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Empowerment of PKK Members in Training for the Production of Red Dragon Fruit Peel Tisane in the Kauman Subdistrict of Malang City

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Abstract. Tisane is an infusion beverage composed of a mixture of various ingredients such as leaves, seeds, herbs, legumes, tree bark, fruits, or flowers that are dried, or parts of plants that provide aroma and flavor while also being beneficial for health. Tisanes can offer health benefits such as antioxidant, antimicrobial, antihemolytic, and cytotoxic activities. Red dragon fruit peel contains a significant amount of natural anthocyanin colorants, rich in polyphenolic compounds, betalain compounds, vitamins C, E, and A, alkaloids, terpenoids, flavonoids, thiamine, niacin, pyridoxine, cobalamin, phenolics, carotenes, and phytoalbumins, making it a potential source of natural antioxidants. Therefore, red dragon fruit peel can be used to make tisanes due to its proven health benefits. Empowering members of the PKK (Family Welfare Movement) in the Kauman Subdistrict of Malang City in tisane production aims to increase the knowledge and skills of PKK members regarding the benefits and methods of tisane production using red dragon fruit peel waste. The community service activity was conducted in three phases. The first phase involved an explanation of the health benefits of tisanes. The second phase covered the method of making tisanes using red dragon fruit peel, and the third phase included practical tisane production and evaluation. Evaluation results showed an improvement in participants' understanding, with an average pretest score of 61.74 and an average post-test score of 90.87, with an average participant skill score of 28.61 (categorized as skilled). This indicates that the information provided about tisane production was well-understood by the participants, indicating the success of the community service activity. Throughout the activity, participants interacted well and responded by asking questions about the community service activity.

Key Words: tisane, *Hylocereus polyrhizus*, antioxidant, red dragon fruit peel, herbal

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INTRODUCTION

Health-based natural ingredient beverages have become an alternative for health-conscious individuals. The increasing awareness of a healthy lifestyle among the public is reflected in the healthy living patterns adopted in their daily lives. In addition to consuming healthy food daily, beverages that support health are gaining popularity, and one of these is tisane.

Tisane, commonly known as herbal tea, is an infusion beverage that does not originate from tea leaves (*Camellia sinensis*). Tisane typically consists of a mixture of dried leaves, grains, herbs, legumes, tree bark, dried fruits, flowers, or parts of plants that provide aroma and flavor to the beverage while also offering health benefits as an herbal drink. Tisane has become popular among tea enthusiasts because, besides its pleasant taste and aroma, it offers health benefits and relaxation. Regular consumption of tisane can be used as a therapeutic treatment to improve heart health, address digestive issues, boost energy and vitality, enhance the immune system, provide essential antioxidants for the body, reduce stress, improve sleep quality, and stimulate the functioning of various organs (Ravikumar, 2014).

Various types of tisanes have been studied and found to offer health benefits (Poswal et al., 2019). Some tisanes have been shown to contain compounds with bioactivity, such as antioxidants in grapefruit peel tisane (Saragih et al., 2021), butterfly pea flower tisane (Fitri & Pamungkasih, 2022), and cocoa bean shell tisane (Gumelar et al., 2022), as well as antimicrobial, antihemolytic, and cytotoxic activities in a mixture of lemon, thyme, St. John's wort, cloves, and cinnamon tisane (Paschoalinotto et al., 2021). Tisanes made from starfruit have been effective in lowering blood sugar levels in type 2 diabetes patients (Sutomo & Purwanto, 2023).

