BUILDING A VALUE CHAIN MODEL FOR TAMOGI MUSHROOM (PLEUROTUS CITRINOPILEATUS) IN LUONG SON, PHU THO, VIETNAM

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Abstract:
Tamogi oyster mushroom (Pleurotus citrinopileatus) is a highly valuable food and medicinal mushroom species, rich in β-glucan and antioxidants, and in increasing demand in the functional food market. This study aims to develop and evaluate an integrated value chain model for Tamogi mushrooms in Luong Son commune, Phu Tho province, Vietnam, encompassing production, processing, commercialization, and integration with agricultural tourism development. The model will be implemented from April 2024 to September 2025 through collaboration between cooperatives, farmers, and businesses. Standardized technical procedures have been developed for mushroom propagation, controlled cultivation, post-harvest processing, and the production of value-added products such as dried mushrooms, mushroom powder, tea bags, and instant tea granules. Research results show that the disease infection rate during cultivation decreased from 12–15% to 3–5%, while productivity increased by approximately 18–25% compared to the period before applying the model. The system achieved a production capacity of approximately 60 tons of fresh mushrooms per year according to GACP-WHO standards. Simultaneously, the model created jobs for about 50 local workers and successfully developed 4 products that received OCOP certification. The integration of digital traceability and agricultural tourism has contributed to improving market access and increasing product value. This research provides a scalable model framework for developing a bioeconomic value chain based on mushrooms in Vietnam and other regions with similar conditions

Keywords: *Tamogi mushrooms; Value chain; Functional food; Rural development; OCOP.*

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1.Introduction

The global shift toward sustainable food systems has strongly promoted the development of functional foods, circular bioeconomy, and integrated agricultural value chain models. In this context, edible-medicinal mushrooms are increasingly asserting their role due to their nutritional value and pharmacological potential, including their ability to modulate immunity, act as antioxidants, and support metabolic regulation (Ahmed,S.A.; Kadam,J.A.; Mane,V.P.; Patil,S.S.; Baig, M.M.V.; 2009), (Aso-Campos H. and Zolla G.; 2026). Among these, Pleurotus Citrinopileatus (Tamogi mushroom) is considered a highly valuable species due to its significant β-glucan content and bioactive compounds such as Ergothioneine and Polyphenol (Baumgartner U.; Nguyen T., 2017), (Bentangan,M.A.; Nugroho,A.R.; Hartantyo,R.; Ilman,R.Z.; Ajidarma,E. and Nurhadi,M.Y.; 2020). The global transition toward sustainable food systems has spurred the development of functional foods, circular bioeconomy, and value chain models. Food-medicinal fungi are increasingly recognized for their nutritional and therapeutic properties, including immunomodulatory, antioxidant, and metabolic modulatory capabilities (Ahmed,S. A.; Kadam,J.A.; Mane,V.P.; Patil, S. S., & Baig, M. M. V.; 2009), (Aso-Campos H. and Zolla G., 2026).

Globally, many countries such as Japan, South Korea, and China have successfully developed value chains for medicinal mushrooms that integrate production, deep processing, and commercialization into functional foods and health-protective foods (nutraceuticals) (Berch,S.M.; Kang-Hyeon, K.; Hyun, P., & Winder, R.; 2007), (Bijla S.Sharma V.P.; 2023). These systems not only include functional food and beverage products but also extend to cosmetics, healthcare, and agricultural tourism, thereby contributing to the development of a circular economy (Burkitbayeva S.; Swinnen J.; 2018), (Chang,S.T.; & Wasser,S.P.; 2017). Simultaneously, the application of digital technology and traceability systems has helped to enhance transparency, management efficiency, and sustainability of the value chain (Chauhan,D.; 2024). These systems often include nutraceutical products, beverages, cosmetic applications, and integrated agricultural tourism, contributing to the circular economy (Burkitbayeva S.; Swinnen J.; 2018), (Chang,S.T.; & Wasser,S.P.; 2017). They also often integrate digital traceability systems, helping to enhance both economic and environmental sustainability (Chauhan, D., 2024).

