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Herbal insecticide candles from duku peels: Innovative counseling for dengue fever prevention at Olak Kemang Health Center

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Abstract

Background: The problem of Dengue Hemorrhagic Fever (DHF) in the Olak Kemang Public Health Center area demands innovative prevention methods. This community service project aims to disseminate knowledge about the use of duku fruit peel waste as a botanical insecticide. Duku skin contains active compounds such as Saponin, Flavonoid, and Terpenoid, which have been proven effective as mosquito repellents and killers. Insecticidal candles were identified as a practical and easily accessible medium for the public**. Method:** This activity focuses on Interactive Counseling conducted at the Olak Kemang Health Center, targeting health staff and cadres. The extension methods used are: a. Delivery of Scientific and Practical Materials: Education on the dangers of dengue fever and the potential of duku peel, b. Screening of Educational Videos: Showing a demonstration of the steps for making duku peel insecticide candles to facilitate visual understanding and transfer of practical skills. The evaluation was conducted to measure the participants' level of understanding and response to this innovation. **Results:** The extension activity was successful with high enthusiasm from the participants. Through video media, participants understand the scientific basis of duku skin and simple steps to make their own candles at home. Duku peel insecticide candles were introduced as an affordable and environmentally friendly dengue prevention solution, transforming local waste into a valuable product for community health. **Conclusion:** This program successfully transferred knowledge about the potential of duku skin through effective video-based extension methods. The utilization of this waste serves as an inspiration for the community at the Olak Kemang Health Center to independently and sustainably prevent dengue fever.

Keywords: Duku peel; botanical insecticide; candle; counseling; Olak Kemang Health Center; dengue fever.

Cite This Article

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INTRODUCTION

Duku (*Lansium domesticum*) contains secondary metabolites with established insecticidal properties [1]. These compounds include phenolics, flavonoids, and other bioactive molecules that can affect insect physiology [2] Research has specifically shown that extracts from Duku leaves and bark can influence the development and enzyme activity of Aedes aegypti larvae, reducing esterase activity and increasing GST enzyme activity, which is critical for detoxification processes in insects[1] [3]. The bioactive compounds in Duku bark and leaves can disrupt insect growth, feeding, and reproduction[4] These compounds act as antifeedants, growth inhibitors, and enzyme disruptors, which are essential for managing pest populations [1][5]

Teaching videos have proven highly effective in facilitating skill transfer across various community empowerment programs by offering learning opportunities that are easily accessible, flexible, and engaging [6] [7] They support skill acquisition and retention, foster community building and collaboration, and are adaptable to a wide range of practical applications to build local capacity and confidence[8] [9] The success of these programs often relies on active participant engagement with the video content and the creation of a supportive learning community [8]Healthpreneurship integrates health and entrepreneurship to drive innovation, enhance healthcare delivery, and address global health challenges[10] [11].Educational programs and training initiatives play a vital role in developing the necessary skills and knowledge for health professionals to become successful healthpreneurs [11].

Direct information provided on structured socialization to the community for processing duku peel into anti-mosquito aromatherapy candles is not yet available[12] However, relevant insights can be drawn from related studies on fruit peel utilization and its potential applications[13]. Langsat peel, which is similar to duku peel, has been successfully formulated into anti-mosquito lotion due to its triterpenoid compounds [14][15]. Other fruit peels, such as pineapple, have been used in mosquito repellent products and aromatherapy candles, respectively, showing a potential pathway for duku peel utilization [16][17] The potential for processing waste into high-value products is a crucial effort in community education activities, such as utilizing duku peel waste into environmentally friendly mosquito repellent products through video-based socialization methods[18][19] Therefore, the main objective of this service is to socialize how to make anti-mosquito aromatherapy candles from duku peel using an instructional video as an educational medium[20]

METHODS

This community service activity was designed with an educational socialization approach combined with practical demonstrations, using direct instructional videos as the primary medium [7] The activity was conducted in the working area of the Olak Kemang Public Health Center, Jambi City, involving 25 participants consisting of Olak Kemang health cadres [19].

Population, samples and sampling
The population in this activity were 25 participants, consisting of health cadres and health staff working in the Olak Kemang Public Health Center area [19].

Instruments and criteria
Evaluation was conducted to measure the increase in participants' understanding and skills using pre-test and post-test instruments and a simple questionnaire [12, 19]. The instruments used in this activity included training modules, evaluation questionnaires, and photo and video documentation to ensure that the entire process was systematically recorded [25].

