

# Cultivation of Acem acem (*Oxalis dehradunensis* Raizada) and Its Utilization as a Hand Sanitizer for Protection of Exposure to Chemical Pesticides

Yaya Hasanah<sup>1\*</sup>, Eka Lestari Mahyuni<sup>2</sup>, and Urip Harahap<sup>3</sup>

<sup>1</sup> Faculty of Agriculture, Universitas Sumatera Utara, Jl. Prof. A. Sofyan No 3 Kampus USU, Medan 20155

<sup>2</sup> Faculty of Public Health, Universitas Sumatera Utara, Jl. Universitas No 32 Kampus USU, Medan 20222.

<sup>3</sup> Faculty of Pharmacy, Universitas Sumatera Utara, Jl. Tridharma No 5 Kampus USU, Medan 20155

**Abstract.** Farmers in Tanah Karo still use chemical pesticides a lot and often experience direct exposure to pesticides due to not using personal protection during pesticide spraying. Based on the farmers' habits, exposure to pesticides is cleaned by rubbing the leaves of acem acem (*Oxalis dehradunensis* Raizada) to the dirty and exposed parts of the pesticide. Acem acem leaves have many benefits and are local potentials that can be new opportunities for farmers to process acem acem leaves into products that have economic value. In addition, acem acem leaves that grow wild and are scattered in every farmer's field in Tanah Karo become an obstacle in providing raw materials in large quantities because it will take a lot of time, effort, and money to collect them. The purpose of this community partnership program is to develop acem acem leaves as raw material for hand sanitizers by means of intensive cultivation, increase farmers' understanding of the use of acem acem leaves in protecting exposure to chemical pesticides, empower farming communities in making hand sanitizers made from acem acem leaves. The solution to partner problems is to cultivate acem acem as raw materials, educate the farming community to utilize acem acem leaves into products that have economic value such as hand sanitizers so that they can increase farmers' income. The implementation of community partnership service activities is carried out by training at each stage of acem acem cultivation, maintenance of acem acem, harvesting, and post-harvest as well as processing acem acem into hand sanitizers, as well as direct practice of demonstration plots for acem acem cultivation.

**Keyword:** Elderly people, Posyandu, monitoring, health status, Cadres

**Abstrak** Petani di Tanah Karo masih banyak menggunakan pestisida kimia dan sering mengalami paparan langsung pestisida akibat tidak menggunakan pelindung diri selama penyemprotan pestisida. Berdasarkan kebiasaan petani, paparan pestisida ini dibersihkan dengan menggosokkan daun acem acem (*Oxalis dehradunensis* Raizada) ke bagian yang kotor dan terkena pestisida. Daun acem acem memiliki banyak khasiat dan merupakan potensi lokal dan peluang baru bagi petani untuk mengolah daun acem acem menjadi produk bernilai ekonomi seperti hand sanitizer. Di samping itu daun acem acem yang tumbuh liar dan tersebar di tiap ladang petani di Tanah Karo menjadi hambatan dalam penyediaan bahan baku dalam jumlah yang banyak karena akan menghabiskan banyak waktu, tenaga, dan biaya untuk mengumpulkannya. Tujuan program kemitraan masyarakat ini yaitu untuk mengembangkan daun acem acem sebagai bahan baku hand sanitizer dengan cara pembudidayaan intensif, meningkatkan pemahaman petani (mitra) akan kegunaan daun

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\*Corresponding author at : Faculty of Agriculture, Universitas Sumatera Utara, Prof. A. Sofyan No. 3 Kampus USU, Medan

E-mail address: yaya@usu.ac.id

*acem acem dalam melindungi paparan pestisida kimia, memberdayakan masyarakat petani (mitra) dalam pembuatan hand sanitizer berbahan baku daun acem acem, Solusi dari permasalahan mitra adalah dengan membudidayakan daun acem acem sebagai bahan baku, mengedukasi masyarakat petani untuk memanfaatkan daun acem acem menjadi produk yang memiliki nilai ekonomi seperti hand sanitizer sehingga dapat menambah pendapatan petani. Hasil pengabdian menunjukkan bahwa sejumlah 70% masyarakat (mitra) yang mengikuti pengabdian sangat antusias dan tertarik untuk budidaya acem acem dan membuat hand sanitizer secara mandiri*