However, in many developing countries, the current mushroom production system still mainly operates on a linear model with low added value, focusing on the consumption of fresh products with short shelf lives. This situation leads to low economic efficiency, high post-harvest losses, and limited market linkages. In Vietnam, although medicinal mushrooms in general and Tamogi mushrooms in particular have significant economic potential and biological value, commercialization is still not commensurate due to heavy reliance on natural harvesting, lack of advanced processing technology, and the absence of a sustainable distribution system (Choi,S.-W.; & Shin,Y.J.; 2023).

In addition, opportunities for value chain development remain wide open through cooperation with processing businesses, participation in the "One Commune One Product" (OCOP) program, and application of certification standards such as organic or FairWild to enhance traceability and commercial value (Dai,Y.C.; Yang,Z.L.; Cui, B.K.; Yu,C.J.; Zhou,L.W., 2022), (Do,T.T.H. and Le,K.L.,2025).

However, most mushroom production systems in developing countries remain linear and low-value, primarily focused on selling fresh produce with limited shelf life. This results in low economic efficiency, high post-harvest losses, and weak market linkages. In Vietnam, despite its high medicinal and economic value, commercialization remains limited due to unsustainable natural exploitation, low added value, and uneven distribution of benefits (Choi,S.-W., & Shin,Y.J.; 2023).

Many new and innovative agricultural products can be brought to market. Opportunities include collaboration with private processing businesses, participation in the One Commune One Product (OCOP) program, and the application of certification programs (organic, FairWild) to enhance traceability and market value (Dai,Y.C.; Yang,Z.L.; Cui,B.K.; Yu,C.J.; Zhou,L.W.; 2022), (Do,T.T.H. and Le, K.L.; 2025).

Tamogi mushrooms, belonging to the genus Pleurotus, are well-adapted to warm climates but have stricter ecological requirements than common oyster mushrooms. Microclimatic conditions during cultivation directly affect yield, fruiting body color, and the content of bioactive compounds (Gebru H., Belete T., Faye G., 2024). The optimal mycelial growth phase occurs at temperatures of 24-28°C, with an acclimatization threshold ranging from 20-32°C (Gereffi, G., Humphrey, J., & Sturgeon, T., 2005).

Meanwhile, fruiting body formation requires "thermal shock" or relative temperature reduction conditions, with an optimal temperature of 18-24°C, air humidity of 85-95%, CO_2 concentration below 800-1,000 ppm, light intensity of approximately

500-1,000 lux, and substrate humidity maintained at 60-65% (Guo, H., Xu, W., Lin, M., Zhang, X., & Liu, P., 2025).

Therefore, Tamogi mushrooms grow most effectively in subtropical-temperate climates or in controlled indoor cultivation systems in tropical regions. (Tamogi is a species of Pleurotus adapted to warm climates, but more sensitive than common oyster mushrooms. Suitable climatic parameters for Tamogi cultivation play a decisive role in yield, color, and content of bioactive compounds (Gebru H., Belete T., Faye G., 2022).

Because mycelium grows faster under stable warm temperatures (mycelial growth stage), the optimal temperature is 24–28°C with a tolerance range of 20–32°C (Gereffi,G., Humphrey,J.,& Sturgeon,T., 2005). Since Tamogi requires a temperature drop or thermal shock to stimulate fruiting body formation during cultivation, the fruiting body formation stage requires an optimal temperature of 18–24°C, optimal humidity of 85–95%, and optimal CO_2 concentration below 800–1,000 ppm. (Medium light intensity of 500–1,000 lux and substrate humidity of 60–65%.)

The development of value chains for medicinal plants and their products not only improves access to markets, inputs, and credit for smallholder farmers but also promotes production efficiency (Burkitbayeva, S., Swinnen J., 2018), (Porter, M., 1985). In Vietnam, the Government increasingly prioritizes the development of agricultural value chains (Baumgartner U., Nguyen,T.H.; 2017), (Thi,T.H.H.; Sy, H.U.; 2026). Although the cultivation of Tamogi mushrooms has expanded in recent years, its use remains mainly limited to fresh consumption, resulting in low added value and short shelf life.

In Vietnam, the midland and mountainous areas of the North such as Hoa Binh, Phu Tho, Lao Cai as well as the Da Lat plateau are considered to have suitable ecological conditions for cultivating Tamogi mushrooms (Grunert, K., Jeppesen,L.F.; Jepersen, K.R., Sonne,A-M.; 2005), (Jihyuk, Bang; Ji Woo Han, 2025).The Luong Son area is located in the transitional climate zone of Northern Vietnam, characterized by a tropical monsoon climate and an average altitude of 200-600 meters above sea level. The climate conditions here are relatively favorable for the development of medicinal mushrooms, with an average annual temperature of 22-24°C, rainfall of 1,600-2,000 mm/year, and air humidity maintained at 80-88%.

