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Strengthening Fish Product Processing Skills for Featured Product Innovation and Entrepreneurship

Rasidah[1,3*], Yuliana[1,3], Ani Mahrita[2], Leony Wulandari[1], Vionae Igeshy Daniella[1], and Yusi Christiani[2]

[1]Chemistry Department, Faculty of Mathematics and Natural Sciences, Universitas Palangka Raya, Palangka Raya, Indonesia

[2]Management Department, Faculty of Economics and Business, Universitas Palangka Raya, Palangka Raya, Indonesia

[3]Nutriscience Laboratory, Palangka Raya, Indonesia

*rasidah@mipa.upr.ac.id

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Abstract

The Freshwater Fisheries Agribusiness Department at SMKN 5 Palangka Raya has no featured product yet. The lack of equipment and training in schools is a factor causing the limited practice of processing farmed fish. The community service team held training to improve fish product processing skills using the PAR (Participatory Action Research) and ABCD (Asset-Based Community Development) methods as a form of community service. This activity aims to develop featured products and entrepreneurship for students according to their major specialization. From this activity, two featured products, namely fish balls and Crispy Patin, were successfully developed with the use of attractive and modern packaging. In addition, the pre-test and post-test results showed increased students' understanding of fish processing into high-selling products and the concept of entrepreneurship, with an average score of 76.9. The service satisfaction results were very good (⩾80%) regarding suitability of interests, benefits, time allocation, knowledge delivery, and equipment provision. In the future, students are expected to be motivated to become entrepreneurs who meet their interests and available resources.

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INTRODUCTION

SMKN 5 Palangka Raya is an educational institution located in a remote village on Jl. Manduhara, Kereng Bangkirai, Sabangau District, Palangka Raya City, Central Kalimantan Province. The disparate advancement and educational resources in Central Kalimantan render this school less appealing to prospective students, even though the distance from this school to Palangka Raya City is only about 30 minutes. Most students choose schools in the city center that offer more comprehensive facilities. Consequently, despite the institution offering three majors—freshwater fisheries, agribusiness, visual communication design, and animal nursing—the students are only 60 as of March 2024.

The freshwater fisheries agribusiness department is the first to be opened and already has adequate fish farming facilities and infrastructure (tilapia, catfish, and Pangasius

catfish). Interviews with the principal and instructors of SMKN 5 Palangka Raya revealed that the school has not yet featured processed fish products. Interviews with the principal and instructors of SMKN 5 Palangka Raya revealed that the school currently lacks distinguished processed fish items. Despite the school possessing six fish ponds for rearing and two for breeding as resources for processing and developing fish products, the existing instructional curriculum remains confined to fish breeding. A significant aspect influencing this is the deficiency in knowledge and abilities among students about the production of fish-based products. The inadequate facilities for practical equipment in fish product processing restrict the feasible operations that can be conducted. For instance, students lack access to various equipment, including dehydrators, ovens, sterilizers, vacuum machines, heavy-duty sealing machines, coolers, and other fish product processing apparatus. Consequently, individuals cannot do diverse experiments autonomously and solely depend on theoretical knowledge from textbooks or video presentations. Practical activities are limited to processing fish products through basic boiling or frying techniques, utilizing non-durable packaging. Eventually, the focus of student learning and practicums is predominantly on fish cultivation rather than the processing of fish farming products, resulting in a significant deficiency in economic activity and entrepreneurial interest among students at SMKN 5 Palangka Raya. Without direct experience, students will inevitably struggle to cultivate the practical skills and creativity necessary to develop processed fish products and the packaging designs.

The school's location is near the Kereng Bengkirai Pier Tourist Attraction, along the Black Water Sabangau River banks, frequented by local and international tourists, presenting an excellent opportunity to promote the school's featured products. This represents a prospective market for the marketing and selling processed fish products derived from the school's growing operations. Consequently, the SMKN 5 Palangka Raya community service initiatives include training in fish product processing skills and education on nutrition, quality, and food safety. This activity encompasses disseminating scientific and technological knowledge to collaborators in the proposer's areas of specialization, specifically chemistry, biotechnology, and management, on the quality and safety of food ingredients, food processing technology, and product marketing management. Activities engage teachers and students in developing the school's featured products, indirectly educating pupils in entrepreneurship (Arisanty et al., 2020; Priyono et al., 2022; Yuddin et al., 2021). These are the things that distinguish this community service from other socializing events, product development training, or community empowerment (Ansar et al., 2023; Oktavianawati & Palupi, 2017; Usman et al., 2023; Wally & Abdollah, 2022).

