

Innovation of Spice Chocolate and Chocolate Derivatives as an Effort to Realize Self-reliance in Bodag Village

Rizka Mulyani¹, Prakoso Adi^{a)}, Dea Yoana Putri Damayanti, Dewi Irawati, Arum Puspa Maharani, Citra Bherly Fantika Wibowo, Ragil Siwi Puspa Khirana, Anisa Kurniawati, Bowis Fatwa Afif, Ceut Halimah Heca Wardani¹, Cindy Amelia¹, Hanifah Eka Cahyani, Amiwiti Fayyadh Islami Falih, Earlian Zaka Bintang Lazuardi

Study Program of Agricultural Product Technology, Vocational School, Sebelas Maret University, Surakarta, Indonesia

^{a)}Corresponding Author: prakoso.adi@staff.uns.ac.id

Abstract

Cocoa is one of the most important commodities in Madiun Regency. Cocoa has the potential to be developed into processed chocolate products that will become unique souvenirs of Madiun Regency. This potential has been utilized by the Badan Usaha Milik Desa (BUMDes) of Rumah Coklat Bodag, Bodag Village, Kare District, Madiun Regency. However, the need for chocolate product innovation and the underutilization of cocoa butter is still faced by this BUMDes. The main purpose of this empowerment activity is to empower this BUMDes to innovate chocolate products and the derivatives, especially in utilizing the potential of spices and cocoa butter. In this empowerment activity, training and mentoring in chocolate production with the addition of spices (ginger, cardamom, and cloves) and training on making soap made from cocoa butter have been carried out. This training and mentoring have created innovative chocolate spices and soaps made from cocoa butter. These products can later be a signature product of Madiun Regency. In addition, through this activity, counseling on food safety has also been carried out to increase the knowledge of the residents of Bodag village so that the products produced by Bodag village have good quality. Based on observations made by the team, there was an increase in the knowledge of Bodag villagers regarding food safety after the community empowerment. This indicates that the team has successfully transferred knowledge regarding food safety to the residents of Bodag village.

Keywords : cardamom, chocolate, clove, ginger, spice chocolate

INTRODUCTION

Bodag Village, Kare District, Madiun Regency, East Java, is an area that has cocoa, spices, horticulture, and tubers plantation commodities. Bodag village has long been known as one of Indonesia's important cocoa bean production centers, with a cocoa plantation area of 40 hectares. However, the leading sector in Bodag Village, Madiun Regency, is the agricultural sector. The forest area on the slopes of Mount Willis is known as an area that has the potential to produce cocoa. Based on data from the BPS East Java in 2016, it is known that the land area in Kare Sub-district used to grow cocoa reaches 525 hectares, with production reaching 8190 tons. The cocoa production rate in Kare District is the third highest in Madiun District after *Gemarang* District and *Dagangan* District.

Cocoa (*Theobroma cacao*) is an agricultural product with a high selling price and much demand. Cocoa has been grown by cocoa farmers in Bodag Village for generations, so cocoa plants in Bodag Village are inherited from former farmers and their families. Cocoa beans have good nutrition for the needs of the human body, such as fat, carbohydrates, protein, antioxidant compounds, and minerals. In addition, the active ingredients of chocolate, such as caffeine and theobromine, are known to have anti-depressant properties, improve mood, and relieve fatigue. (Felicia et al., 2016). The most favorite processed chocolate product is chocolate. Chocolate is one of the processed products that are useful as a natural antioxidant that is beneficial for maintaining cardiovascular health; this benefit is due to the polyphenol content of the catechin and epicatechin groups in chocolate (Hurst et al., 2011).

In addition to abundant amount of cocoa, Bodag Village also has other natural commodities such as spices such as cloves, ginger, and cardamom. Farmers in Bodag Village sell these spice commodities in dry form without processing. There is no innovation in processing spice products, so efforts are needed to innovate that can provide added value for farmers. One example of chocolate product innovation is the manufacture of spiced chocolate. Using abundant local chocolate commodities in Bodag Village and spices can be an innovation for business development in Bodag Village. This innovation helps increase the selling price and variety of processed products. The chocolate-spice innovation is one of the ideas for building the village of Bodag to utilize commodities that have yet to be utilized optimally.