Red dragon fruit peel is an agricultural waste product that contains a relatively high amount of natural anthocyanin colorants (Ali, 2016). Anthocyanin is a colorant that plays a role in providing red color and has the potential to be a natural food dye, offering a safer alternative to synthetic dyes (Handayani & Rahmawati, 2012). Red dragon fruit peel is rich in polyphenolic compounds, betalain compounds, anthocyanin, vitamins C, E, and A, alkaloids, terpenoids, flavonoids, thiamine, niacin, pyridoxine, cobalamin, phenolics, carotenes, and phytoalbumins. In addition to its potential as a natural pigment source, red dragon fruit peel also serves as a natural antioxidant (Nizori et al., 2020). Research results have shown that 2 grams of red dragon fruit peel herbal tea, brewed with water at 100°C,

contains antioxidants with an IC50 value of 8.50 mg/mL and a relatively high phenolic content (0.83g/100g) (Ardianta et al., 2019) (Aiyuni et al., 2017). With proper drying methods, the antioxidant content of red dragon fruit peel can reach an IC_{50} value of 2,713 ppm (Purnomo et al., 2016) (Fadilah et al., 2021). Therefore, red dragon fruit peel can be utilized as an ingredient in tisanes due to its proven health benefits.

Based on the results of previous community partnership programs, it is known that PKK (Family Welfare Movement) members in the Kauman Subdistrict need more innovations in utilizing local environmental resources. Red dragon fruit peel is a type of waste that has not been optimally utilized, despite constituting a significant portion, approximately 30-35%, of the fruit. Empowering PKK members in the Kauman Subdistrict of Malang City to produce tisanes using red dragon fruit peel aims to increase their knowledge and skills regarding the health benefits of tisanes and the formulation of tisanes using red dragon fruit peel as an ingredient.

PROBLEM

Based on observations conducted through communication with the PKK (Family Welfare Movement) coordinator in Kauman, Malang City, and an evaluation of previous Community Service (PkM) activities, a situational analysis was performed. The assessment revealed specific issues encountered with the partner organization. These issues include a lack of knowledge among PKK members regarding the health benefits of herbal tea (tisane), limited development of skills among PKK members related to making tisane using dragon fruit peel, and a deficiency in PKK members' knowledge concerning tisane formulation using dragon fruit peel.

METHOD OF IMPLEMENTATION

The implementation methodology of the Community Service (PkM) program encompasses several stages, namely, the preparatory stage, the implementation stage, and the evaluation stage.

Preparatory Stage

The preparatory stage comprises several steps, including:

a. Field observations and situational analysis in the Kauman Village, Klojen Subdistrict, Malang City.

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b. Communication and coordination with the PKK coordinator in Kauman Village, Malang City, regarding the activity plan.
c. Preparation of presentation materials using PowerPoint (PPT) (covering the benefits of tisane for health and the process of making tisane using red dragon fruit peel) and the acquisition of equipment for tisane preparation practice.
d. Creation of a video demonstrating the process of making tisane using red dragon fruit peel.

Implementation Stage

The Community Service activities are conducted in three phases. The first phase includes activities related to the socialization of the health benefits of tisane, which begins with a pretest. The pretest questionnaire consists of 10 questions related to the selection of red dragon fruit peel, the compounds and benefits of red dragon fruit peel, the drying method of red dragon fruit peel, and the process of making and brewing tisane from red dragon fruit peel.

The second phase of activities involves the socialization of the process of making tisane using red dragon fruit peel, while the third phase comprises hands-on practice in making tisane from red dragon fruit peel. Active discussions between participants and presenters take place, and at the end of the activities, an evaluation of the participants' skills is conducted to assess their ability to comprehend the information presented. A post-test is administered by distributing questionnaires to the participants.

Evaluation Stage

Evaluation is conducted on the members of the PKK in Kauman Village, Malang City, who participated in the activities. The evaluation aims to measure the participants' knowledge improvement and assess their skills in making tisane from red dragon fruit peel. Knowledge improvement is assessed using the pretest questionnaire, which consists of 10 questions related to the criteria for selecting red dragon fruit peel for tisane preparation, the health benefits and compounds of red dragon fruit peel, the drying method of red dragon fruit peel, and the process of making and brewing tisane from red dragon fruit peel. Participant skills are evaluated by observing their ability to perform a redemonstration of the tisane-making process, with the assessment based on a skills evaluation sheet containing 10 skill assessment indicators.

