



Short Paper

# Technology Demonstration of Ginger Turmeric Pandan Tea Granules: An Extension Experience of a State University in Bicol, Philippines

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## Abstract

Extension is systematically transferring technology, innovation, or information based on the community's needs. This paper aims to provide technology demonstration and commercialization of ginger turmeric pandan tea granules with Utility Model Registration Number 2-20170502256 to selected associations. The five associations that were trained have adopted the technology. This extension program was conducted through a series of training sessions and demonstrations of production. A memorandum of agreement or memorandum of understanding was inked between parties. The results of the training showed a very satisfactory overall score (4.76) ranging from 4.67 to 4.85, using the BUEMD evaluation tool. Gender roles in production and commercialization were observed, wherein most of the processes were predominantly performed by women. Commercialization of the product showed a positive return on investment (ROI). However, further clinical study and impact assessment are recommended.

**Keywords** – Commercialization, Extension, product development, technology demonstration



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## INTRODUCTION

Since ancient times, fresh and dried leaves have been used as a refreshment or beverage. In recent years, herbal teas have significantly increased in popularity because of their promising potential health benefits. Among these are Ginger Turmeric Pandan Tea Granules with Utility Model Registration Number 2-20170502256 (Jadie & Naz, 2017). It is a combination of three essential plants, namely, ginger (*Zingiber officinale*), turmeric (*Curcuma longa*), and Pandan (*Pandanus odoratissimus*). These are widely recognized for their therapeutic properties and are commonly used for medicinal purposes.

Ginger (*Zingiber officinale*) is locally known as “luya” and is widely known for its pharmacological properties (Gunasena et al., 2022; Wohlmuth, 2008). Studies have shown that ginger has antimicrobial, antibacterial, anti-inflammatory, anti-ulcer, aphrodisiac, and anti-cardiovascular diseases (Afzal et al., 2001; Daharia et al., 2022; Grzanna et al., 2005; Gunasena et al., 2022). The use of ginger can be traced back to 2000 BC (Afzal et al., 2001). Nowadays, it is used for medicinal and culinary purposes.

In addition, turmeric (*Curcuma longa*) belongs to Zingiberaceae and is similar to ginger. It is an aromatic perennial herb with creeping horizontal and tuberous rhizomes that grows up to a meter high and is distributed throughout tropical and subtropical regions, mainly in India and China (Yadav et al., 2013). Turmeric has a long history in Ayurvedic medicine; it is also used as a spice, preservative, and food coloring agent (Yadav et al., 2013). Compounds from turmeric have been shown to have anti-rheumatoid arthritis, antioxidant, hepatoprotective, anti-cancer, anti-viral, analgesic, and antimicrobial properties (Eke-Okoro et al., 2018; Jyotirmayee & Mahalik, 2022; Orellana-Paucar & Machado-Orellana, 2022; Yadav et al., 2013).

Similarly, Pandan (*Pandanus odoratissimus*) also has promising medicinal properties; according to (Adkar & Bhaskar, 2014; Londonkar et al., 2010; Rahayu et al., 2013), pandan has antifungal, antiviral, anthelmintic, antidiabetic, antiepileptic, anticonvulsant, anti-inflammatory, analgesic, aphrodisiac and antidiabetic. Combining these ingredients can offer a wide range of health benefits. Thus, a ‘Ginger Turmeric Pandan Tea Granules’ with Utility Model Registration Number 2-20170502256 was developed.

On the other hand, the result toxicity test report of Bicol University Regional Center for Food and Quality Assurance (BURCFQA) on the nutrient and toxicity test of the product showed that a ratio of 200 ml hot/cold water to one tablespoon was most favored at 7.7 mean scores. Per serving, the product has low calories and low fat with 6 to 7% carbohydrate adequacy because of sugar. It contains 2% of the recommended protein, magnesium, and negligible amounts of other minerals. It is non-toxic and is very suitable

for human consumption. Therefore, it is acceptable for its sensory attributes, right proportion of serving, nutritious, and healthy.

This technology demonstration and commercialization was conceptualized to provide additional livelihood activities to the community. This is part of the extension activity of a state university in the province of Sorsogon. Extension refers to technology transfer, innovation, or information systematically that is generated by higher education institutions (HEIs) and their partners to provide alternative solutions to the needs and problems identified (Castillo et al., 2024). Especially now that we are in a post-COVID era and trying to recover from the adverse impact of COVID-19, in which many jobs were lost. The Republic Act 9509, or 'the Barangay Livelihood and Skills Training Act of 2008' and the Provincial Government of the Province of Sorsogon encourage all government agencies and State Universities and Colleges (SUCs) in the province to collaborate with them in the conduct of livelihood and entrepreneurial training among all their constituents to enhance the productivity and to have greater income to support their families.

