still in good condition, the surface was smooth, not peeling, and there were no holes. Before and after production, the equipment is pre-washed and drained. Overall, the evaluation of GMP on equipment followed the established concept.

☼ ISSN 2302-9668 (Print), 2809-1183 (Online)

Water Supply

The water source comes from well water using a water pump with a depth of more than 40 meters. The water supply was relatively abundant even in the dry season.However, there was no reservoir for the water supply. The water was odourless,colourless, and tasteless. The water supplyfacilities were following the GMP concept.

Hygiene and Sanitation Facilities and Activities

Cleaning facilities are available and well-maintained, including brooms, buckets, rags, broomsticks, floor wipers, and detergents. They used clean water for cleaning and washing. The floor cleaning was performed by brushing and spraying water and was swept using a broomstick. The water used for sanitation activities was clean and in sufficient quantities. The cleaning or washing facilities at the SME need to follow the established concept, as the cleaning tools still have oil residues and are only washed using ordinary well water. Washing hot water was suggestedto clean the oil residue left on the tool.

Hygiene and sanitation were performed by regularly cleaning all equipment after the production ended. Theprocess uses detergent and a sponge, then drain. Before the tool was used for theproduction process, the tool was only wiped using a washcloth. Cleaning the floor in the production room was carried out by brushing and spraying water and was swept using a broomstick. The SME'shygiene and sanitation activity did not follow the concept because of the absence of employees responsible for cleaning activities. Suggestions that can be used to improve the evaluation were to conduct orhold a schedule for routine cleaning activities given to employees on a rotatingbasis.

Employee Health and Hygiene

SME has imposed regulations on sick employees, who can cause cross- contamination not work. Employees who can carry out production activities must bein good health. The evaluation ofemployee health has followed the established concept.

Maintenance and Hygiene and Sanitation Program

The SME's environment, buildings, and equipment were still well-monitored and functioning. The environment and buildings were cleaned by regularly sweeping and using washcloths after the production process. The detergent used forwashing was placed in the corner of the washing place so that it was far from the final product. The evaluation of maintenance and cleaning has followed the established concept.

Storage

The raw materials and final products were stored in separate places and different rooms. When fresh eel arrives, it will be immediately cleaned andproduced. The storage area for additional materials such as flour, salt, cooking oil, and other seasonings was stored near the production room. Spices were placed on a plastic basket. The final product that had not been packed was laid out on cardboard, given several thick layers ofplastic, and tightly closed.

The final product that had been packaged was placed on a storefront in thefront store or for sale. The final product storage implemented the First in First Out (FIFO) system and the First Expired First Out (FEFO) system. The FIFO system was applied by stocking materials when the supply of materials was running low, making it easier to remember whichmaterials should be used first. Newspapers that coat finished eel chips are better replaced with oil paper as it could lead to cross-contamination.

Process Control

The eels come from suppliers who supply around 40kg of fresh eel. Eels from suppliers are directly processed, so the eels produced are still fresh. The quality evaluation was performed organoleptically, including shape, size, colour, smell, and texture. The eel was round shaped with a length of 10-15 cm, had a blackish brown colour, did not have a fishy or pungent smell and had a dense texture. The conformity of the raw material per the SNI standards showed that the quality control of eel raw materials was quite good.

However, quality control of the final product needs to be carried out so that the quality of the final product remains guaranteed food safety. Quality control of the final product of eel chips includes moisture content, free fatty acid (FFA) analysis, protein, total plate numbers, and sensory analysis. The results of the chemical analysis were compared with SNI 7687.1: 2013. The results showed that eel chips followed the Indonesia National Standard.

Table 1. Analysis Results

No	Type of Analysis	SNI	Test Results
1.	Moisture content	Max. 5%	1,878%
2.	Protein	Min. 15%	28,434%
3.	ALT	Max.$5{,}0x10^3$	$3x10^3$

Food Labeling

The labels listed on the packaging were a trademark, P.IRT number, telephone number, address, and composition. The packaging label did not include the product's production code or expiration date. However, the SME hasestimated the shelf life by storing the product for several weeks and sensory observation. The net weight should alsobe included in the package to find out the net weight of each package. Productioncode should be listed for traceability, and the expiration date should also be listed sothat consumers know the shelf life suitablefor consumption.

The food label needs to be following the established GMP concept. It suggested redesigning the food labels used for product packaging following the applicable concept. The P.IRT or registration number used had expired,which affects the IRTP level, which drops to level IV. In this case, updating the P.IRT number is necessary. Labels must atleast contain the product's name; list ofingredients or composition used; net weight; SME name and address; expirydate, month, and year; production code; and P-IRT numbers.

Supervision by the Person in Charge

Owners supervise, including receivingraw materials, the quality of the materials used, the ongoing production process, and the feasibility of finished products produced daily. The purpose of this supervision was to maintain the quality of the products produced, and if deviant actions were found, they would be followed up with corrective actions. SME owners, as the person in charge of routine supervision, follow food safetycounseling held by the health office. The suggestion to improve the evaluation was that the training application was based on the principles of food hygiene and sanitation regular, and scheduled monitoring to minimize contamination in the product.

