

Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi

¹Madyasta Anggana Rarassari, ²Raudhatu Sa'adah, ¹Ahlan Innayatullah, ¹Eka Nurrisa Khairunnisa, ¹Nia Boru Ritonga, ¹Ira Gusti Riani, ¹Aldilla Sari Utami, ¹Marta Tika Handayani, ³Rizki Eka Puteri, ⁴Selly Ratna Sari

¹Program Studi Teknologi Pangan, Jurusan Rekayasa Teknologi dan Bisnis Pertanian Politeknik Negeri Sriwijaya, Palembang, Indonesia

²Program Studi Agribisnis Pangan, Jurusan Rekayasa Teknologi dan Bisnis Pertanian Politeknik Negeri Sriwijaya, Palembang, Indonesia

³Program Studi Ilmu Perikanan, Fakultas Pertanian, Universitas Sumatera Selatan, Palembang, Indonesia

⁴Program Studi Teknologi Industri Pertanian, Jurusan Teknologi Industri Pertanian, Universitas Bengkulu, Bengkulu, Indonesia

*Corresponding author

Email: raudhatu.saadah@polsri.ac.id

Volume

5

Issue

2

Edition

November

Page

692-697

Year

2024

Article History

Submission: 18-08-2024

Review: 20-8-2024

Accepted: 29-08-2024

Keyword

Catfish;

Cold Chain;

Post-harvest;

How to cite

Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R. (2024). Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi. *Jurnal Pengabdian Masyarakat*, 5(2), 692-697
<https://doi.org/10.32815/jpm.v5i1.2320>

Abstract

Purpose: UPR Mandiri Abadi is a community hatchery unit that focuses on catfish production at the grow-out stage. The rearing process is carried out for three months with the harvest of catfish weighing 1 kg per 6 fish. Currently, catfish distribution is mostly in the South Sumatra area, such as restaurants and catfish pecel sellers. Because the distance is up to two hours between the UPR location in Kerten and the sales area in Indralaya, post-harvest handling using cold chains is the right solution to maintain fish quality.

Method: In this service activity, the team provided counseling to UPR Mandiri Abadi members regarding post-harvest fish handling techniques using cold chains. Members actively participated by asking various questions regarding good cold chain procedures for fish shipments.

Practical Applications: This service activity also includes training and outreach materials which are designed to be easily understood and applied by catfish farmers, especially in terms of shipping fish using a cold chain system.

Conclusion: Through this outreach, UPR Mandiri Abadi can maintain the quality of fresher catfish so that it can attract more consumers and increase fish sales.



693) Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi, Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R.

Introduction

Fish is a highly perishable commodity and requires immediate handling after being caught or harvested. Damage to fish occurs quickly after the fish dies, caused by the process of protein degradation, oxidative rancidity, and the growth of microorganisms. Therefore, fish handling must be done immediately to inhibit the time-dependent spoilage process. According to (Moeljanto, 1992), to maintain the freshness and quality of fish, processing and preservation methods are needed that can delay or stop the activity of microorganisms that cause damage. One of the technologies used is frozen storage which is safe and does not reduce the nutritional value of the fish.

Handling fish farming products, especially post-harvest, is an important activity in supporting fisheries development. Proper handling can save production from decreasing quality, increase fish farmers' income, and protect consumers from potential losses. Distribution of fishery products must pay attention to the condition of the equipment and facilities used so that the quality of the products is maintained during the delivery process. Therefore, distributors/distributors of fishery products must understand the requirements that must be met in the fishery product distribution process (Direktorat Jendral Perikanan, 2000).

The cold chain system is one solution that can be applied in post-harvest handling of fish. The cold chain is a system that keeps frozen or chilled products at a certain temperature during the production, storage, transportation and sales processes, to maintain product quality (Zhu et al., 2015). The decline in fish quality is greatly influenced by time, so the implementation of the cold chain must begin immediately after the fish is caught or harvested. According to (Winarni et al., 2003) quality of fishery products including appearance, texture, smell, good taste directly or indirectly which will be assessed by consumers or users of the fish product. The quality of fishery products also influences the production process of fish processing and determines the price or selling value of the fish (Suriawira, 2005).