Rumah Coklat Bodag still needs product innovation in the form of chocolate bars with a spiced variant. The chocolate spice innovation can take advantage of the potential of natural resources in the form of spices such as cloves, cardamom, and ginger. This supports Bodag Village in utilizing commodities that currently need optimally utilized.

Spice is known to have beneficial value to body. For example, cloves have been widely studied to have the ability as antibacterial, antifungal, anti-inflammatory/inflammation, relieve respiratory tract infections, and overcome nausea and vomiting. These functional properties arise from active compounds such as eugenol and *Betacaryophyllene*. Ginger is known to have an excellent ability to lower blood pressure, aid digestion, make the stomach comfortable, and contain antioxidants that help neutralize the damaging effects caused by free radicals in the body. Cardamom has properties as a cough medicine. Cardamom also has properties to prevent bone loss (Rahmah et al., 2021). Cardamom is a plant belonging to the *Zingiberaceae* tribe and is helpful as a spice in cooking and medicine. In Indonesia, cardamom plants have two types, namely sabrang cardamom (*Elettaria cardamomum* (L.) Maton) and Javanese cardamom (*Amomum compactum* Soland. ex Maton) (Komala et al., 2020).

The innovation of processed chocolate products must continue to be carried out so that consumers are always interested in buying chocolate products at the *Rumah Coklat Bodag*. The potential for the production of several spice plants in Bodag Village (such as ginger, temulawak, turmeric, *lemuyang*, and cloves) and the increasing public interest in functional food products due to the health effects that the development of spiced chocolate products can cause can be one solution for innovation of processed chocolate products. For the *Rumah Coklat Bodag*. The development of spiced chocolate products can be one solution for the innovation of processed chocolate products for the *Rumah Coklat Bodag*. Of course, several studies on the UNS Madiun campus also support this spice chocolate innovation.

The potential of natural resources in Bodag Village is very much, especially spices (turmeric, ginger, cloves). However, these natural resources can boost the economy. However, this potential has yet to be fully utilized. Thus, to take advantage of these natural resources, there is a development of chocolate products, namely the innovation of spiced chocolate products. In order to overcome the community's economy and take advantage of the existing natural resource commodities in the village.

The by-product of cocoa powder processing is cocoa butter. In the industrial world, cocoa butter is often used to manufacture other products such as soap mixtures, skin moisturizers, and other food additives. However, until now, the cocoa butter produced from making cocoa powder at the *Rumah Coklat Bodag* has yet to be utilized. Therefore, using unused cocoa butter to increase the creativity of the Bodag Village community is one of the main focuses of this service activity. In addition, the utilization generates business ideas, including the innovation of chocolate derivative products such as hand soap made from cocoa butter.

The purpose of this community service activity is to process chocolate spices and make soap from cocoa butter, it is hoped that the *Rumah Coklat Bodag* will be able to innovate additional spices such as ginger, cardamom, and cloves to increase the public's attraction to buy and consume spiced chocolate and also buy soap from cocoa butter. This is because it also utilizes

commodities in Bodag Village, such as cloves, cardamom, ginger, and also fat from the chocolate itself, to be able to provide a selling value for these products.

METHOD

Community service activities were carried out in Bodag Village on August 16-September 6 2022. This activity was carried out by the P2MD service team consisting of 12 students and two lecturers of Agricultural Product Technology Sebelas Maret University (UNS). This series of community service activities consists of several activities, including:

Observation

The method implemented in this service activity begins with observing the problems found in partners and continues with a discussion of activities to be carried out with partners (**Figure 1**). This activity will be held on April 14, 2022.

Spice Chocolate Science and Technology Diffusion

Many commodities in Bodag village have yet to be utilized, so the idea emerged, namely the manufacture of spiced chocolate with variations of ginger, cardamom, and clove spices. Trials of making spiced chocolate in the Agricultural Products Technology laboratory using various formulations. Testing the acceptability of spiced chocolate products was carried out with a total of 15 panelists. This series of activities will be held on July 28, 2022 - August 5, 2022, at the Agricultural Products Technology laboratory, Sebelas Maret University, Caruban, Madiun Regency, East Java. After testing the level of consumer preference, the formulation that is most preferred by consumers appears. This formulation was then introduced to the *Rumah Coklat Bodag* production team.