RESULT AND DISCUSSION

The implementation of this Community Service (PkM) activity serves as a follow-up to previous PkM activities. The program was developed after conducting observations in Kauman Village, Malang City, with a specific focus on the members of the PKK (Family Welfare Movement) group in Kauman Village, Malang City. Following approaches and communication with the PKK coordinator in Kauman Village, the necessary permits were obtained to conduct the PkM activities within the PKK group.

Subsequently, coordination was established with the PKK coordinator in Kauman Village to determine the timing, location, technical implementation, and participants for the PkM activities. The coordination results, in conjunction with the PKK coordinator in Kauman Village, determined that the PkM activities would be conducted in three stages. The first stage involved the dissemination of information on the "Benefits of Tisane for Health," the second stage focused on the dissemination of information on the "Process of Making Tisane from Dragon Fruit Peel," and the third stage involved practical tisane-making activities using dragon fruit peel. The PkM activities commenced with a pre-test and concluded with a post-test.

In the first stage of the PkM activities, together with the PKK members, participants were introduced to the health benefits of tisane. The women of the PKK group were provided with information about tisane in general and its potential health benefits. This activity also served as a reminder to the participants regarding the functions of dragon fruit peel and the various benefits it contains. It emphasized the recycling of dragon fruit peel waste into useful products, one of which is its transformation into tisane.

Figure 1. Introduction of tisane health benefits to the participants

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The second stage of this Community Service (PkM) activity involves introducing and teaching the process of making tisane from dragon fruit peel. During this second stage, the PKK women were instructed in the theoretical aspects of transforming dragon fruit peel into tisane. This instruction encompassed various steps, beginning with how to select quality dragon fruit, followed by the process of drying the dragon fruit peel, and concluding with the method of crafting tisane from the dried dragon fruit peel. Throughout this activity, explanations were supported by visual aids, including photographs illustrating the stages of processing. These visual aids facilitated the participants' understanding of the procedures involved in making tisane from dragon fruit peel.

Figure 2. Training on making tisane from dragon fruit peel.

Moving on to the third stage, it involved direct hands-on practice in making tisane from dragon fruit peel by the members of the PKK (Family Welfare Movement) in Kauman Village. The participants received guidance during the practical tisane-making process. The equipment used during this practical activity included: a medium-sized bowl, cutting board, knife, scissors, baking tray, oven, baking paper, 500 mL glass beaker, glass stirring rod, heater, teacups, and 100 mL paper cups. The materials used to create the dragon fruit peel powder included: fresh dragon fruit peel that had been peeled from the fruit and thoroughly washed. The ingredients for making dragon fruit peel tisane included: fresh dragon fruit, additional ingredients (dried orange peel and cinnamon), tea bags, hot water, and honey/sugar.

In the tisane-making process, the PKK women from Kauman Village actively participated in the process, accompanied by a PkM team comprising of professors and students. They displayed enthusiasm while participating in the series of activities. After the

tisane was prepared, each participant sampled the tisane they had created. At the conclusion of the activity sequence, an evaluation process was conducted by distributing post-test questionnaires to the participants for them to answer. The questionnaire consisted of 10 questions prepared by the PkM team to assess the participants' level of knowledge acquired during the PkM activities. The questions covered topics such as selecting red dragon fruit peel, the compounds and benefits of red dragon fruit peel, the drying method of red dragon fruit peel, and the process of making and brewing tisane from red dragon fruit peel.

Figure 3. Dragon fruit peel tisane product.

The average pretest score for the PkM participants was 61.74, and after participating in the PkM activities, their understanding increased, resulting in an average post-test score of 90.87. This represents an improvement of 47.8% from the pretest to the post-test. Evaluation results indicate that participants were able to correctly answer > 70% of the 10 questions provided, with a minimum score of 80 and a maximum score of 100. Participants were considered to have improved their knowledge if they could answer at least 7 questions correctly out of the 10 questions. The calculation for assessing the level of knowledge is as follows:

$$Level\ of\ Knowledge = \frac{Number\ of\ correct\ answer}{Total\ number\ of\ questions} \times 100$$

Equation 1. Calculation for assessing the level of knowledge.