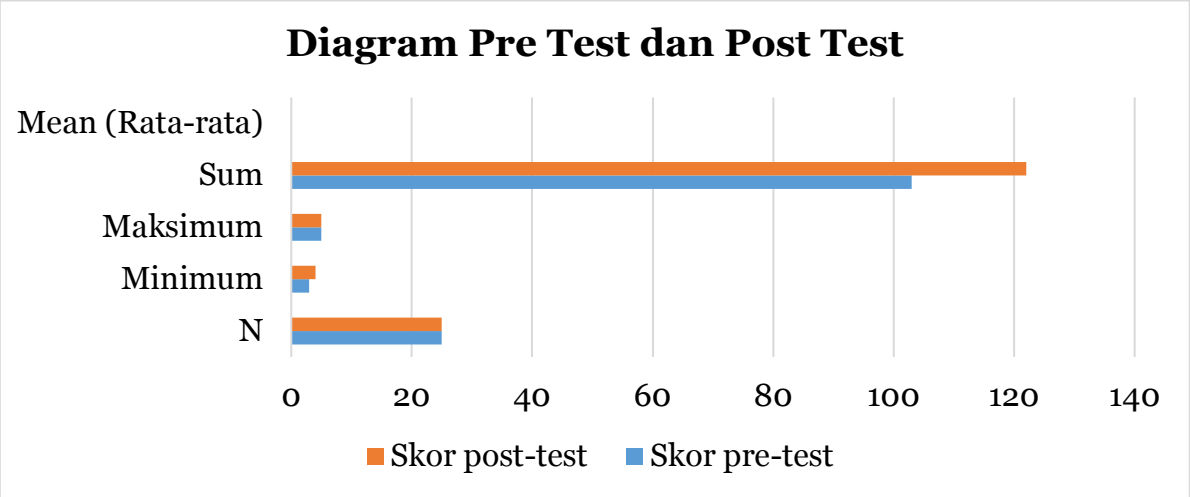
Procedure and data collection
The activity stages began with the preparation and production of an instructional video on how to make anti-mosquito aromatherapy candles based on *Lansium domesticum* fruit peel as the main learning medium [21]. This was followed by socialization and screening of the instructional video to the participants to provide a comprehensive understanding of the background, raw materials, and product manufacturing procedures [5]. After the video screening, the activity continued with a discussion and question-and-answer session to deepen participants' understanding [24]. The next stage was a direct practice of making the anti-mosquito candles by the participants, assisted by the implementation team [15, 18].

Statistical analysis
Data from the evaluation results were analyzed descriptively to determine the number of participants who understood and were able to practice product manufacturing independently [12]. The main indicator of achieving the goal, which is the increase in knowledge/skills, was determined by the increase in the average (Mean) score from the pre-test to the post-test [12].

RESULTS
The community service activity was carried out through a series of structured steps, which generally included planning, intervention (training) implementation, and evaluation [8, 9]. Based on the data, the main focus of this activity appeared to be the increase in knowledge or skills of the target audience, which was measured using pre-test and post-test [12]. The achievement of the main objective, namely the increase in knowledge/skills, was demonstrated by the rise in the average (Mean) score from the pre-test to the post-test [12].

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Pre-test Score	25	3	5	103	4.12	0.726
Post-test Score	25	4	5	122	4.88	0.332
Valid N (listwise)	25					



Gambar 1. Diagram *Pre Test dan Post Test*

Figure 1. Kegiatan Pre-Test

Figure 2. Kegiatan Post-Test

DISCUSSION

Based on the results of this service, there was a significant increase in the average score from 4.12 (pre-test) to 4.88 (post-test), indicating a significant increase in knowledge and/or skills among the 25 participants in the Olak Kemang Public Health Center working area, Jambi City [7] with an increase in the average score of 0.76 points (4.88 - 4.12) [21]. The focal points of this intervention program included: The utilization of *Lansium domesticum* (Duku/Langsat) fruit peel as a natural mosquito repellent raw material, the Development of creative products from local natural resources, and the concept of Healthpreneurship [22].

These findings are consistent with various studies that have confirmed the presence of compounds like saponin in langsat/duku peel, which have the potential as natural insecticides or mosquito repellents [23] Thus, the material conveyed in the service program successfully increased participants' understanding of the potential of this local resource [24]. The decrease in the Standard Deviation value from 0.726 to 0.332 is a strong indicator of success This shows that the use of instructional videos had a positive impact, leading to better uniformity of understanding among all participants The majority of participants now have scores very close to the average value (4.88) and the maximum value (5) It can be assumed that the training program successfully raised the scores of participants who previously had lower knowledge or skills (the minimum score increased from 3 to 4.[25,26]

The high post-test score reflects that participants have a solid knowledge base regarding the innovative anti-mosquito product made from duku peel [27][28]. This strong understanding is crucial initial capital for the Development and production of safe and environmentally friendly anti-mosquito products [29–31]. Furthermore, the program fostered a spirit of Healthpreneurship in the community to create new business opportunities based on local health innovation, aligning with the main goal of community service [32,33]. Overall, the descriptive statistical results confirm that the community service program "development of anti-mosquito products based on *Lansium domesticum* fruit peel as a creative innovation in healthpreneurship Based on local natural resources in the Olak Kemang Public Health Center working area, Jambi City" successfully increased the knowledge and/or skills of the participants significantly and uniformly, proving that the intervention achieved its objective in community empowerment

CONCLUSIONS

The community service activity, through the socialization of making anti-mosquito aromatherapy candles from *Lansium domesticum* fruit peel using video instruction media, proved effective in enhancing participants' skills in producing innovative products based on local natural resources Through this method, the community was not only able to practice the product manufacturing technique independently but also gained new insights into botanical insecticides and the concept of healthpreneurship, which can open creative business opportunities This digital media-based socialization model shows significant potential for replication in other areas with similar characteristics, thereby becoming a sustainable community empowerment strategy and supporting efforts to develop environmentally friendly natural health products

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE
This study used artificial intelligence (AI) tools and methodologies in the following capacities Manuscript writing support: AI-based language models, such as [for example, ChatGPT, Quillbot], were/was employed to: Language refinement (improving the grammar, sentence structure, and readability of the manuscript).

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