Students practice chocolate making with the *Rumah Coklat Bodag* partner production team on 20 - 21 September 2022 at the *Rumah Coklat Bodag* production building, the UNS service team, and *Rumah Coklat Bodag* partners.

Cocoa Butter-Based Soap Making Training

After finding the most appropriate and safest method of making soap from cocoa butter, training was conducted with the PKK and KWT groups. This training took place on August 3 and was attended by PKK and KWT groups. This activity was carried out at the *Rumah Coklat Bodag*, Bodag Village, Madiun Regency, East Java.

The raw material used in this training comes from cocoa butter which is innovated into hand soap. The method of making cocoa butter soap is based on (Sari et al., 2018). The ingredients used in making soap consist of coconut oil, KOH, and distilled water.

Food Safety Training for Agricultural Products

In addition to training on chocolate spice and cocoa butter innovation, it is necessary to conduct training with the theme of food safety for agricultural products. This activity is crucial to be carried out to improve the quality of agricultural products in Bodag Village so that they can produce safe and quality products. This activity was held on August 3 by inviting professional resource persons from Sebelas Maret University, namely Dr. Ir. Choiroel Anam, M.P., M.T.

RESULT AND DISCUSSION

Based on the initial observations, it is known that at the *Rumah Coklat Bodag*, there is no innovation in making spice chocolate. However, from the results of joint discussions with partners, it was agreed that several main activities were to be carried out in community service activities. The first activity is training in making chocolate spices; the second is training in making soap based on cocoa butter; the third is training on food safety for agricultural products.

Technology Diffusion Spice Chocolate Innovation

The innovation introduced by the UNS service team to the Bodag Chocolate House partners was spice chocolate. Spiced chocolate introduced to partners is the formulation with the

highest acceptability based on the results of organoleptic testing. After introducing the spiced chocolate, the partners, together with the service team, produced spiced chocolate (**Figure 2**).

Spice chocolate produced due to the diffusion of science and technology can be seen in **Figure 3**. Innovation is an essential element in business development, especially in an era of increasingly competitive competition and increasingly critical consumers (Suhaeni, 2018). Innovation is needed to increase excellence to improve the business condition of a business. With innovation, a business can offer new products that are better than competitors (Kojo et al., 2018).

Innovation can be in the form of the creation of new ideas, new processes, or new products (Wijaya et al., 2019). Product innovation is one of the product business development strategies for Micro, Small, and Medium Enterprises (MSMEs) (Saefullah et al., 2021). In carrying out these ideas and innovations, innovation needs to pay attention to several aspects, including the availability of natural resources (Wahyudi, 2020) and human resources (Sundah, 2020). Bodag Village, which has abundant natural resources potential, allows for several innovations based on natural resources, including abundant ginger, cloves, and cardamom. Innovation by adding this spice powder can produce products that are attractive to consumers and have a functional effect because the spice raw materials have antioxidant activity that is good for the body. In addition, spiced chocolate products can be a signature product for Bodag Village. Utilization of local product is crucial to develop the village economy and to build a resilience village (Hartati et al., 2020; Mariani et al., 2020).

Cocoa Butter-Based Soap Making Training

The training on manufacturing cocoa butter derivative products was carried out on August 3, 2022. This activity presented UNS lecturers Fitriyah Zulfa, S.KM., and M.Si as resource persons. In the material, the resource person explained the potential for processing cocoa butter (**Figure 4**). This activity was attended by the PKK group in Bodag Village and the Women Farmers Group (KWT) in Bodag Village. This activity was carried out at the *Rumah Coklat Bodag*, Bodag Village, Madiun Regency, East Java. Simultaneously with this training, joint production training was conducted with partners from the Bodag Village PKK group and the Women Farmers Group (KWT) Bodag Village (**Figure 5**). The raw material used in this training comes from cocoa butter which is innovated into hand soap. The ingredients used in making this soap are readily available. The method of making cocoa butter soap is based on. The materials used in this study consisted of coconut oil, KOH, and distilled water.