Anent this, the Bicol University Gubat Campus (BUGC) responded to this call by providing alternative livelihood to the locals through technology demonstration and commercialization. This paper aims to present the experiences of an extension training conducted by BUGC to the selected associations/groups in the province of Sorsogon.

### ***Program Implementation***

The technology demonstration and commercialization of ginger turmeric pandan tea granules were conducted through a series of extension training. There were a series of lectures and practical demonstrations. The discussion covered how to produce ginger turmeric pandan tea granules by adapting a patented formulation. It also included additional topics such as packaging, labeling, marketing, business management, and organizational development. The inclusion of organizational development topics was part of the social preparation for those adopting the technology. For the practical demonstration, all participants were trained on how to produce the GTPTG using the patented (utility model) formulation. A total of 75 participants participated in the training.

These groups were selected after the community needs assessment (CNA). CNA is conducted to ensure that the interventions given are appropriate or needed by the target community (Castillo et al., 2025). This technology's adopters are mostly unemployed or wives/husbands of the employed spouse. Moreover, four out of five associations have socio-economic activities that help their members provide alternative income sources. One of which is the production of ginger turmeric pandan tea granules.

After the identification of adopters, a memorandum of agreement (MOA) and/or memorandum of understanding (MOU) was signed between the university and the adopters. In the Memorandum of Understanding (MOU), the university transferred the

technology by conducting a demonstration at the adopter-buyer's location, as agreed upon by both parties. Additionally, the university granted the adopter-buyer a non-exclusive license, without the right to sublicense, to make, use, and sell the technology. The adopter was required to pay a royalty fee of five percent (5%) of the net profit. Testimonials, monitoring, and evaluation were conducted. Each training was evaluated using the Bicol University Extension Management Division (BUEMD) monitoring and evaluation tool.

### **Training Evaluation**

During the series of trainings, five local associations in Sorsogon province, Philippines participated. In total, 75 participants attended and adopted the technology (see Table 1). These organizations successfully adopted and commercialized the technology for 'ginger turmeric pandan tea granules.' It is a product of research with Utility Model Registration Number 2-20170502256.

In addition, the training programs were evaluated using the training evaluation form developed by the Bicol University Extension Management Division (BUEMD). The result of the evaluation showed an outstanding performance, with an overall training evaluation of 4.76, with an average score ranging from 4.67 to 4.85, where 1 (poor), 2 (fair), 3 (Good), 4 (Very good) and 5 (excellent) (Table 1). These positive evaluation scores indicate a high level of satisfaction among the trainees. Assessing the effectiveness of the training or intervention provides insights into how the training went and provides feedback that can be useful for future similar interventions, especially for replication. Through this, training implementers or extension practitioners can optimize their investments.

Table 1. Associations trained, its adaptors, and the result of the training evaluation.

<b>Adaptors of technology</b>	<b>Number of Trainees</b>	<b>Training Evaluation</b>
Adopter A	20	4.81
Adopter B	18	4.85
Adopter C/D*	22	4.71
Adopter E	15	4.67
<b>Total</b>	<b>n=75</b>	<b>4.76</b>

*\*Adopter C/D attended the sessions and demonstration together*

### **Gender Roles in the Production and Commercialization Process**

The five trained associations all adopted the technology and commercialized the product. These adopters have observed gender roles in production and commercialization. There is an assigned member to market the raw materials (fresh ginger and turmeric), washing, grating/grinding, cooking, labeling, and selling (Table 2).

However, the result of the study showed that most of the activities for producing and commercializing ginger turmeric pandan tea granules are predominantly done by women. This implies that most of the participants in the training were women; however, there was no gender bias in the selection to participate in the demonstration and commercialization of technology. Empirical observation showed that in most of the extension activities provided by the university, most of the participants were female. It is because their husband is working and has no time to attend. Meanwhile, their wives have the chance to attend training. Thus, it is recommended that when a wife or husband, or vice versa, is attending a seminar or training, one must relay the knowledge and skills to another family member.

