
Empowering The Community to Produce Moringa Leaf Capsules for Traditional Medicine

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ABSTRACT

Moringa oleifera is a plant that has the potential to be used as a medicine, but to get the maximum effect, a sufficient amount is needed when consumed. This service educates the community about turning Moringa leaves into herbal capsules as health support. Knowledge transfer is done by providing counselling on the benefits of moringa leaves and demonstrating the making of capsules from moringa leaves. Pre- and post-tests are conducted to determine the activity's level of success, which is then analyzed using the Wilcoxon non-parametric test. There was a significant increase ($p < 0.05$) in public knowledge regarding using, utilising and processing Moringa leaves as herbal medicine to support health. Processing Moringa leaves into herbal capsules can be an alternative to treatment

Keywords: Capsul; Health, Leaf; Medicine; Moringa

INTRODUCTION

Health development is an essential part of national development. Its goal is to raise awareness, willingness, and ability for everyone to live a healthy lifestyle, in order to achieve the highest level of health [1]. Health development is a collaborative effort involving the potential of the entire Indonesian nation, including the community, private sector, and government. The vision of health development is to attain a healthy Indonesia by 2045 [2]

Traditional medicine in Indonesia plays a massive role in improving public health and has excellent potential to be developed [3] Indonesia is rich in plants that can be used as medicinal ingredients, but this natural wealth has not been optimally utilized for health. One of the reasons is that people's purchasing power for modern medicines is decreasing [4].

Indonesia is known to have the second-largest biodiversity in the world after Brazil. Various studies have stated that of the approximately 90,000 plant species in Indonesia, 9,600 species are efficacious as medicine, and 300 species have been used as traditional medicine ingredients by the traditional medicine industry [5]. Other sources state that plants in Indonesia are estimated to reach more than 7,000 species and around 1,000 species are used to prevent and treat diseases [6].

Moringa oleifera is one of the plants that has the potential to be used as a medicinal ingredient. Various studies on the Moringa plant have shown that all parts of this plant benefit humans. Traditionally, Moringa treats wounds, ulcers, pain, liver disease, heart disease, cancer, and inflammation [7,8]. Furthermore, modern scientific research has found more than a hundred types of bioactive substances found in Moringa, including alkaloids, phenolics, isothiocyanates, flavonoids, anthraquinones, vitamins (especially A and C), glycosides, and terpenes, as well as the pharmacological effects of various parts of the Moringa plant including hepatoprotective,

cardioprotective, antioxidant, anti-inflammatory, antimicrobial, anticancer, antihypertensive, antidiabetic, and nutritional effects [9–11]

Moringa plants are widely found in all provinces in Indonesia, including North Maluku Province. However, the problem is that the selling value of the moringa plant could be higher if it is only used as a side dish for everyday food. Sometimes, the moringa plant is only found as a plant that grows wild because it is not used other than as a side dish or animal feed. Sufficient quantities and appropriate doses are required to achieve maximum effect from using moringa leaves as medicine. So, one solution is to process Moringa leaves into herbal capsules. In addition, the capsule form is more practical to consume.

Based on this, community education and empowerment are carried out in processing Moringa leaves into herbal capsules at the Kastela tourist beach, Ternate Island, North Maluku Province.

METHOD

Community service activities were conducted at the Kastela beach, Ternate Island, Ternate City, North Maluku, on Saturday, August 10, 2024. The target of this activity was the community domiciled in Kastela Island Village and visitors to the tourist beach. The community service team acting as the implementer were lecturers from the Department of Pharmacy, Faculty of Medicine, Khairun University.

To assess the activity's success, participants were given pre-and post-tests. The activity began with the participant registration process, then continued with a questionnaire as a pretest and counselling activities on the use of plants that can be developed as traditional medicine and their processing to increase their selling value.

The counselling method consisted of lectures, leaflet distribution, and an interactive approach with participants. Then, a demonstration of how to process Moringa leaves into herbal capsules was followed. As evaluation material, a post-test session and participant questions and answers were carried out. The results of the pre-and post-tests will be processed statistically to conclude the activities that have been carried out.

RESULTS

Based on the pre-and post-test results, there was an increase in the post-test score after the counselling activity; this indicates that the community service participants absorbed the material provided well. To see if there were significant changes in the pre and post-tests, a statistical test was carried out, which was previously carried out with a normality test to see the normality of the data distribution (see Figure 1)

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|-----------|---------------------------------|----|-------|--------------|----|-------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| pre test | .182 | 30 | .013 | .933 | 30 | .058 |
| post test | .286 | 30 | <.001 | .858 | 30 | <.001 |

a. Lilliefors Significance Correction

Figure 1. Normality Test Results

Based on Figure 1. The normality test obtained a p value <0.05 in the pre-test and post-test, so it is concluded that the data is not normally distributed. Based on the normality test carried out, the calculation will be continued using the Wilcoxon non-parametric test with the following results.