Cocoa butter is known as a precious ingredient in the chocolate processing process. If processed into other products, Cocoa butter will have a high selling value. Some processed cocoa butter products sold in the market are soap (Setiawan, 2018), lotion (Ramlah, 2017), perfume, and several other beauty products that add cocoa butter to their products. In addition, cocoa butter is also known to be used in the biopharmaceutical industry, such as suspending agents, adsorbents, and gelling agents in tablet preparations and suspensions (Towaha, 2020).

Rumah Coklat Bodag only uses cocoa butter as an ingredient in chocolate making. So, to give more value to cocoa butter, the UNS service team conducted training in making soap made from cocoa butter. This training was followed enthusiastically by the PKK and KWT groups in Bodag Village so that later soap products could become new derivative products and could create new business units. In this training, cocoa butter is processed into liquid and solid soap. **Figure 6** shows the products produced by the trainees.

Food Safety Training for Agricultural Products

The food safety training event for agricultural products was held on September 4, 2022. This activity was attended by 22 PKK and KWT groups with great enthusiasm. The resource person who gave the material was Dr. Ir. Choirul Anam, M.P., M.T, as THP UNS Lecturer. This activity was carried out at the *Rumah Coklat Bodag*, Bodag Village, Madiun Regency, East Java. The material given is food safety (GMP), Licensing of processed food products (P-IRT and BPOM). This activity is based on the fact that 94% of MSMEs in Bodag Village develop food products,

including chips, coffee, chocolate, cakes, and several other preparations. The results of initial observations indicate that the MSME group has never been and is very interested in knowing how to process food properly so that it can produce safe and consistent products. The results of the evaluation of the implementation of this activity can be seen in **Figure 7**.

The evaluation results above show the pre-test and post-test scores during training activities. Prior to the presentation of the material, it was known that the average value of the participants was 53. In contrast, after receiving the presentation of the material by the resource persons, there was an increase in the value to 76. The increase in value from before and after the presentation of the material showed that there was a transfer of knowledge during the training activities, and it could be interpreted that the participants were able to understand the knowledge conveyed by resource persons (Sahami & Hamzah, 2020).

CONCLUSION

Problems from *Rumah Coklat Bodag*, Bodag Village, Kare District, Madiun Regency are lack of innovation for chocolate products and cocoa butter that have not been utilized. From these problems, the Village Community Empowerment Program (P2MD) team provided a solution in the form of socializing the development of chocolate products with the addition of spices such as ginger, cardamom, and cloves and the use of cocoa butter into hand soap products in the form of bar soap or liquid soap. Besides that, so that the *Rumah Coklat Bodag* and the Bodag village community understand and understand how the process is made, we also conduct training and practice on the process of producing spiced chocolate and soap from cocoa butter which includes training on the manufacture, process, and packaging of products.

REFERENCES

- Felicia, M., Tanudjaja, B. B., & Salamoon, D. K. (2016). *Perancangan Media Komunikasi Visual Produk Cokelat Vicco Kopkar Sekar Jember*.
- Hartati, Nangsih Sulastri Slamet, Arlan K. Imran, and Salman. (2022). Empowerment of Gorontalo Local Natural Ingredients to Become Functional Food at Dasa Wisma, South Toto Village, Kabila District, Towards A Resilient Village in The Middle of COVID-19. *Abdimas Umtas: Junrna; Pengabdian Kepada Masyarakat*, 5(2), 5.
- Hurst, W. J., Susann H Krake, Stephen C Bergmeier, Mark J Payne, Kenneth B Miller, & Stuart, D. A. (2011). Impact of fermentation, drying, roasting and Dutch processing on flavan-3-ol stereochemistry in cacao beans and cocoa ingredients. *Chemistry Central Journal*, 5(53), 10.
- Kojo, C., Rogi, M. H., & Lintong, D. C. (2018). PKM Pengembangan Inovasi Produk Makanan dan Minuman yang Dijual di Seputaran Kampus UNSRAT BAHU. *Jurnal LPPM Bidang EkoSosBudKum*, 4(2), 9.
- Komala, O., Ismanto, & Maulana, M. A. (2020). Aktivitas Aantbakteri Ekstrak Etanol Biji Kapulaga Jawa (*Amomum compactum* Soland. ex Maton) Terhadap *Streptococcus pyogenes*. *Ekologia : Jurnal Ilmiah Ilmu Dasar dan Lingkungan Hidup*, 20(1), 9.
- Mariani, Y., Fathul Yusro, and Hikma Yanti. (2022). Empowering the Community of Mandor Village, Mandor District Landak Regency, West Kalimantan in Utilize the Kaffir Lime Plants as a Potential Source of Essential Oils. *Abdimas Umtas: Junrna; Pengabdian Kepada Masyarakat*, 5(2), 5
- Rahmah, O. M., Agung Muhamad Rizki, Muhammad Fikry Firdaus, Iis Supenti, & Naida Rahma Almira, S. M. J. M. (2021). Mamfaat Serbuk Jahe Untuk Meningkatkan Imunitas Masyarakat Desa Dayeuhmanggung Kabupaten Garut Di Masa Pandemi COVID-19. *BAKTIMU : Jurnal Pengabdian Kepada Masyarakat*, 1(2), 10.
- Ramlah, S. (2017). Characteristics of Quality and Effect of Polyphenol Addition to Cocoa Butter Based Hand Body Lotion to Skin. *Jurnal Industri Hasil Perkebunan*, 12(2), 11.