Table 2. Gender Roles in the Production and Commercialization Process

Producti on Process	Adopter A		Adopter B		Adopter C		Adopter D		Adopter E	
	M*	F <sup>+</sup>	M	F	M	F	M	F	M	F
Market of Raw Materials	1	-	1	1	-	1	1	-	-	1
Washing	1	2	-	5	3	-	1	-	-	3
Grating/ Grinding	2	-	3	3	-	5	1	2	-	4
Cooking	-	2	1	2	-	3	-	1	-	2
Packing	-	10	-	3	-	3	-	2	-	2
Labeling	-	5	-	3	-	3	-	2	1	-
Selling	2	10	4	5	-	5	1	2	1	6
<b>TOTAL</b>	<b>6</b>	<b>29</b>	<b>9</b>	<b>22</b>	<b>3</b>	<b>20</b>	<b>4</b>	<b>9</b>	<b>2</b>	<b>18</b>

Note: \*= M (male); += F (female)

### Return on Investment (ROI)

After a few months, these trained organizations/associations adapted and started commercializing the technology. The result of the commercialization of the adopters showed a positive Return on Investment (ROI) even though some have just started. ROI refers to the profitability of the investment. Table 3 shows that the Adopter E has a 405% return on investment. This means that the investment has increased by 405% of its original value. Adopter B has 250% ROI, while Adopter C has the lowest with 130% ROI. This implies that the technology demonstration and commercialization are effective, and the product produced is feasible for the market.

Table 3. Name of adopters with their Return on Investment (ROI)

<b>Adopters</b>	<b>Sales</b> (in Php)	<b>Expenses</b> (in Php)	<b>Net</b> (in Php)	<b>ROI</b> (%)
Adopter A	83,150.00	30,368.67	52,781.33	174
Adopter B	10,500.00	3,000.00	7,500.00	250
Adopter C	14,080.00	6,124.00	7,956.00	130
Adopter D	4,700.00	1,528.00	3,172.00	208
Adopter E	17,682.00	3,500.00	14,182.00	405

### ***Plan for Sustainability***

To ensure the sustainability of ginger-turmeric pandan tea granules technology adoption and commercialization, a multifaceted approach should be considered. Firstly, gardens should be established in the locality, and high-yielding turmeric, ginger, and pandan varieties should be used. Additionally, these adopters may consider consignment and connect to other enterprises where they can display and sell their produce in the market. Currently, they sell their produce to their members. Furthermore, the packaging needs to be updated to align with current trends and consumer preferences.

In addition, a dedicated team should be appointed to consistently monitor this technology's adoption. Finally, integrating these strategies into a comprehensive plan will ensure a seamless transition from the initial program implementation and technology demonstration to long-term sustainability, ensuring that GTPG production's benefits are maintained over time.

### **CONCLUSION**

Extension services aim to systematically provide training, technical knowledge, innovation, or information tailored to the community's needs. The goal is to improve the living conditions of those who adopt these services. This specific case is a successful example of extension interventions, as it involves research, demonstration, and commercialization of technological advancement. The research conducted for this product development obtained a Utility Model Registration Number 2-20170502256.

In conclusion, five associations in the province of Sorsogon were trained and adopted the technology. Successful strategies involved trained associations embracing technology and its commercialization. The training evaluation yielded highly satisfactory results, with a mean score of 4.76 using the BUEMD evaluation tool. It is worth noting that women predominantly produce and commercialize Ginger Turmeric Pandan Tea

Granules. These organizations efficiently assigned specific production tasks to their members. However, the selection process for participation in this extension program was not biased toward any specific gender. Lastly, the income statement from the commercialization efforts demonstrated an exceptionally positive return on investment (ROI). This indicates that this type of extension service has the potential to be replicated by other associations.

## **RECOMMENDATIONS**

Further clinical studies should be conducted on Ginger Turmeric Pandan Tea Granules. Adopters shall address safety concerns by implementing enhanced quality control measures during production to mitigate contamination, heavy metals, pesticide residues, and microbial issues.

Additionally, the income statement and financial reports should be reviewed by a bookkeeper or an accountant. Currently, only one out of five adopters has been assigned a bookkeeper. It is essential to record and document all expenses as it is not only a legal requirement but also crucial for the business's financial health.

Furthermore, explore opportunities to improve supply chain efficiency to reduce costs and ensure consistent quality. Research on consumer preferences and market trends should also be conducted to align production and processing with market demands. Finally, it is recommended that an impact assessment of this project be conducted to ensure its success and its impact on the recipient's socio-economic domain.

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## **DECLARATIONS**

### ***Conflict of Interest***

The authors declare no conflict of interest.

## Informed Consent

All authors declared that all participants involved in the conduct of this extension project are fully informed and their participation is voluntary.

## Ethics Approval

All authors declared strict adherence to the Data Privacy Act and all participants are fully informed.

