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Improving the Economy of the Combatants Through the Development of Regional Business Potential of Citronella Oil into a Multi-Purpose Oil in Blang Crum Village, Muara Dua District, Lhokseumawe

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ABSTRACT

The prolonged conflict between the Indonesian government and the Free Aceh Movement (GAM) has led to a high unemployment rate in Aceh, especially among former combatants who lack productive skills. Aceh, as an essential oil producing area, has great potential to develop citronella oil into multi-purpose oil products with high economic value. The Community Science and Technology Application (PIM) program aims to improve the skills, income, and quality of life of former combatants in Blang Crum Village, Lhokseumawe, through training in modern distillation technology and the manufacture of multipurpose oil products. The training includes processing lemongrass oil with hydrodistillation technology, mixing herbal compositions to produce multipurpose oils, and marketing products digitally. This program is expected to increase the productivity of essential oils, improve product quality, and open up export opportunities. With a holistic approach, the program also aims to create a sustainable entrepreneurial community that supports local and national economic development.

Keywords: lemongrass oil, multi-purpose oil, former combatant, hydrodistillation, economic development.

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INTRODUCTION

After the conflict between the Indonesian government and the Free Aceh Movement (GAM) in 2005, unemployment in Aceh increased because former combatants did not have productive jobs caused by the low level of education of combatants, so they were unable to compete for jobs. This has an impact on the quality of life of combatants who are at the poverty level. One way to overcome the unemployment of these former combatants is to develop a business using resources that are famous in Aceh.

The land of Aceh is one of the largest essential oil producing areas because it is filled with a variety of plants, both in the form of spices and other similar herbal plants. Essential oils in Indonesia are commodities that generate the country's foreign exchange, so essential oils have received considerable attention from the Indonesian government. Currently, Indonesia only produces nine types of essential oils, namely clove oil, ylang ylang oil, patchouli oil, vetiver oil, nutmeg oil, eucalyptus oil, and lemongrass oil. Here are some pictures of plants that produce essential oils:

Figure 1 Some essential oil-producing plants as ingredients *for Multipurpose Oils*.

One of the plants that are widely found in Indonesia, especially in Aceh, is the citronella plant. Citronella plants are widely cultivated in several areas such as Aceh Besar, Aceh Singkil, North Aceh, Lhokseumawe, and Gayo Lues.

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Therefore, Aceh is a citronella oil producer in Indonesia and this means that citronella oil has great potential to be developed.

Citronella oil can be used as a *multi-purpose oil*. *Multi purpose oils* are oils that are concocted in composition, so they are often referred to as aromatherapy oils, massage oils or wind oils. This *multi-purpose oil* turns out to have extraordinary properties that can cure several diseases such as being able to overcome muscle pain, joint pain, warming the body during colds, and massage oils [6]. This oil is used by wiping/massaging/inhaling. This oil also has the advantage of being 100% natural and has a long shelf life, even without chemicals.

Broadly speaking, the main ingredient of the all-purpose oil used is lemongrass oil, but that does not mean that all all-purpose oils are of the same quality. The exceptional quality of the oil can only be obtained from certain compositions, usually herbalists who have their own concoctions with various additional herbs [7,8].

The development of the potential of citronella oil into multi-purpose oils can be a business opportunity, increase life *skills* for GAM combatants in Aceh in increasing income and improve their quality of life, and foster a sense of love for the homeland for combatants. This development can also benefit citronella farmers and also increase the income of the Aceh region. In addition, *multi-purpose oils* can also be an export item that can increase Indonesia's income.

Partner Problems

Blang Crum Village, Muara Dua District, Lhokseumawe is one of the areas that has the potential for the development of *Multi purpose Oils* products because this area is dominated by people who mostly make a living as farmers of essential oil-producing crop plantations. The location is also not far from the source of raw materials that can be used for the manufacture of *multi-purpose oil products*, so it is easy to carry out activities and its application to help increase the economic independence of the community, especially former GAM combatants who do not have productive activities. Essential oil ingredients such as citronella can be found in the Nisam area which is only about half an hour from the partner area.

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Figure 2. Simple Distillation Technology of Essential Oils in the Blang Crum Village Area, Muara Dua District

Based on the figure above, it can be seen that most of the farmers of essential oil-producing plants only know the distillation process in a simple way that produces essential oils in small quantities depending on the quantity of the plant and the length of the distillation process [6]. Therefore, to help increase the productivity of citronella oil, which is sometimes only sold raw, it is necessary to process citronella essential oil with the latest hydro-distillation technology which will then be used as multi-purpose oils with a composition according to herbal science which of course provides health benefits and increases the economic value of *citronella essential oil*.