**Kata Kunci :** *Oxalis dehradunensis, pestisida kimia, hand sanitizer, budidaya*

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## 1. Introduction

Karo Regency is an area where the majority of the people are engaged in agriculture. In agricultural management, farmers generally still use a lot of pesticides to help productivity of agricultural products. The management method is generally intercropping so that in one field there will be various types of plants, namely groups of horticultural crops. In the management of plants, generally they are prone to pests and diseases so that they require intensive attention with the use of quite high pesticides [1]. Based on literature studies, the high rate of pesticide poisoning is caused by direct exposure to pesticides that occurs due to farmers not using personal protection during pesticide spraying. The highest exposure through the skin on several parts of the body such as on the hands and feet is always encountered and is often experienced by farmers due to pump seepage that leaks, splashes, spills, or direct contact when mixing and spraying pesticides [2-4].

One of the efforts to protect oneself from exposure to chemical pesticides is to use complete personal protective equipment and maintain personal hygiene after applying the pesticide. Health problems generally occur in farmers because weak application of personal hygiene among farmers. This is caused by the unavailability of water and soap in the fields, thus requiring farmers to postpone self-cleaning after exposure to pesticides [5-7]. Based on the results of research that has been done previously, the community service team found one of the wild plants known as the term "acem acem" leaf by the Karo farming community. This acem acem leaf grows wild all around fields and is often used to wash hands and clean dirty body parts or exposed to pesticides. Farmers generally mix a little water into the acem acem leaves then rubbed into dirty body parts such as hands, feet or affected body parts pesticide. The results shown from this behavior are trusted by the Karo farming community able to clean pesticide exposure (Fig. 1) [8].



**Figure 1.** Local wisdom of using acem acem leaves for chemical pesticide protection

Based on its characteristics, acem acem leaves include clover-like plants mountains that are found around the Tanah Karo mountains. These leaves have flowers purple, leaf shape resembling a butterfly, has hairy stems and roots fibrous with white tubers. The nature of this acem acem leaf plant is in groups and propagates by spreading around other plants and likes to absorb water from plants surroundings. Based on the results of phytochemical analysis in the laboratory, this leaf belongs to the genus *Oxalis* with the species *dehradunensis* so the Latin name of this plant is *Oxalis dehradunensis* Raizada.

Acem acem leaf has secondary metabolites that are efficacious some of them contain saponins, flavonoids, polyphenols, tannins, steroids and tripenoids, tannins and oxalic acid [8-10]. This matter indicates that acem acem contains cleaning agents as soap and is also assumed be an antioxidant. The content of saponins and tannins owned by acem acem leaves shows that the leaves It has soap-like properties that are able to clean dirt [11]. One of the products that can be managed by using extracts from acem acem leaves, this is a hand sanitizer that It is easy to carry and practical so it can be a new business opportunity for farmers besides helping in maintaining cleanliness and protecting the health of farmers from exposure chemical pesticides. In general, hand sanitizer is an antiseptic cleaning fluid that it can reduce the number of microbes in a person's body. But no closing the possibility that the development of the function of hand sanitizers can be improved by utilizes acem acem leaf extract which has been proven to be able to bind and clean pesticides, especially pesticides with chlorphyrifos compounds which often interfere with activities cholinesterase enzyme and has the potential to cause acute poisoning. Adding leaf extract acem acem in the form of hand sanitizer will be a new innovation that can used by farming communities to improve health and the economy as well as public welfare [8, 13-14].

The objective of the community service is to develop acem acem leaves as raw material for handicrafts sanitizer by means of intensive cultivation, increasing the understanding of farmers (partners) about the use of acem acem leaves in protecting exposure to chemical pesticides and empowering partners in making hand sanitizers made from acem acem leaves. The problem faced by partners is that they do not understand how to use acem acem leaves be a product that is nutritious for health and has economic value as it is made become a hand sanitizer and can be resold to increase farmers' income, and the need for continuity of raw materials for acem acem so

that wild acem acem needs to be cultivated. Therefore, the solution offered is to cultivate acem acem and utilize the acem acem into products that are beneficial for health (such as being a hand sanitizer).