Seasonally, the period from April to June is the transitional period at the beginning of the rainy season, with temperatures of 24-32°C, rainfall of 100-250 mm/month, and the onset of monsoon rains, increasing humidity (85-90%). The period from July to September is the peak of the rainy season, with temperatures of 26-34°C, rainfall of 250-400+ mm/month, heavy rain, and high humidity (>90%), making it very suitable for agroforestry and mushroom cultivation. From October to December, this is the end of the rainy season and the beginning of a mild dry season with temperatures of 20-28°C, rainfall gradually decreasing to 50-150 mm/month, stable weather, and good sunshine. From January to March, this is the cool, dry season with temperatures of 14-22°C (possibly dropping to 10-12°C), rainfall of 20-60 mm/month, dry, cloudy weather, and occasional drizzle. From April to September, the beginning of the rainy season cycle begins again.

Theoretically, the value chain model proposed by Michael Porter (1985) (Lin,S.Y., Chien,S.C., Wang,S.Y., & Mau,J.L.; 2016) has become an important foundation in analyzing the production and commercialization of agricultural products. This approach allows for the consideration of the entire value creation process from input supply, production, processing to distribution and final consumption. According to Grunert et al. (2005), the value chain model has wide applicability due to the similarities in constituent elements across many production sectors (Nguyen,A.T.; Ngo,K.H.; Ngo,N.X.; Le,N.A.; Trinh,P.N.; Thao,D.T., et al., 2025).

Value chain analysis provides a framework for examining the processes and actors involved in the production, distribution, and consumption of medicinal plants, with the aim of identifying opportunities for value creation and improved livelihoods for participants, especially ethnic minorities in mountainous regions. This method has also been applied in the commercialization of medicinal plants and their products (Nguyen,A.T. et al., 2025) (Nguyen,T.D.; Nguyen,T.M.H.; 2012).

Michael Porter introduced the value chain model (Porter, 1985) (Lin,S.Y.; Chien,S.C.; Wang,S. Y., & Mau,J.L.;2016). Porter's classical value chain approach is suitable for many industrial processes and manufacturers. The value chain model can be applied to many businesses due to the basic elements being similar across industries (Grunert,K. et al.; 2005) (Nguyen,A.T.; Ngo,K.H., Ngo,N.X.; Le,N.A.; Trinh,P.N.; Thao,D.T., et al.,2025).

In this context, developing agricultural and medicinal plant value chains is considered an important strategy to increase income and promote sustainable rural development (Trienekens,J.H.; 2011; Osei,T.A. et al.; 2023) (Nguyen,V.T.P.; Vu T.V.P.; Vu,H.N.; Nguyen,T.H.; 2023). Developing medicinal plants and their products' value chains not only enhances smallholder farmers' access to markets, inputs, and credit but also boosts production efficiency (Burkitbayeva, S; Swinnen,J., 2018) (Osei,T.A.; Donkoh,S..; Ansah,I.G.K.; Awuni,J.A.; Cobbinah,M.T.; 2023). In Vietnam, the government has increasingly prioritized the development of agricultural value chains (Baumgartner,U.; Nguyen,T.H.; 2017),(Burkitbayeva,S.; Swinnen,J; 2018). Although Tamogi mushroom cultivation has expanded in recent years, its utilization remains limited to fresh consumption, resulting in low added value and short shelf life.

In Luong Son community, the research group implemented two Tamogi mushroom cultivation models. The first model was a controlled environment model with a temperature of 23–28°C, humidity of 80–90%, and ventilation of 8–12 cycles/hour. The second model was a lower-cost, well-ventilated house model for small-scale farmers. Each system had an area of approximately 500 m². A product processing and development model was also implemented (Jihyuk Bang; Ji Woo Han, 2025). Factors Influencing Farmers' Motivation to Adopt Smart Farm Technology in South Korea. Standardized protocols were established for drying and grinding; production of dried mushrooms, powders and extracts; and functional products (filter tea, and instant granule tea) (Nguyen,V.T.P.; Vu,T.V.P.; Vu,H.N.; Nguyen,T.H.; 2026).