Product recalls

SME never recall its product, or consumers return its product. The existing stock in SME was regularly updated, and it ran out in just one week due to its shelf life. SME has not

prepared procedures related to product recalls, so it needed to prepare procedures related to productrecalls for anticipation.

Recording and Documentation

SME still needs to record anddocument important information on rawmaterials, materials, production processes and recording of final products. SME onlyrecords the sales results. A suggestion thatcan be used to improve the evaluation is torecord incoming and outgoing goods, and the documents stored and ensure that the data is accurate.

Employee Training

The owner has attended several food safety training sessions held by the local government. The owner leads employee training in basic knowledge about food safety and the production process.

4. Conclusion

Based on the evaluation of the GMP concept that has been carried out, there are 9 parameters out of 14 that are not in accordance with BPOM Regulation HK.03.1.23.04.12.2207 of 2012. The number of discrepancies found in UKM "XYZ": 1 element minor, 2 major elements, 7 elements serious, and 4 elements critical. It can be concluded that the "XYZ" SME is at level 4, which means that they have to carry out internal audits every day. However, the results of testing the eel chip product including moisture, FFA, protein content, and total plate count showed that it was in accordance with SNI standards for quality requirements for eel chips SNI 7687.1: 2013. In addition, the sensory test results showed that the panelist's assessment of the five parameters of the "XYZ" SME eel chips was included in the interval from like to really like. So it can be said that eel chips with a shelf life of 1 day, 15 days, or 30 days can be accepted by consumers.

Reference

BPOM. (2012). Peraturan Kepala Badan Pengawas Obat dan Makanan Republik Indonesia Tentang Cara Produksi Pangan yang Baik untuk Industri Rumah Tangga. Jakarta: Badan Pengawas Obat dan Makanan.

BPOM. (2012). Peraturan Kepala Badan Pengawas Obat dan Makanan Republik Indonesia Tentang Tata Cara pemeriksaan Sarana Produksi Pangan Industri Rumah Tangga. Jakarta: Badan Pengawas Obat dan Makanan.

BSN (Badan Standarisasi Nasional). (2013). *Syarat Mutu Keripik Belut*. SNI 7687.2:2013. Jakarta.

Budiarti, I., Swastawati, F., & Rianingsih, L. (2016). Pengaruh Perbedaan LamaPerendaman Dalam Asap Cair Terhadap Perubahan Komposisi Asam Lemak Dan Kolesterol Belut(Monopterus Albus) Asap. *Jurnal Pengolahan Dan Bioteknologi Hasil Perikanan*, *5*(1).

Deliana, Y., Sri, F., & Endah, W. (2018). Pemanfaatan limbah kulit mangga menjadi kerupuk sebagai upaya diversifikasi produk pangan. *JurnalPengabdian Kepada Masyarakat*,*2*(1).

Erwin, L. T. (2011). *Gemar makan ikan25 cita rasa lele dan belut*. Gramediapustaka utama. Jakarta.

Irawan, D., Wardhana, M. G., & Sulthoniyah. (2020). PembuatanBakso Belut (Monopterus albus). *Jurnal Ilmu Perikanan Dan Kelautan*, *2*(1).

Latief, R., Dirpan, A., Tahir, M. M., &Albanjar, F.V. (2018). The application status of Good Food Production Method (GFPM) production of corn crackers in SME Mawar Merah Luwu Utara. *IOP Conference Series: Earth and Environmental Science*, *157*(1). https://doi.org/10.1088/1755-1315/157/1/012035

Phillips, B. P., Gomez-Navarro, N., & Miller, E. A. (2020). Protein quality control in the endoplasmic reticulum. In *Current Opinion in Cell Biology* (Vol. 65). https://doi.org/10.1016/j.ceb.2020.04.002

Rahman, H., Sari, P. M., Fitrianingsih, F., Kurniati, A., & Kurniawati, F. (2021). Pengembangan Potensi Ekstrak Belut (Monopterus albus) dalam Menangkal Radikal Bebas. *Jurnal Pharmascience*, *8*(1). https://doi.org/10.20527/jps.v8i1.9092

Sagita, D. N., Matin, M., & Suryadi, S. (2019). Sistem Manajemen Mutu Iso 9001:2015 Di Fakultas Ekonomi,Universitas NegeriJakarta. *JMKSP (Jurnal Manajemen, Kepemimpinan, DanSupervisi Pendidikan)*, *4*(1).https://doi.org/10.31851/jmksp.v4i1. 2481

Sukmiwati, M., Sari, N. I., & Dahlia, D. (2019). IbM kelompok usaha ikan salai lele dan kerupuk ikan. *Unri Conference Series: CommunityEngagement*, *1*. https://doi.org/10.31258/unricsce.1.639-644

Tunjungsari. M.R. (2001). *Pemanfaatan Ikan Sapu-Sapu (hyposarcuspardalis) Dalam Pembuatan Keripik Ikan*. Fakultas Perikanan dan Ilmu Kelautan Institut Pertanian Bogor.

Winarno FG. (2020). *Kimia Pangan dan Gizi*. PT. Gramedia Pustaka Utama. Jakarta.

Zhang, J. Y. (2018). How to Be Modern? The Social Negotiation of ‘Good Food’ in Contemporary China. Sociology, 52(1). https://doi.org/10.1177/0038038517737475