Based on the explanation above, in this Community Science and Technology Application (PIM) activity, the proposer from the Lhokseumawe State Polytechnic campus wants to do community service to develop village potential by further applying hydro-distillation and extraction technology so as to produce citronella essential oil with the best quality. The lemongrass essential oil products produced can be developed into *multi-purpose oils* including blended from lemongrass oil, nutmeg, eucalyptus, turmeric and others. This activity will be one of the potential economic development of former GAM combatants in Blang Crum Village, Muara Dua District, Lhokseumawe

METHOD

The method of implementing this activity is a training method and direct practice using distillation equipment that has previously been prepared by the proposer. This activity is planned to involve around 20 former GAM combatants of Blang Crum Village, Muara Dua District, Lhokseumawe. After being equipped with knowledge of how to refine *Citronella Essential Oil*, the implementation of *Citronella Essential Oil distillation* was carried out by involving former combatants and farmers in the implementation of activities. In addition, there will be a demonstration on the manufacture of *Multi Purpose Oils* (multipurpose oils) as the final product that is expected to be developed by former GAM combatants. Broadly speaking, the implementation of this activity includes:

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1. Procurement of essential oil distillation equipment (hydro distillation).
2. Raw material preparation training includes the drying or *crushing* process.
3. Training on the use of *multistage vacuum hydrodistillation* technology.
4. Training in making *multi-purpose oils* (multi-purpose health oils).
5. Proposal to create an essential oil community for *multi-purpose oils* so that they can be commercialized nationally to export.

The target of this Community Science and Technology Application (PIM) activity is to increase the productivity and effectiveness of citronella essential oil to produce quality *multi-purpose oil* that can improve the economy of the GAM combatant community, the Aceh region, and can compete in the world market and help establish cooperation between farmers and consumers in an effort to increase the availability of harvest-ready essential producing crops. Improvements in the field of refining processes can be made by introducing hydrolyzed distillation machines that meet essential oil refining standards.

The application of Community Science and Technology (PIM) was initially used in the form of descriptive activities using a qualitative approach. The descriptive method is a method used to analyze data by describing or describing the data that has been collected as it is without intending to make generalized conclusions or generalizations [4]. Therefore, this descriptive method will also present data, analyze, and interpret and can also be comparative and correlational.

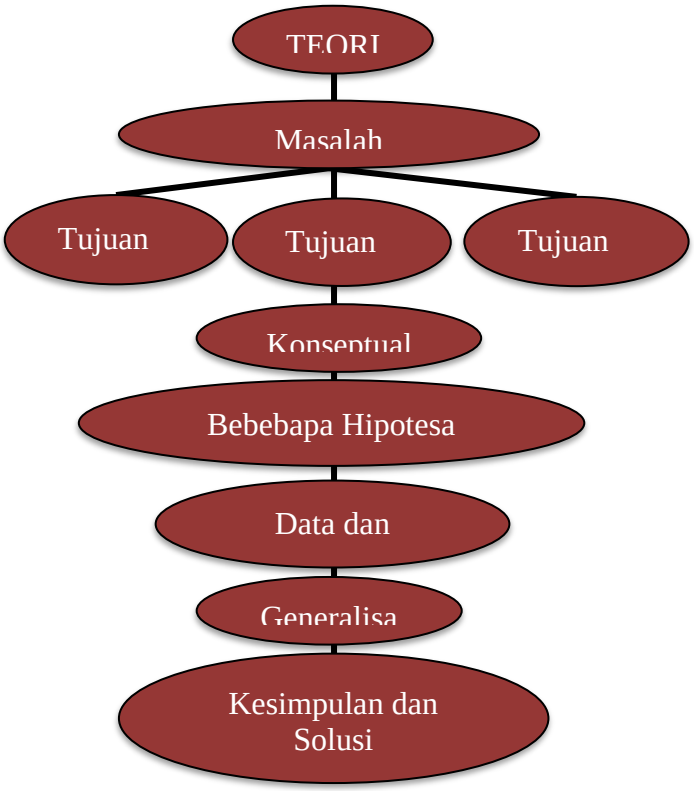

Figure 3 Methods of Identifying Community Problems

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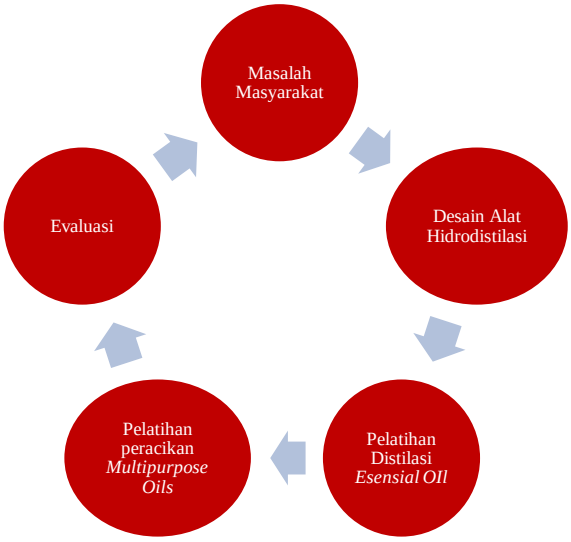

The procedure for implementing PIM activities is carried out starting from problem identification, data collection, product design, implementation of dissemination/training activities, and evaluation of activities.