Processing local products with attractive packaging, long shelf life, and without preservatives is very necessary to produce featured products that captivate consumer interest (Alisa Septivianti & Made Ida Pratiwi, 2023; Julyaningsih et al., 2023; Ramadhina & Mugiono, 2022). Along with the advancement of the modern era, the notion of manufacturing processed fish products must align with the current trending food culture. Therefore, the primary objective of this community service is to implement healthy fish-based product processing technology that excludes dangerous food additives, ensures good taste, and features modern packaging aesthetics. Thus, it is hoped that it will enhance the creativity and innovation of students in educational institutions, particularly with product diversification and packaging design concepts. This program aims to deliver a thorough experiential learning opportunity through problem-solving activities in their surroundings, ensuring that knowledge transfer aligns with the participating students' needs.

METHODS

The execution of community service activities used a combination of PAR (Participatory Action Research) and ABCD (Asset-Based Community Development) methods. This program involves students from grades XI and XII majoring in Freshwater Fish Agribusiness and Visual Communication Design, and SMKN 5 Palangka Raya teachers as partners. Partners served as training participants, while the community service team served as resource trainers and mentors during the program. The community service team generally delivered or demonstrated knowledge and skills while assessing participants' understanding during each session. Then, they provided feedback and opportunities for independent implementation for 1-2 months.

The stages of the activity that were carried out are as follows.

1. Preparation
   Preparation included administrative activities and technical matters required so that the implementation of activities can run smoothly, such as coordination with partners, division of tasks, preparation of materials and equipment for training, and other things.
2. Implementation
   This stage encompassed three primary activities: information dissemination, practical application, and subsequent autonomous work demonstration.
3. Monitoring and Evaluation
   Monitoring and evaluating activities included monitoring and evaluating the understanding of knowledge and skills, and the achievement of meeting output targets.

RESULTS AND DISCUSSION

The program commences with a discussion with the teachers concerning the diversification of processed fish products that have been and will be produced as premier school offerings before the training session. The school already has processed fish products such as fermented fish (*wadi*), meatballs, and crispy fish, which are often showcased and sold at the EXPO organized by the Central Kalimantan Provincial Education Office at the end of the year. From the discussion, particularly about the challenges encountered, an agreement was reached to manufacture pangasius catfish products (patin fishballs and crispy patin) that represent the school.

Pangasius catfish is selected as the primary raw material for featured products because it is an indigenous fish cultivated at the school and has nutritional benefits. Fish is healthier than meat and chicken because it has high fatty acids. Specifically, Pangasius catfish has a high fat content, potentially reaching over 40%, compared to other freshwater fish such as snakehead fish and carp, which are 4.0% and 2.9% (Lestari, 2010; Panagan et al., 2012; Pandiangan, 2021). Moreover, Pangasius catfish is a source of omega-3 (EPA and DHA) and omega-6 (ARA). Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are two forms of omega-3 fatty acids beneficial for cognitive development, stamina, and cardiovascular health, akin to arachidonic acid (ARA), a type of omega-6 fatty acid (Hidayaturrahmah et al., 2016). More specifically, pangasius catfish fat contains EPA, DHA, and ARA, approximately 0.21-2.48%, 0.95-9.96%, and 0.349-1.105%, respectively (Panagan et al., 2012). The digestibility value of fish protein, particularly catfish, is notably high at approximately 94%, signifying a greater percentage of protein that can be digested, absorbed, or utilized by the body (Anugrahati et al., 2012). Thus, selecting Pangasius catfish as the primary ingredient is based on economic and health considerations.

The initial training sessions related to entrepreneurship, specifically focusing on business feasibility studies and business planning, were imparted by Mrs. Ani Mahrita, S.E., M.Sc. According to Zimmerer & Scarborough (1996), entrepreneurship arises from a methodical and structured process that entails the utilization of creativity and invention in response to market requirements and opportunities. It is essential to recognize that a viable business or enterprise can yield a return on investment and generate sustainable profits over the long run (Syawal et al., 2020). Numerous enterprises yield substantial profits yet lack sustainability, ultimately leading to bankruptcy and replacement by competitors over time; thus, creativity and invention alone are insufficient. Strategic business planning is essential to ensure the viability and expansion of the enterprise. Business planning entails the formulation of strategic measures that include identifying market opportunities and challenges, developing marketing and sales strategies, developing human resources, analyzing technology and innovation, and managing environmental sustainability, all aimed at resource optimization and the preparation for potential risks and contingencies to attain long-term objectives and visions (Sagala et al., 2024). Consequently, partners need to possess the information and abilities necessary to assess the viability of the school's featured product.