Based on these technologies, we aims to develop and evaluate a pilot value chain model for Tamogi mushrooms in Luong Son, Phu Tho, integrating production, processing, and commercialization into a scalable and sustainable system. It comprises five stages, including: 1) Spawn production, 2) Cultivation, 3) Post-harvest processing, 4) Deep processing (functional products), and 5) Commercialization and distribution. The system combines horizontal linkages (cooperatives, farm groups, and farmers) and vertical integration from input supply to market (Nguyen, A.T. et al., 2025) (Grunert,K.; Jeppesen,L.F.; Jepersen,K.R.; Sonne,A-M.;2005).

The model incorporated both horizontal linkages (cooperatives and farmer groups) and vertical integration (from input supply to market distribution). This comprehensive value chain model is essential to enhance economic efficiency, improve product diversification, and support rural development.

2. Materials and Methods

2.1. Study area and implementation period

The study was conducted in Luong Son community (Phu Tho province). Agricultural residues were collected in Luong Son community and used such as sawdust, corn cobs, rice straw, and even mushroom substrate (mushroom growing medium) after harvest.

Major markets were in Phu Tho, Hanoi: Retail activities were conducted directly at the farm in Luong Son and through supply to affiliated units and distribution partners in Hanoi and several other provinces, of which the Hanoi market accounts for the major proportion. Some representative partners included Logistics Cooperative Union, Giang My Company, Uoc Le Gio Cha Cooperative, Phuong Northern Nem Cooperative, Vietnam Clean Mushroom Production and Investment Joint Stock Company, Toan Tam Hanoi Cooperative, Bac Ha Restaurant Tourism and Investment Joint Stock Company, Ngoi Sao Supermarket, VietRAP Thang Long Co., Ltd., together with several other affiliated units.

The project was implemented from April 2024 to September 2025.

2.2. Value chain framework

The value chain model comprised five stages, including:

1)Spawn production: Mushroom spawn production technologies were transferred and technically supported by the Mushroom Research and Development Center.

2)Cultivation: Mushroom cultivation technologies were transferred and technically supported by the Mushroom Research and Development Center. The production of mushrooms and mushroom-derived products is carried out at Luong Son Mushroom Farm with a workforce consisting mainly of local laborers, under the management of technical staff from VietRAP Trading Investment Joint Stock Company.

3)Post-harvest processing and product processing technologies were transferred and technically supported by the Institute of Chemistry and Materials.

4)Deep processing (Tamogi tea products): VietRap Co's facility

5)Commercialization and distribution: Product commercialization and distribution activities were managed by VietRAP Trading Investment Joint Stock Company, with most personnel working at the company's headquarters in Hanoi. The distribution system included direct retail sales, cooperative linkages, partner enterprises, and distribution units in Hanoi and many other provinces and cities.

The value chain comprised 02 models, including:

1)System horizontal linkages: cooperatives, farm groups and farmers

2) System vertical integration: from input supply to market distribution.

The value chain built 02 models, including:

1) Controlled environment cultivation model 500 m²

2) Ventilated house cultivation model 500 m².

Standardized protocols for drying and grinding; production of dried mushrooms, powders and extracts; and functional products (filter tea, and instant granule tea)

2.3. Data collection and analysis

Indicators included yield and disease rate, economic performance, employment, and product quality. Data were analyzed descriptively and comparatively.

3. Results and Discussion

3.1. Performance of cultivation models

Two models were successfully built for the value chain in the Luong Son community by the group of farmers, which forms the first element of the horizontal linkage. Figure 1 shows the controlled environment cultivation model (500 m²). It works at a temperature of 23-28°C, humidity of 80-90%, and ventilation of 8-12 cycles/h. This model belongs to the mushroom spawn production and cultivation system for which technology transfer and technical support were provided to VietRAP Trading Investment Joint Stock Company by the Mushroom Research and Development Center. In Figure 2, the ventilated house cultivation model (500 m²) was established. It fits as a lower-cost alternative for smallholders. Two models use locally available sawdust, corn cobs, and rice straw as cultivation substrates that serve as input for vertical integration.