Wilcoxon Signed Ranks Test

| | | Ranks | | |
|----------------------|----------------|-----------------|-----------|--------------|
| | | N | Mean Rank | Sum of Ranks |
| post test - pre test | Negative Ranks | 0 ^a | .00 | .00 |
| | Positive Ranks | 30 ^b | 15.50 | 465.00 |
| | Ties | 0 ^c | | |
| | Total | 30 | | |

- a. post test < pre test
- b. post test > pre test
- c. post test = pre test

Test Statistics^a

| | post test - pre test |
|------------------------|----------------------|
| Z | -4.793 ^b |
| Asymp. Sig. (2-tailed) | <.001 |

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

Figure 2. Wilcoxon non-parametric test results

Based on Table 2, the results of the Wilcoxon test show a significance value (2-tailed) of 0.000, which is less than 0.05. This means that the hypothesis is accepted, and it can be concluded that the pre-test and post-test results experienced significant, meaningful changes

DISCUSSION

The community service activity was conducted on Saturday, August 10, 2024, at the Kastela tourist beach, Ternate Island, North Maluku. The beach location was chosen because the community service activity was carried out over the weekend, so the target participants were expected to be within the Kastela sub-district and beach tourism visitors. As a form of concern from the community service team, in addition to providing education and demonstrations, the community service team also provided free health checks to community service participants through blood pressure measurements.

The first stage of the activity was participant registration. The total number of participants who participated in the activity was 30, 18 of whom were elderly. Most participants were residents of the Kastela sub-district, and several were visitors to the Kastela tourist beach. After the registration process, a blood pressure check was carried out. The average blood pressure of the community service participants showed a systolic value of 160mmHg with a diastolic value of 100mmHg, which is included in the grade 2 hypertension category [12].

Hypertension/high blood pressure is often called a silent killer because it can be deadly silently, without any prior symptoms as a warning to the sufferer. When it appears, these symptoms are often considered a common disorder, so the sufferer is late in realizing the disease's arrival [13]. Hypertension is a severe health problem because if it is not prevented immediately, it will cause complications that endanger health, especially the elderly. The consequences can also be fatal due to the complications experienced, such as stroke (brain haemorrhage), coronary heart disease, and kidney failure [14,15]

Based on information obtained from community service participants, it was found that they rarely had routine check-ups but had experienced symptoms such as stiff neck, frequent cramps, and sometimes blurred vision. In addition, the community's lifestyle prefers fast food, which contains lots of fat, protein, high salt and low fibre [16]. So, the community service team took an interactive approach to provide individual education, hoping that the community could absorb information optimally, especially for the elderly.

The second stage of the activity was a demonstration of making moringa leaf capsules accompanied by distributing leaflets to the people present; at this stage, the community service team showed the capsule-making process, which began with collecting raw materials, washing, drying, processing into fine powder and the packaging process into capsules. Moringa leaf capsules do not use preservatives or other additives; they are guaranteed safe and hygienic.



Figure 3. Education and Demonstration of Making Capsules from Moringa Leaves

The capsule form was chosen because it can cover unpleasant odours and tastes, is easy to consume and prepare, and protects the contents from external influences (light and moisture) [17]. The capsule dosage form is more accessible to swallow and has a more straightforward formulation than the tablet dosage form [18,19].

The third stage of the activity is the delivery of material about using plants as herbal medicine and the benefits and rules for taking moringa leaf capsules. Each capsule contains 70mg of moringa leaf powder, which can be consumed twice a day every 12 hours or in as many as two capsules. Moringa leaf capsules help treat anaemia, lowering blood sugar, cholesterol, and anticancer [20–22].

The community was enthusiastic about listening to the material presented during the activity. Some questions were asked: Is consuming Moringa leaves safe in the long term? What other parts

of Moringa can be used as medicine besides the leaves? Based on these questions, the community service team tried to answer using easy-to-understand language.

Moringa leaves contain many vitamins and metabolite compounds that benefit body health. Leaves are part of the Moringa plant that has the highest nutritional value, namely containing protein (19-29%), fibre (16-24%), fat, carbohydrates, minerals and vitamins (A), B1 (thiamine), B2 (riboflavin), C and E (Eka et al., 2020; Noreen et al., 2020; Primadana et al., 2023) For an explanation of safety and effectiveness, various research results will be reviewed regarding the safety of each part of Moringa.

Based on research on in vivo moringa leaf toxicity tests shows that moringa leaf infusion is safe to consume up to a dose of 2000mg/kgBW for 21 days; other studies also state that moringa leaf water extract does not show death in test animals up to a dose of 5000mg/kgBW, but shows an increase in kidney function in haematology examinations. In addition, there is a journal stating that consuming moringa leaves in large doses can cause high iron accumulation. High iron can cause digestive tract disorders and hemochromatosis (excessive iron levels) [26]. Moringa has been used for various purposes. Its roots, leaves, flowers, and fruits can be used for food. The leaves and pods contain sufficient nutritional value, producing many vitamins and minerals. The leaves can be eaten cooked or dried [21,27]

After the question and answer session, participants were given a post-test again to see their level of understanding of the participants. The post-test results showed an increase in the knowledge of the counselling participants by 50% from the pre-test results, with statistical analysis results that were significantly different. At the end of the counselling, participants received moringa leaf capsule products. Counselling participants followed the series of events well and orderly. At the end of the event, the community service team also provided applicable gift packages to participants who followed the activities from the beginning to the end.



Figure 4. Community Service at Kastela Tourist Beach, Ternate City, North Maluku, Indonesia

CONCLUSION

After educating participants about the potential of the Moringa plant and how it can be processed into herbal capsules, it can be concluded that their knowledge increased. This is indicated by the total questionnaire score, which increased in the post-test compared to the pretest

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