Cold Chain System or Cold chain system is part of the chain supply which aims to maintain the temperature so that product quality remains maintained and maintained throughout the supply chain process (Lazuardi et al., 2014). Harvest season. However, distribution of catfish still uses a wet system with barrels filled with water, which causes the fish to jostle for oxygen and is vulnerable to injury due to friction between fish. Therefore, our team conducted training and counseling about fish delivery systems using cold chains to the UPR Mandiri Abadi group. It is hoped that with this training, the quality of catfish from UPR Mandiri Abadi will be maintained until it reaches consumers, in clean, hygienic and delicious conditions.

Method

The implementation of community service activities was carried out in September 2024 at UPR Mandiri Abadi. Community service activities were carried out at 09.00-11.00 WIB and were attended by all members of the UPR Mandiri Abadi group.

Catfish cultivation at UPR Mandiri Abadi is currently producing fish in the enlargement stage where UPR Mandiri Abadi carries out fish cultivation activities for approximately 3 months of maintenance and obtains catfish measuring 100-200 gr/tail so that 1 kg can contain 5-10 catfish for consumption. Post-harvest is a risky time to maintain the quality of fish meat so that farmers must pay attention to post-harvest fish treatment. UPR Mandiri Abadi has not implemented a cold chain system in distributing fish to buyers so that the taste and quality of catfish meat are still fresh until they reach consumers.

The stages of this service activity method are in the form of field surveys, counseling and training for the UPR Mandiri Abadi group

a. Field survey

Before carrying out service activities, the team collaborated with UPR Mandiri Abadi to develop research and service activities. Due to problems regarding

694) Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi, Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R.

post-harvest fish delivery techniques, training and counseling regarding cold chain delivery of fish was provided to cultivation groups at UPR Mandiri Abadi

b. Counseling

Counseling is provided by providing material regarding sending fish using a cold chain system, methods and methods of cold chain delivery as well as the benefits and advantages of sending cold chain fish.

c. Training

Cold chain system training is carried out by directly practicing how to send fish post-harvest using a cold chain system so that the quality of catfish is maintained

Result

The results of service activities carried out at UPR Mandiri Abadi are as follows:

Figure 1. Community service activities at UPR Mandiri Abadi



The cold chain concept was conceptualized for post-harvest fish handling at UPR Mandiri Abadi:

Figure 2. Cold chain catfish delivery process



695) Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi, Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R.

Discussion

UPR Mandiri Abadi is a fish farming community group in the city of Palembang. UPR Mandiri Abadi has been in process since 2015. Since the beginning of its fish cultivation activities, UPR Mandiri Abadi has carried out catfish cultivation activities for enlargement. Sales of catfish at UPR Mandiri Abadi reach 1500 kg in one harvest cycle. In 1 year, UPR Mandiri Abadi can carry out 2 cycles of fish cultivation. Catfish consumed by UPR Mandiri Abadi is usually sold directly to the community around the cultivation location and to collectors and food sellers in large or small restaurants. Catfish cultivation at UPR Mandiri Abadi currently uses tarpaulin ponds and regular feeding 3 times every day. Harvesting activities are carried out when the catfish reach a weight of 150 grams to 200 grams per fish. Where in 1 kg of fish weight there are 8-6 catfish.

Buyers of catfish for consumption at UPR Mandiri Abadi reach the Indralaya area of Ogan Ilir district where the travel time for delivery to Indralaya is approximately 2 hours' drive from the city of Palembang. In the current harvest process, UPR Mandiri Perennial uses partial harvest and total harvest. Partial harvest is carried out under conditions that adjust to consumer needs so that not all the fish in the pond are harvested, while total harvest is usually carried out at the end of the cultivation cycle where the fish in the pond are uniform in size and ready to be sold. According to (Baiduri et al., 2022) partial harvest is carried out to consider fish productivity, economic growth and land readiness for further fish cultivation.

Sending fish over long distances will result in a decline in the quality of fish meat until it reaches consumers, so innovation is needed in maintaining the quality of fish during the delivery process, one of which is by implementing a cold chain in the process of sending fish to consumers. According to (Wodi et al., 2018) fish freshness has a very important role in determining the quality of fishery products. The quality of fishery products greatly influences the production process, when determining the selling price/selling value of fish. Good and correct handling which is still being carried out today is by implementing a cold chain system, namely keeping the fish cold (low temperature). So that the freshness of the fish can be maintained properly. The simplest cooling medium that can be done is using ice, because it is relatively cheap, easy to obtain and not dangerous. Ice can reduce temperature, so it has a role in inhibiting the activity of microorganisms thereby delaying fish rot.