Figure 1. Controlled environment cultivation model

Figure 2. Ventilated house cultivation model

The implementation of these two standardized cultivation protocols resulted in a substantial improvement in production efficiency and crop health as established in Figure 3. Disease incidence was markedly reduced from an initial 12-15% to 3-5%, reflecting enhanced hygiene control, optimized environmental conditions, and improved substrate management. Concurrently, yield increased by 18-25%, demonstrating the effectiveness of the integrated cultivation approach. The utilization of locally available agricultural residues (e.g., sawdust, corn cobs, and rice straw) as cultivation substrates contributed to both environmental and economic sustainability. This practice not only reduced input costs but also promoted circular resource use, aligning with bioeconomy and waste valorization principles. Under GACP-WHO-compliant conditions, the systems achieved an annual production capacity of approximately 60 tons of fresh Tamogi mushrooms. This output indicates the scalability and technical feasibility of the model for commercial deployment. The results highlight the critical role of standardization and resource optimization in enhancing productivity, reducing production risks, and supporting sustainable mushroom cultivation systems.

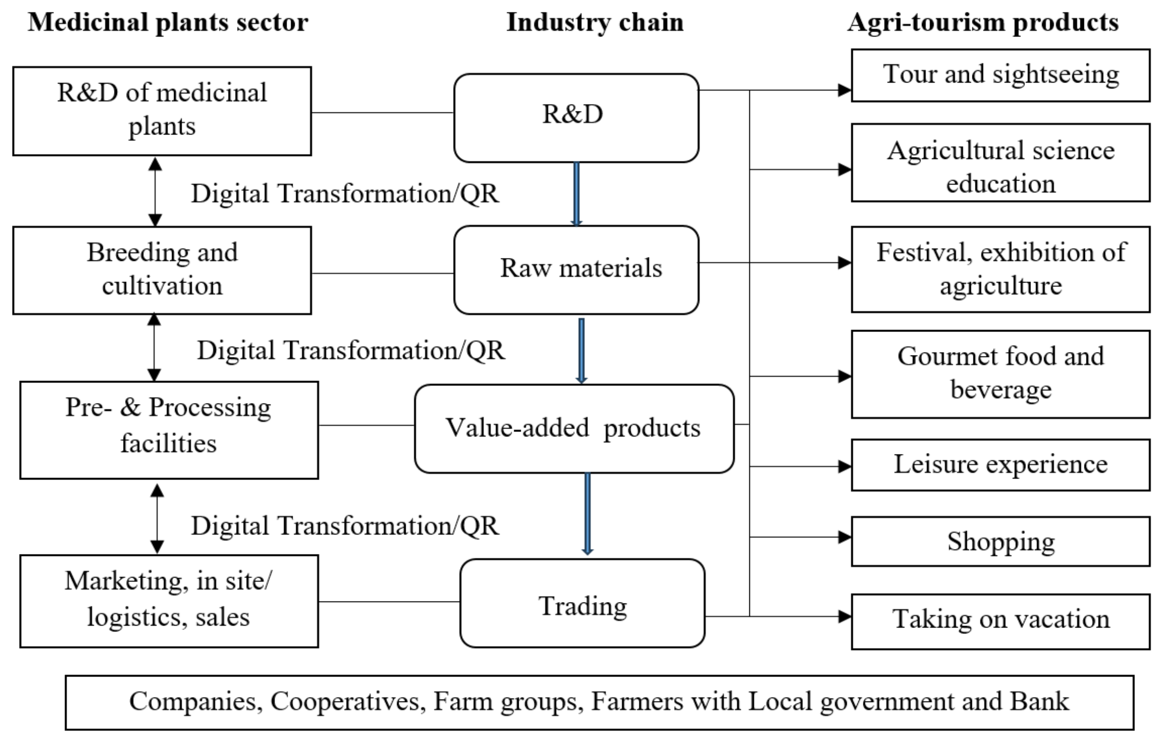

Figure 3. Schema of horizontal modern Tamogi mushrooms development and value chain integration

When compared with international mushroom production systems in China and South Korea, several similarities and distinctions can be identified. In China, large-scale mushroom cultivation systems are characterized by high mechanization, automated climate control, and industrialized substrate preparation, often achieving yields of 20-30 kg/m² per production cycle (Nguyen,V.T.P.; Vu,T.V.P.; Vu,H.N.; Nguyen,T.H.;2026),(Dai,Y.C.; Yang,Z.L.; Cui,B.K.; Yu,C.J.; Zhou,L.W.;2009).