This training activity is designed systematically to cover various aspects involving learning about science and technology that include mastery of knowledge and practical skills, from planning and manufacturing to marketing. Hasan (2020) emphasized that the cornerstone of success in entrepreneurship education lies in discovering the most effective pedagogical approaches for imparting learnable skills and aligning student needs with the teaching methods used. Therefore, in the second training session, partners were provided with food quality and safety topics, including quality standards and food packaging selection, by Mrs. Rasidah, S.Pd., M.Sc. This material serves as a reinforcement of the practical application of prior business planning resources, emphasizing that partners must comprehend food quality and safety before fish product processing, ensuring that all production or processing activities do not compromise the quality of the final product. Consequently, the quality of the processed product is preserved or can be enhanced in compliance with established food safety norms and standards.

Following the students' comprehension of food quality and safety, Mrs. Yuliana, S.Si., M.Biotek, conducts training on fish product processing. Each session includes theoretical and practical skills assisted by college students, as illustrated in Figures 1.

(a) (b)

Figure 1 (a) Fish product processing practices and (b) Introduction to equipment and packaging practices for processed fish products

The entrepreneurial process begins with innovation. This innovation is influenced by various internal and external factors, such as education, sociology, organization, culture, and environment (Nizar et al., 2017). Through fish product processing training, students are introduced to the types and technologies of food processing and preservation and the various uses of food additives. The team also provides food storage and processing equipment to enhance student practice, including freezers, dehydrators, meat grinders, vacuum sealers, pouch sealers, and other ancillary equipment. Thus, it is hoped that transferring science and technology will operate efficiently and sustainably, affording students enhanced prospects for innovation, unimpeded by inadequate equipment.

To assess students' comprehension of the material presented, a test consisting of 10 questions was administered both before (pre-test) and after (post-test) the sessions. The entrepreneurship session covers four aspects of business feasibility analysis: production management, human resources, finance, and marketing management. Concerning the comprehension of business feasibility aspects, there was a notable enhancement in students' understanding before and after the knowledge transfer. In the pre-test, only 7.7% of participants provided correct responses, which rose to 65.4% in the post-test. This indicates that students increasingly comprehend the concepts associated with the four aspects of business feasibility assessment. Students have a better comprehension of financial and production management compared to human resources management. This is likely due to the importance of determining production prices, where the main reference is financial. This comprehension is evidenced by the rise in percentage from the pre-test score of 53.8% to the post-test score of 76.9%.

Figure 2 shows that students' comprehension of the three training subjects has improved. In entrepreneurship, students' comprehension improved from satisfactory to commendable, with an average score rising from 49.2 to 61.2. A considerable enhancement in comprehension was observed regarding food product quality and safety, rising from an initial average score of 36.5 (moderately satisfactory) to 65.9 (satisfactory). The highest average scores from the pre-test and post-test were recorded in the comprehension of the fish processing topic, specifically 66.9 and 76.9. Among the three subjects, students possess greater familiarity with fish processing than with the other two, which may be unfamiliar, particularly those about food product quality and safety.

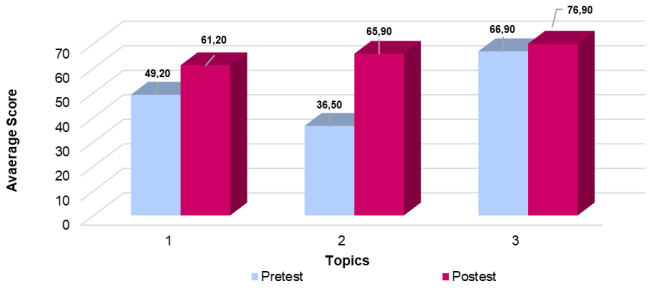

Figure 2 Level of student understanding of the subjects presented

This community service has accomplished its objective of enhancing understanding and abilities in production and marketing management. For instance, fish ball production utilized instant flour or premixes without understanding the specific composition of their ingredients, and the production can now employ self-formulated ingredients, both in terms of type and quantity of food additives. Furthermore, the product was previously packaged solely in mica plastic (Figure 3a), and now the school can subsequently offer its products in more appealing and durable packaging, as illustrated in Figure 3b. An airtight

or vacuum packaging technology for fish ball products will extend shelf life, facilitating broader market distribution.

(a) (b)

Figure 3 (a) Initial product view and (b) Final product view

The overall service satisfaction results (Figure 4) related to time allocation, topic interest, benefits, knowledge delivery, and adequacy of equipment provision fall within the excellent category (≥80%). Besides the aspects of time allocation and topic interests, other aspects achieved a satisfaction rate of 90%.