The process of fish spoilage can occur due to changes due to the activity of certain enzymes found in the body, the activity of bacteria and other microorganisms or due to the process of fat oxidation by air. Usually, the activities that cause the above spoilage can be reduced or stopped altogether if the environmental temperature is lowered, for example by using low temperature. Preservation using low temperatures is intended to inhibit or stop microbial growth, enzymatic and chemical reactions. The temperature used has a different influence on microbial growth and the reactions that take place (Afrianto and Liviawaty, 1989)

Extension activities regarding the cold chain system for post-harvest fish treatment at UPR Mandiri Abadi are expected to provide benefits for fish farmers in maintaining the quality of their harvest. according to (Suningsih et al., 2024) practical counseling and training provide benefits in increasing knowledge and technology for the community to reduce agricultural waste with silage technology which has proven to be useful in improving sustainable agricultural practices.

Cold chain treatment for fish shipments can be done by adding ice cubes and ice cubes and salt. This is to maintain the freshness of the fish by maintaining ice cubes so that the fish remains cold. Adding salt to the ice medium can lower the freezing point of ice (0°C) so that the temperature. The fish center is capable of being below 0°C causes a long timusingor the cold chain system to catch fresh fish takes longer compared to just using ice. With a decrease in temperature fish center below 0°C then growth/ activity of bacteria in the

696) Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi, Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R.

fish body will be disturbed during use ice media with the addition of salt can resulting in a long cold chain system time old and durable. Decreased central temperature fish below 0°C with the addition of salt still under cooling due to limits cooling temperature between -2°C to 10°C (Murniyati, dan Sunarman, 2000). (Wiranata et al., 2017) stated that sending fish using a cold chain system using salt, the quality of the freshness of the fish is better than using ice cubes alone

It is thought that sending fish using the cold chain method can reduce the level of deterioration in fish quality during the process of sending fish to consumers. According to (Nento and Suwandi, 2014), there are changes in the quality of tuna fish due to organoleptic changes that occur in fish treated with the cold chain process. Deterioration of fish quality will affect the quality and taste of the fish so that the implementation of the cold chain is very necessary in UPR Mandiri Abadi. Some food processing technologies will be closely related to the post-harvest process carried out according to (Samudro et al., 2024) which states that the post-harvest process greatly influences the final food product produced, as well as the processing technology carried out will influence the quality of the final product.

The cold chain process can prevent deterioration in fish quality so that the quality of the fish is maintained so that the selling price will also be high. According to (Pertiwi and Handayani, 2023) stated that the cold chain process reduces the quality of fish so that it can reduce the risk of supply chain activities so that the fish business sustainability process can run well.

Conclusion

The conclusion that has been obtained from community service activities at UPR Mandiri Abadi is that all members of the UPR Mandiri Abadi group have participated in the outreach activities well. It is hoped that with the information regarding the application of the cold chain for post-harvest fish delivery over long distances it can be slowly implemented at UPR Mandiri Abadi. By implementing the cold chain, sending fish to suppliers will keep the fish fresh. Hopefully, with training on harvesting with fish chains at UPR Mandiri Abadi, the catfish harvested can maintain the freshness of the fish and can increase the selling value of the fish harvested from UPR Mandiri Abadi.

Acknowledgements

We would like to thank the Sriwijaya State Polytechnic Community Service Research Center and also the UPR Mandiri Abadi partners who have given the time and opportunity to the service team to carry out outreach activities at UPR Mandiri Abadi.