## REFERENCES

- Adkar, P. P., & Bhaskar, V. H. (2014). *Pandanus odoratissimus* (Kewda): A review on ethnopharmacology, phytochemistry, and nutritional aspects. *Advances in Pharmacological Sciences*, 2014, 1-19. <https://doi.org/10.1155/2014/120895>
- Afzal, M., Al-Hadidi, D., Menon, M., Pesek, J., & Dhami, M. S. I. (2001). Ginger: An ethnomedical, chemical and pharmacological review. *Drug Metabolism and Drug Interactions*, 18(3-4), 159-190. <https://doi.org/10.1515/DMDI.2001.18.3-4.159>
- Castillo, D. E., Estiller, G. H., & Jadie, R. R. (2024). Extension training on Bokashi fertilizer production. *Puissant*, 5, 1387-1397.
- Castillo, D. E., Lopez, G. E., Jadie, R. R., & Hermo, R. B. (2025). Community Needs Assessment ( CNA ): Basis for community development in select communities in Gubat, Sorsogon, Philippines. *Ho Chi Minh City Open University Journal of Social Sciences*, 15(1), 3-17. <https://doi.org/10.46223/HCMCOUJS.soci.en.15.1.3160.2025>
- Daharia, A., Kumar Jaiswal, V., Royal, K. P., Sharma, H., Kumar Joginath, A., Kumar, R., & Saha, P. (2022). A comparative review on ginger and garlic with their pharmacological action. *Asian Journal of Pharmaceutical Research and Development*, 10(3), 65-69. <https://doi.org/10.22270/ajprd.v10i3.1147>
- Eke-Okoro, U. J., Raffa, R. B., Pergolizzi, J. V., Breve, F., & Taylor, R. (2018). Curcumin in turmeric: Basic and clinical evidence for a potential role in analgesia. *Journal of Clinical Pharmacy and Therapeutics*, 43(4), 460-466. <https://doi.org/10.1111/jcpt.12703>
- Grzanna, R., Lindmark, L., & Frondoza, C. G. (2005). Ginger - An herbal medicinal product with broad anti-inflammatory actions. *Journal of Medicinal Food*, 8(2), 125-132. <https://doi.org/10.1089/jmf.2005.8.125>
- Gunasena, M. T., Rafi, A., Afif, S., Zobir, M., Hussein, M. Z., Ali, A., Kutawa, A. B., Aswad, M., Wahab, A., Sulaiman, M. R., Adzmi, F., & Ahmad, K. (2022). Phytochemical profiling, antimicrobial activity, and ginger (*Zingiber officinale* Roscoe cv. Bentong) against *Burkholderia glumae* causative agent of bacterial panicle blight disease of rice. *Plants*, 11, 1466.
- Jyotirmayee, B., & Mahalik, G. (2022). A review on selected pharmacological activities of *Curcuma longa* L. *International Journal of Food Properties*, 25(1), 1377-1398. <https://doi.org/10.1080/10942912.2022.2082464>
- Londonkar, R., Kamble, A., & Reddy, V. C. (2010). Anti-inflammatory activity of *Pandanus odoratissimus* extract. *International Journal of Pharmacology*, 6(3), 311-314.



- Orellana-Paucar, A. M., & Machado-Orellana, M. G. (2022). Pharmacological Profile, Bioactivities, and Safety of Turmeric Oil. *Molecules*, 27(16), 1–16. <https://doi.org/10.3390/molecules27165055>
- Republic Act 9509. (October 21, 2008) An Act Establishing Livelihood and Skills Training Centers in Fourth, Fifth, and Sixth Class Municipalities, and For Other Purposes. <https://www.officialgazette.gov.ph/2008/10/21/republic-act-no-9509/>
- Rahayu, S., Handayani, S., & Noverita, I. (2013). Antifungal and preliminary phytochemical screening of leaf extract of *Pandanus odoratissimus* L.F. *Fuel Science and Technology International*, 100–105.
- Jadie, R. & Naz, C. (February 7, 2018). Process of producing tea from ginger (*Zinger officinale*), turmeric (*Curcuma longa*), and Pandan (*Pandanus odoratissimus*). Utility Model Registration Number 220170502256. Bureau of Patents-Intellectual Property Office of the Philippines. 21(3). [https://onlineservices.ipophil.gov.ph/patgazette/IPASJournal/V21N16\\_UM\\_1st.pdf](https://onlineservices.ipophil.gov.ph/patgazette/IPASJournal/V21N16_UM_1st.pdf)
- Wohhlmuth, H. (2008). *Phytochemistry and pharmacology of plants from the ginger family Zingiberaceae*. Southern Cross University.
- Yadav, D., Yadav, S. K., Khar, R. K., Mujeeb, M., & Akhtar, M. (2013). Turmeric (*Curcuma longa* L.): A promising spice for phytochemical and pharmacological activities. *International Journal of Green Pharmacy*, 7(2), 85–89. <https://doi.org/10.4103/0973-8258.116375>

## Author's Biography

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