- Saefullah, E., Putra, A. R., & Tabroni. (2021). Inovasi dan Pengembangan UMKM Emping Melinjo Pada Masa Pandemi COVID-19 dengan Optimalisasi Media Pemasaran dan Alat Produksi. *Reswara Jurnal Pengabdian Kepada Masyarakat*, 2(2), 9.
- Setiawan, T. (2018). Economical Potency, Local And Consumer Preferences On The Products Based Cacao: Soap And Jam In Durian Village Of Pesawaran Regency Lampung Province. *Diaspora: Eksakta*, 1(2), 19.
- Suhaeni, T. (2018). Pengaruh Strategi Inovasi Terhadap Keunggulan Bersaing di Industri Kreatif (Studi Kasus UMKM Bidang Kerajinan Tangan di Kota Bandung). *Jurnal Riset Bisnis dan Investasi*, 4(1), 18.
- Sundah, D. I. (2020). Inovasi dan Strategi Pengembangan Sumber Daya Manusia. In GCAINDO (Ed.), *Manajemen Sumber Daya Manusia: Prinsip Dasar dan Aplikasi* (1 ed., pp. 228). Diandra Kreatif/Mirra Buana Media.
- Towaha, J. (2020). *Diversifikasi Produk Kakao Sebagai Bahan Baku Biofarmaka* (Bunga Rampai: Inovasi Teknologi Bioindustri Kakao, Issue.
- Wahyudi, M. Z. (2020). *Inovasi Difokuskan pada Pengembangan Sumber Daya Alam*. Kompas. Retrieved 27 Agustus from <https://www.kompas.id/baca/ilmu-pengetahuan-teknologi/2020/08/27/inovasi-difokuskan-pada-pengembangan-sumber-daya-alam>
- Wijaya, R. A., Qurratu'aini, N. I., & Paramastri, B. (2019). Pentingnya Pengelolaan Inovasi Dalam Era Persaingan. *Jurnal Manajemen Dan Bisnis Indonesia*, 5(2), 9.

APPENDIX



Figure 1. Observation



Figure 2. Spice chocolate production with Rumah Coklat Bodag



Figure 3. The product of chocolate innovation: Spice chocolate



Figure 4. Training of chocolate derivatives Fitriyah Zulfa, S.KM., M.Si



Figure 5. Training of chocolate-fat-based soap



Figure 6. Solid and liquid soap from cocoa butter

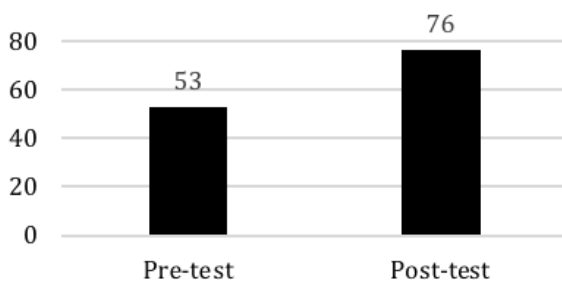


Figure 7. The evaluation score from food safety training