Reference

- Afrianto, E dan E. Liviawaty. 1989. *Pengawetan dan Pengolahan Ikan*. Yogyakarta: Kanisius
- Baiduri, M.A., Andriani., Ridwan dan Muslimin. 2022. *Panen Parsial sebagai penyeimbang antara biomassa udang dan daya dukung media pada budidaya udang vaname di tambak intensif*. Prosiding Seminar Nasional Politani Pangkap. Vol 3.pp 115-122.
- Direktorat Jendral Perikanan. 2000a. *Konsepsi Dasar Pendoman Penerapan Manajemen Mutu Terpadu (PMMT) Berdasarkan Konsepsi HCCP Modul I*. Direktorat Usaha dan Pengelolaan Hasil Dirjen Perikanan. Jakarta
- Lazuardi, S. D., Achmadi, T., Wuryaningrum, P., & Putri, S. N. (n.d.). *Model Standardisasi Pengiriman Kemasan Rantai Dingin pada Usaha Kecil dan Menengah dengan Moda Transportasi Laut*. In *Journal of Advances in Information and Industrial Technology (JAIIIT)* (Vol. 2, Issue 1).
- Moeljanto, 1992, *Pengawetan dan Pengolahan Hasil Perikanan*, Jakarta : Penebar Swadaya
- Murniyati, A. S dan Sunarman. 2000. *Pendinginan, Pembekuan, dan Pengawetan Ikan*. Kanisius. Yogyakarta. Hal. 15-21
- Nento.N.. Suwandi. 2014. *Perubahan Mutu Daging Terang Ikan Tuna Yellowfin di Perairan*

697) Post Harvest Handling of Fish Through the Cold Chain at UPR Mandiri Abadi, Rarassari, M. A., Sa'adah, R., Innayatullah, A., Khairunnisa, E. N., Ritonga, N. B., Riani, I. G., Utami, A. S., Handayani, M. T., Puteri, R. E., Sari, S. R.

- Teluk Tomini Propinsi Gorontalo* (JPHPI. Volume 17. Nomor 3). Bogor.
- Pertiwi, Q. M dan W.Handayani. 2023. *Analisis Manajemen Risiko Penerapan Cold Chain System Pengolahan Ikan Terinasi dengan Integrasi Metode Analytical Process Network (ANP) dan Failure Mode and Effect Analysis (FMEA)*. Jurnal Riset dan Konseptual. Vol.8(1): hal 205-217. <http://dx.doi.org/10.28926/briliant.v8i1.1144>
- Samudro, B. R., A.M. Soesilo. Y. P. Pratama. A. Prasetyo. 2024. *Alternative Fish Food Production Technology: Case Study in Trenceng Village, Tulungagung Regency* . Jurnal Pengabdian Masyarakat. Vol 5 (1): hal.130-135. <https://jurnal.stie.asia.ac.id/index.php/jpm/article/view/1179>
- Suningsih, N., M. Hakim., Nur'aini. 2024. *Training on the Application of Silage Technology for Vegetable Waste as Feed for Ducks in Kayu Manis Village*. Jurnal pengabdian Masyarakat. Vol.5. No.1. hal. 1-7 <https://doi.org/10.32815/jpm.v5i1.1259> <https://jurnal.stie.asia.ac.id/index.php/jpm/article/view/1259>.
- Suriawira. 2005. *Penguji Mutu Hasil Perikanan yang Aman bagi Kesehatan*. Jakarta: Jasa Boga.
- Winarni, T., Swastawati, F., Darmanto, Y. S., dan Dewi, E. N. 2003. *Uji Mutu Terpadu pada Beberapa Spesies Ikan dan Produk Perikanan Di Indonesia*. Semarang : Universitas Diponegoro
- Wiranata, K., I. W.Widia dan I.P.G.B. Sanjaya. 2017. *Pengembangan Sistem Rantai Dingin Ikan Tongkol (Euthynnus Affini) Segar Untuk Pedagang Keliling*. BETA (Biosistem dan Teknik Pertanian). Vol 6 (1). Hal 12-21. <http://ojs.unud.ac.id/index.php/beta>.
- Wodi, S. I. M., Rieuwpassa, J., Cahyono. E. 2018. *Peningkatan Kualitas Hasil Tangkapan Melalui Penerapan Sistem Rantai Dingin di Kelurahan Santiago*. Jurnal Ilmiah Tatengkorang. Vol. 2 (2): Hal 70-72.
- Zhu.X.. Zhang. R.. Chu. F.. He. Z.. Li. J.. 2015. *A Flexsim-based Optimization for the Operation Process of Cold-Chain Logistics Distribution Centre* (*Journal of Applied Research and Technology* Vol 12 Number 2 Pages 270-278). Beijing.