Similarly, South Korea employs advanced smart-farming technologies, including IoT-based monitoring and precision environmental control, resulting in high productivity and consistent product quality (Zhang,Y.; Geng,W.; Shen,Y.; Wang,Y., & Dai,Y.C.;2014),(Jihyuk Bang, Ji Woo Han; 2025). Although the Vietnamese model operates at a smaller scale and with lower technological intensity, its performance indicators, particularly the reduction in disease incidence and yield improvement, are comparable to early-stage or semi-industrial systems reported in these countries. Notably, the reliance on locally available agricultural residues provides a distinct advantage in terms of sustainability and cost-efficiency, whereas industrial systems in China and Korea often depend on more energy-intensive processing and infrastructure. Furthermore, the integration of cultivation with downstream processing (e.g., functional products such as filter tea and instant granules) represents a key differentiation. While Chinese and Korean models are highly optimized for volume production, the present model emphasizes value addition and diversification, aligning more closely with emerging trends in functional food development and rural bioeconomy systems (Nguyen,V.T.P.; Vu,T. V.P.; Vu,H.N.; Nguyen,T.H.;2026), (Dai,Y.C.; Yang,Z.L.; Cui,B.K.; Yu,C.J.; Zhou,L.W.;2009),(Zhang,Y., Geng,W.; Shen,Y.; Wang,Y.;&Dai,Y.C.;2014),(Jihyuk Bang, Ji Woo Han; 2025).

Overall, the results suggest that the proposed cultivation model achieves a balanced trade-off between productivity, sustainability, and economic viability. This positions it as a scalable and context-appropriate alternative for developing countries, with potential for further upgrading through digitalization and controlled-environment technologies.

3.2. Development of value-added products

The processing stage played a pivotal role in upgrading the value chain by converting fresh Tamogi mushrooms into a diversified portfolio of value-added products, including dried mushrooms, extract powder, filter tea, and instant granule tea (Baumgartner U; Nguyen, T.H.;2017). The fresh mushrooms and extract powder from cultivated Tamogi were proccessed with product code registrated as shown in Figures 4-6 and presented for vertical integration.

Figure 4. Fresh Tamogi

Figure 5. Tamogi extract

MÃ VẠCH
Tên sản phẩm: Nấm sò vàng TAMOGI tươi

MÃ VẠCH
8 936092 862467

MÃ VẠCH
Tên sản phẩm: Dịch chiết nấm TAMO GOLD

MÃ VẠCH
8 936092 863136

Figure 6. Codes of these products

Processed products such as filter tea, and granule tea were shown in Figures 7-9, and also presented for vertical integration.

Figure 7. Tamogi filter tea

Figure 8. Tamogi granule tea

MÃ VẠCH
Tên sản phẩm: Trà túi lọc TAMO GIFT

MÃ VẠCH
8 936092 863129

MÃ VẠCH
Tên sản phẩm: Trà cốm nấm TAMOGI

MÃ VẠCH
8 936092 863143

Figure 9. Codes of Tamogi filter tea and granule tea

This transformation effectively extended product shelf life, enhanced convenience, and broadened market applicability across both food and functional beverage segments. All processed products exhibited consistent quality and successfully met the criteria for OCOP certification (3-4 stars), reflecting compliance with national standards for safety, traceability, and market readiness. The standardization of drying, grinding, and formulation processes contributed to product uniformity and quality stability across batches. Importantly, product diversification significantly enhanced economic returns by shifting from low-margin fresh products to higher-value processed goods. At the same time, it substantially reduced post-harvest losses, a common issue associated with the short shelf life of fresh mushrooms. This approach not only improves profitability but also strengthens resilience within the value chain, supporting sustainable commercialization and market expansion.

3.3. Value chain integration and stakeholder participation

The value chain model was strengthened through both horizontal and vertical integration mechanisms. Horizontal linkages facilitated the active participation of cooperatives, farmer groups, and individual households in Luong Son, and of the VietRAP Trading Investment Joint Stock Company. The technology transfers were carried out by Mushroom Research and Development Center for spawn and cultivation application, and by the Institute of Chemistry and Materials for the processing as in Figures 10 and 11. They enable the dissemination of standardized production protocols and technical training, benefiting the local farmers and especially the ethnic people as in Figure 12. This collaborative structure enhanced knowledge transfer, improved production practices, and ensured consistency in cultivation methods across participants.