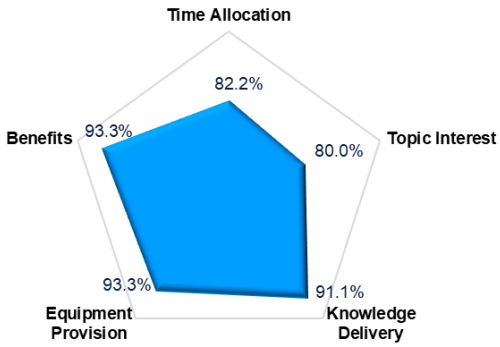

Figure 4 Results of satisfaction with community service activities

Subsequently, over 60% of students reported never participating in fish product processing and entrepreneurship training (Figure 5). Although a small number of students had participated in similar training, all students agreed that this training may enhance their knowledge and abilities and benefit the family's economy.

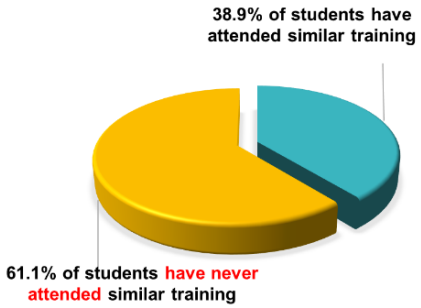

Figure 5 Partner participation in similar product processing and entrepreneurship training activities

Therefore, students deemed this activity highly beneficial and essential. Furthermore, most students, specifically 55.6%, agreed that such activities should be sustained (Figure 6).

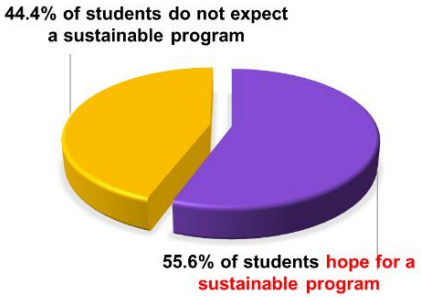

Figure 6 Partner enthusiasm for the need for program sustainability

CONCLUSION

The community service activities at SMKN 5 Palangka Raya were conducted efficiently and effectively, garnering a positive response categorized as very good (≥80%). According to the enhancement in students' comprehension of fish processing into lucrative products and the principles of entrepreneurship, reflected in an average score of 76.9. This program successfully achieved the objective of producing outstanding products, specifically fish balls and crispy patin. Hopefully, it will inspire students to initiate a business or entrepreneurial endeavor aligned with their interests and available resources.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

All authors contributed to producing the final version of this article according to their respective expertise and roles.

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AUTHOR PROFILES

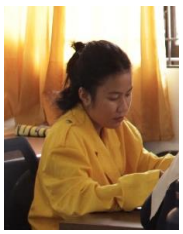
Rasidah, S.Pd., M.Sc.
Lecturer in the Chemistry Department, Faculty of Mathematics and Natural Sciences, Universitas Palangka Raya. Research interest: environmental chemistry, wastewater treatments, and natural products. Email: rasidah@mipa.upr.ac.id, Google Scholar: W7Ue_xIAAAAJ Sinta ID: 6718022, ORCiD: 0000-0001-6555-8986, and Scopus ID: 57222347509.

Yuliana, S.Si., M.Biotek.
Lecturer in the Chemistry Department, Faculty of Mathematics and Natural Sciences, Universitas Palangka Raya. Research interest: biotechnology, natural products, and bioremediation. Email: yuliana@mipa.upr.ac.id, Google Scholar: D4yTNOsAAAAJ, Sinta ID: 6848968, ORCiD: 0009-0006-9549-6230, and Scopus ID: 57215431140.

Ani Mahrita, S.E., M.Sc.
Lecturer in the Management Department, Faculty of Economics and Business, Universitas Palangka Raya. Research Interest: financial management, investment, and corporate management. Email: animahrita@feb.upr.a.id, Google Scholar: Z0M8m-UAAAAJ, Sinta ID: 6718102, ORCiD: 0009-0003-0702-1541, and Scopus ID: 57222590577.

Leony Wulandari
Student of the Chemistry Department. Email: leonywulandari22@mhs.mips.upr.ac.id

Vionae Igeshy Daniella
Student of the Chemistry Department. Email: vionadan01@mhs.mipa.upr.ac.id



Yusi Christiani
Student of the Management Department.