## **2. Method**

The approach method that will be used to support the realization of community service is lectures and discussions, training for each stage of acem acem cultivation, acem acem maintenance, harvesting, and post-harvest and processing of acem acem into hand sanitizers, as well as direct practice and demonstration plot.

The community service training participants are farmers (partners) and the surrounding community as many as 30 persons who interested in acem acem cultivation and its use as a hand sanitizer. To increase understanding of acem acem cultivation, it is hoped that participants will be able to teach their knowledge to other people in the area where they live.

In this community service, various trainings and practices will be carried out on the stages of cultivation acem acem start selecting planting materials, planting, making maintenance, harvesting and post-harvest, the accompanying agribusiness opportunities are processing acem leaves acem becomes a hand sanitizer. It is hoped that with the partnership program activities. In this community, there will be an increase in partners' understanding in understanding cultivation acem acem, so partners are moved to practice acem acem cultivation and process it into hand sanitizer so that in turn there will be an increase income of farmers.

Based on the problems faced by partners and the solutions offered, then the implementation method of this community activity is carried out in two stages as follows :

### **a. Training**

The training materials are:

- Acem acem cultivation techniques include: seed/seedling selection techniques, nursery techniques, planting techniques, maintenance techniques (watering, fertilization, weed control, control of plant pests and diseases, harvest).
- The technique of making hand sanitizers made from acem acem leaves.
- Hand sanitizer business management techniques.

### **b. The direct practice of acem acem cultivation**

### **c. The use of acem acem leaves as a hand sanitizer**

Utilization of acem acem leaves as a hand sanitizer is done by providing education to farmers as a form of implementing science and technology and socializing the use of acem leaves cool. This activity is carried out by conducting training on how to make hand sanitizer made from acem acem leaf extract. The training provided includes anything

materials used to make hand sanitizers and testing on the skin for proves the efficacy that acem acem leaves are able to clean dirt and pesticides perfectly.

### **3. Results and Discussion**

Activities that have been carried out in this community service program are:

#### **3.1 Lectures and Discussions**

##### *3.1.1 Preparation phase*

- Hold a team discussion about the training plan and training materials to be provided.
- Re-contacting the Sumber Mufakat village head and village officials and submitting the planned service activity, namely choosing a location for acem acem leaf cultivation and education in processing acem acem leaves into hand sanitizer products, as well as determining the time and place for community service implementation (Fig. 2)

##### *3.1.1 Implementation Stage*

At this stage the training is carried out in the following sequence of events:

- Acem acem cultivation techniques include: Seed/seedling selection techniques, nursery techniques, planting techniques, maintenance techniques (irrigation, fertilization, weed control, plant pest control, harvesting). Facilitator : Dr. Ir. Yaya Hasanah, M.Si.
- The technique of making hand sanitizer made from acem acem leaves. Facilitator : Prof. Dr. Urip Harahap, Apt.
- Hand sanitizer business management techniques. Facilitator : Dr. Eka Lestari Mahuni SKM., M.Kes
- Discussion and question and answer with the training participants.

#### **3.2 Direct Practice of Acem Acem Cultivation**

The direct practice of acem acem cultivation is carried out on farmer's land (Pak Tulus Sitepu) covering stages including the activity preparation stage and the activity implementation stage.