Figure 10. Technology transfers of spawn and cultivation by Mushroom Research and Development Center

Figure 11. Technology transfers of extract and final product processing by Institute of Chemistry and Materials

Figure 10. Technology transfers of spawn and cultivation by Mushroom Research and Development Center

Figure 11. Technology transfers of extract and final product processing by Institute of Chemistry and Materials

Vertical integration cover especially several marketing activities as the one shown in Figure 13.

Figure 12. Technology transfers for local farmers and ethnic people

Figure 13. Marketing activity of project products in agro-tourist site

This vertical model encompasses the coordination of all stages of the value chain, including spawn production, cultivation, post-harvest processing, and marketing as in Figure 14. Enterprise-led management by VietRap Co played a central role in synchronizing these activities, thereby ensuring a stable supply of raw materials and maintaining consistent product quality. Together, these integrated linkages contributed to improved supply chain reliability, reduced variability, and strengthened overall system efficiency, ultimately supporting sustainable value chain development.

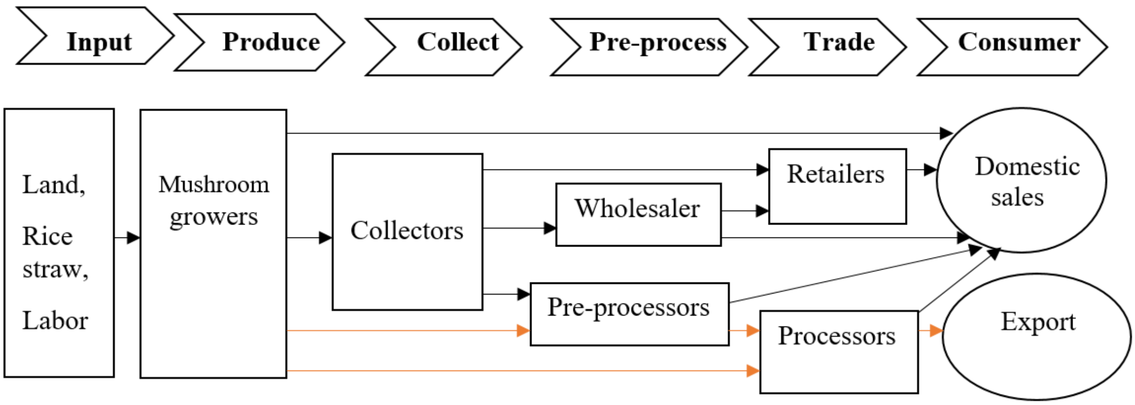

Figure 14. Schema of vertical value chain for Tamogi mushrooms

3.4. Socioeconomic impacts

The implementation of the value chain model generated significant socioeconomic benefits at the local level as in Figure 14. Approximately 50 jobs were created, with an average monthly income of around 6,000,000 VND per worker, contributing to improved livelihoods and rural employment stability. Participating farmers benefited from enhanced market access, systematic technical training, and reduced production risks through standardized cultivation practices and enterprise coordination. These factors collectively improved production efficiency and income security. The products were successfully commercialized through multiple distribution channels, including OCOP retail outlets, e-commerce platforms (e.g., Postmart and Voso), and local supermarkets, thereby expanding market reach and increasing sales opportunities. In addition, agro-tourism activities were integrated into the model, allowing visitors to experience mushroom cultivation and product consumption firsthand. This not only created additional revenue streams but also enhanced product visibility and perceived value, further strengthening the economic sustainability of the value chain.

Figure 15. OCOP retail outlets

Figure 16. Sale activity in project site

3.5. Sustainability and scalability

The model exhibits strong potential for scalability, supported by its effective use of locally available resources and the application of standardized production protocols. The reliance on agricultural residues as cultivation substrates enhances resource efficiency and aligns with circular economy principles, reducing environmental impact and input costs. Standardized procedures across cultivation, processing, and quality control ensure reproducibility and facilitate replication in other regions with similar agro-ecological conditions. Moreover, the integration of value-added processing and diversified market channels further strengthens the model's economic sustainability. Overall, the combination of resource optimization, technical standardization, and value chain integration positions the model as a viable and scalable framework for expanding mushroom-based bioeconomy systems in Vietnam and comparable contexts.