Redemonstration was conducted to assess the participants' skills. Assessment indicators included the participants' ability to recognize the tools and materials used, measure ingredients, follow the sequence of adding ingredients, and perform brewing. Based

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on the assessment results, the lowest score obtained was 26, and the highest score was 30, with an average participant score of 28.61. Participants were considered skilled if they achieved a minimum score of 15. This indicates that the information provided on the tisane-making process was well understood by the participants and signifies the success of the conducted PkM activities. Throughout the activities, participants interacted quite well and responded by asking questions about the ongoing activities. It is hoped that after this empowerment activity, the members of the PKK in Kauman Village, Malang City, will have improved skills in utilizing dragon fruit peel more effectively. This will also enhance their knowledge and inspire them to turn dragon fruit peel into a useful and economically valuable natural dye.

CONCLUSION

Based on the evaluation results of the conducted Community Service (PkM) activities, there was an improvement in the knowledge of the PkM partners, as evidenced by the increase in participants' understanding with an average pretest score of 61.74 and an average post-test score of 90.87, with an average skill score of 28.61, categorizing participants as skilled in making red dragon fruit peel tisane. Furthermore, in addition to its health benefits, it is hoped that future PkM activities will empower members of the PKK (Family Welfare Movement) in terms of skills and knowledge to harness the untapped potential in their surroundings for the benefit of health and as a business idea for the members of Kauman Village, Malang City.

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Original Title:
Pemberdayaan Anggota PKK Dalam Pelatihan Pembuatan Tisane Kulit Buah Naga Merah di Kelurahan Kauman Kota Malang

Abstrak. Tisane merupakan minuman seduhan yang terdiri dari campuran beberapa bahan seperti daun, biji-bijian, rerumputan, kacang-kacangan, kulit pohon, buah-buahan atau bunga yang dikeringkan, ataupun bagian dari tanaman yang dapat memberi aroma dan rasa sekaligus bermanfaat bagi kesehatan. Tisane dapat memberi benefit bagi kesehatan seperti memiliki aktivitas antioksidan, antimicrobial, antihemolytic, dan aktivitas sitotoksik. Kulit buah naga mengandung zat warna alami antosianin cukup tinggi, kaya akan senyawa polifenol, senyawa betalain, vitamin C, vitamin E, vitamin A, alkaloid, terpenoid, flavonoid, tiamin, niasin, piridoksin, kobalamin, fenolik, karoten, dan fitoalbumin, serta potensial sebagai sumber antioksidan alami. Oleh sebab itu kulit buah naga dapat dijadikan tisane karena terbukti memiliki manfaat bagi kesehatan. Pemberdayaan para anggota PKK Kelurahan Kauman kota Malang dalam pembuatan tisane bertujuan untuk menambah pengetahuan dan keterampilan para anggota PKK mengenai manfaat dan cara pembuatan tisane dengan memanfaatkan limbah kulit buah naga. Kegiatan pengabdian dilaksanakan dalam 3 (tiga) tahap. Tahap pertama berupa pemaparan tentang manfaat tisane bagi kesehatan, tahap yang kedua adalah tentang cara pembuatan tisane dengan memanfaatkan kulit buah naga dan tahapan ketiga adalah praktek pembuatan tisane dan evaluasi. Hasil evaluasi menunjukkan peningkatan pemahaman peserta dengan perbedaan nilai rata-rata pretest 61,74 dan rata-rata post test 90,87 dengan skor keterampilan rata-rata peserta 28,61 (dikategorikan terampil). Hal ini menunjukkan bahwa informasi yang disampaikan mengenai cara pembuatan tisane dapat dipahami dengan baik oleh peserta dan mengindikasikan keberhasilan kegiatan PkM yang telah dilaksanakan. Selama kegiatan berlangsung para peserta berinteraksi dengan cukup baik dan merespon dengan memberikan pertanyaan seputar kegiatan PkM.

Kata kunci: Tisane, Hylocereus polyrhizus, antioksidan, kulit buah naga merah, herbal