##### *3.2.1 Activity preparation stage*

- Hold team discussions to discuss plans for preparation of acem acem cultivation activities
- Contacting, holding discussions with farmers (partners)
- Determine the location of acem acem cultivation activities

- Prepare tools and practice materials in the form of acem acem seeds, hoe, corded, manure and liquid organic fertilizer (Fig. 3)

### *3.2.2 Activity implementation stage*

### *3.2.3 Cultivation of acem acem*

Stages of acem acem cultivation : Land preparation for acem acem cultivation (Fig. 4)

- Tillage by hoeing and loosening the soil and then making beds as high as 20 cm.
- Prepare the acem acem seeds to be used which are obtained from the environment around the land
- Before planting, apply kandang fertilizer first to improve the physical, chemical and biological properties of the soil.
- Seedlings of acem acem that have been prepared are planted in the planting groove by immersing (Fig. 5)
- Watering every day
- The fertilizer used is liquid organic fertilizer (40 ml/L) which is applied a week after planting at intervals of once a week.
- Plant maintenance needs to be in the form of weeding, pest control is carried out according to plant conditions (Fig. 6-7)

## **3.3 Direct Practice of Making Hand Sanitizers**

### *3.3.1 Activity preparation stage*

- Hold team discussions to discuss plans for preparing hand sanitizers
- Contacting, holding discussions with farmers (partners)
- Determine the location of the practice of making hand sanitizers
- Prepare tools and practice materials in the form of acem acem leaf extract, glycerin, H<sub>2</sub>O<sub>2</sub>, 96% alcohol, and perfume.

### *3.3.2 Activity implementation stage*

- Preparation of acem acem leaf extraction
- Taking acem acem leaves that grow wild around agricultural land
- Fresh acem acem leaves are first dried so that they can be extracted. The drying process of the leaves takes more than a week (7 days). The dried leaves must be crushed to form dry

simplicia. This simplicia is then macerated for 2-4 weeks with two immersions and two filtrations. Furthermore, the filtering results are put into a rotary evaporator machine to be evaporated to form acem acem leaf extract which is ready to be used as a raw material for hand sanitizer which will be transferred to the community. At the time this activity was carried out there was damage to the rotary machine, thus requiring the rotary results to be continued elsewhere with the freeze drying method to be dried into extracts so that they could be used immediately. The finished extract from the acem acem leaves is then used to make hand sanitizers which will be handed over to the farming community in Sumber Mufakat Village, Kabanjahe District.

### *3.3.3 Implementation of hand sanitizer production*

Hand sanitizer is made by mixing the extract with additional ingredients for making hand sanitizer, namely glycerin, H<sub>2</sub>O<sub>2</sub>, 96% alcohol, and perfume. The formulation used consists of : etanol 96% 1,5 L, H<sub>2</sub>O<sub>2</sub> 3% 62,5 ml, glycerin 22 ml, aquades 1 L, Carbopol 0,15 g TEA 0,3 ml and perfume. The finished hand sanitizer is then given a label that has been designed so that the hand sanitizer container looks attractive (Fig. 8-10).

### **3.4 Handover of Technology Transfer Goods**

In this community service activity, the transfer of technology transfer goods has been carried out in the form of acem acem leaf extract, containers for making hand sanitizers, pH meters, lumping and mortar, glass beakers, stirrer, erlenmeyer, and magnetic stirrer.

It is hoped that with the delivery of technology transfer goods, it will increase public interest in making hand sanitizers so that they can increase people's income and increase protection from exposure to chemical pesticides.

The evaluation of the activities showed that 70% of the people who participated in the community service activities were very enthusiastic about this community service activity and had the desire to be able to cultivate and make hand sanitizers independently.



**Figure 2.** Socialization of community service activities (left), materials and tools for acem acem cultivation (center), land preparation (right)



**Figure 3.** Acem acem planting (left), acem acem cultivation education (center), weeding at 1 WAP (right)



**Figure 4.** Making hand sanitizer education (left), practice making hand sanitizer (center), hand sanitizer as the produce of community service (right)

#### 4. Conclusion

Around 70% of farmers (partners) who participated in community service activities, 70% of those who participated in community service activities were very enthusiastic about this community service activity and had the desire to be able to cultivate and make hand sanitizers independently. Training on making hand sanitizers is useful in increasing public understanding of the efficacy of natural ingredients for acem acem in protecting exposure to chemical pesticides. Cultivation of acem acem is a way that can be done to increase the continuity and availability of *Oxalis dehradunensis* raw materials for the manufacture of products that are nutritious for health. As a follow up to this activity, the community service team continues to provide assistance to farmers in acem acem cultivation and its use as a hand sanitizer:

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