4. Conclusion

This study successfully developed and evaluated an integrated value chain model for Tamogi mushrooms in Luong Son, Phu Tho province, based on the synchronized linkage of seed production, cultivation, post-harvest processing, product development, and commercialization. Experimental results showed that the model not only contributed to increased productivity and reduced disease infection rates during cultivation but also significantly increased the economic value of the product through diversification of processed products and standardization of production processes. The development of OCOP-certified products, combined with agricultural tourism and the application of digital marketing platforms, has expanded market access and enhanced the competitiveness of Tamogi mushrooms.

Besides economic benefits, the model also creates positive social and environmental impacts by generating jobs for local laborers, increasing the participation of farmers, and promoting sustainable agricultural development. The combination of horizontal and vertical linkages in the value chain has contributed to enhancing the stability of the supply chain, strengthening technology transfer, and improving the efficiency of product quality management.

Overall, the Tamogi mushroom value chain model proposed in this study is a feasible, sustainable, and scalable approach to the development of mushroom-based bioeconomy in Vietnam. The model is not only suitable for the conditions of the northern mountainous midland region but also has the potential for replication in localities with similar ecological conditions. In the future, further research should focus on standardizing the content of bioactive compounds, evaluating functional efficacy through preclinical and clinical studies, and refining the commercialization strategy on an industrial scale to enhance the value and sustainability of the medicinal mushroom value chain in Vietnam.

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XÂY DỰNG MÔ HÌNH CHUỖI GIÁ TRỊ CHO NẤM TAMOGI (PLEUROTUS CITRINOPILEATUS) TẠI LƯƠNG SƠN, PHÚ THỌ, VIỆT NAM

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Tóm tắt:

Nấm sò vàng Tamogi (Pleurotus citrinopileatus) là một loài nấm thực phẩm – dược liệu có giá trị cao, giàu β-glucan và các hợp chất chống oxy hóa, và có nhu cầu tiêu thụ ngày càng tăng trên thị trường thực phẩm chức năng. Nghiên cứu này nhằm xây dựng và đánh giá mô hình chuỗi giá trị tích hợp đối với nấm Tamogi tại xã Lương Sơn, tỉnh Phú Thọ, Việt Nam, bao gồm các khâu từ sản xuất, chế biến đến thương mại hóa và gắn với phát triển du lịch nông nghiệp. Mô hình được triển khai trong giai đoạn từ tháng 4/2024 đến tháng 9/2025 thông qua sự phối hợp giữa hợp tác xã, hộ nông dân và doanh nghiệp. Các quy trình kỹ thuật chuẩn hoá đã được xây dựng cho nhân giống nấm, nuôi trồng trong điều kiện kiểm soát, chế biến sau thu hoạch và sản xuất các sản phẩm giá trị gia tăng như nấm sấy khô, bột nấm, trà túi lọc và trà cốm hòa tan.

Kết quả nghiên cứu cho thấy tỷ lệ nhiễm bệnh trong quá trình nuôi trồng giảm từ 12–15% xuống còn 3–5% trong khi năng suất tăng khoảng 18–25% so với giai đoạn trước áp dụng mô hình. Hệ thống đạt công suất sản xuất khoảng 60 tấn nấm tươi mỗi năm theo tiêu chuẩn GACP-WHO. Đồng thời mô hình tạo việc làm cho khoảng 50 lao động địa phương và phát triển thành công 04 sản phẩm đạt

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Lịch sử bài báo

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chứng nhận OCOP. Việc tích hợp truy xuất nguồn gốc số và du lịch nông nghiệp đã góp phần nâng cao khả năng tiếp cận thị trường và gia tăng giá trị sản phẩm. Nghiên cứu này cung cấp một khung mô hình có khả năng mở rộng cho phát triển chuỗi giá trị kinh tế sinh học dựa trên nấm tại Việt Nam và các khu vực có điều kiện tương tự.

Từ khóa: *Nấm Tamogi; Chuỗi giá trị; Thực phẩm chức năng; Phát triển nông thôn; OCOP.*

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