Partner Participation

Business partners consisting of 20 former combatants who produce Essential Oils such as the Business Group in Blang Crum Village, Muara Dua Lhokseumawe District. Through socialization until the stage of production, each participant will follow, so that at the end of the activity they not only act as the main raw material supplier but also as experts in developing sustainable products as an effort to increase economic resources and also have expertise in utilizing natural resources produced by citronella farmers. The community will attend every meeting and training session which will be carried out for 2 months of activities using the activity absence system.

Activity Evaluation

The evaluation of activities will be carried out by the Lhokseumawe State Polytechnic and the Village Apparatus appointed for this activity and Monitoring Evaluation will also be carried out by the Ministry of Education and Culture in the form of a Progress Report on the Implementation of Community Science and Technology Activities 2022 regarding the activities carried out in terms of *skills*, production developments, and social and economic impacts.

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RESULTS AND DISCUSSION

Figure 4. Multipurpose *Oils* Product Overview

In this Community Science and Technology Application (PIM) activity, the parties involved in this activity are us as speakers on the implementation of distillation equipment and product knowledge, students who assist in desemination activities, village officials as activity monitors, and involve partner community groups as targets (people of Blang Crum Village, Muara Dua District, Lhokseumawe) as many as approximately 20 former GAM combatants from Blang Crum Village, Muara Dua District, Lhokseumawe, as the recipient group of PIM program implementation.

Through socialization until the stage of production will be followed by all parties, so that at the end of the activity these parties not only act as suppliers of the main raw materials, but also as experts in developing sustainable products as an effort to increase economic resources and also become life *skills* in utilizing natural resources produced by farmers. The former combatants will attend every meeting and training session which will be carried out for 2 months of activities with the use of absenteeism.

The technology used in this activity is the *Vacum Multistage Hydrodistillation* tool which is a vacuum machine that operates at a pressure below 1 atm. This process is intended so that essential oils are not easily decomposed because this system operates at low temperatures (30°C - 70°C).

The advantage of *this multistage hydrodistillation vacuum* is that it produces a larger quantity of essential oils with high oil purity quality because there is no decomposition of the constituent compounds due to the use of low temperatures. Therefore, the resulting essential oils have an optimal aroma.

The way to refine Essential Oils to produce *Multi Purpose Oils* products that will be implemented to 20 GAM combatants is to include raw materials, namely good quality citronella that has been wilted, dried or wet ingredients into a distiller kettle that has been filled with water and then heated. The raw materials must be *crushed* first before being put into the distillation reactor. Then, the steam that comes out of the boiler is flowed by a pipe connected to the condenser.

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The cooling medium in the condenser is the water that is circulated by the water pump from the water reservoir into the condenser tube. Water pumps are also used for the circulation of cooling water in vacuum pumps.

Steam which is a mixture of water vapor and oil will condense into liquid and be accommodated in a container. Furthermore, the oil and water liquid is separated by an oil *separator* to take the oil only.

This method is commonly used to distill essential oils such as lemongrass oil. The thing to note is that the boiler is made of anti-rust materials such as stainless steel, copper or aluminum-plated iron. This *Multi Purpose Oils* product can be packaged in the form of *fliptop* or *roll-on* bottles and packaged in large sizes as a typical product (souvenir) of Blang Crum village.

For the manufacture of *Multi Purpose Oils*, the proposer has researched and carried out special concoctions with certain compositions, as follows:

a. Lemongrass Oil : 50%
b. Virgin Coconut Oil : 10%
c. Eucalyptus Oil : 10%
d. Minjangan Oil : 10%
e. Ginger Oil : 5%
f. Turmeric Oil : 5%
g. Shallot Oil : 5%
h. Garlic Oil : 5%

The working mechanism of this tool is by inserting dried lemongrass into a basket of ingredients. Next, the basket is inserted into the distillator tube by paying attention to the density of the bolts so that leaks do not occur. The first step is to turn on the temperature control buttons, water pump, and vacuum pump on the control panel box by pressing the buttons in sequence so that each component turns on. The temperature on the control panel is set according to the desired distillation temperature. Meanwhile, the vacuum pressure in the distillator chamber is regulated by regulating the pressure on the vacuum pressure control part. The cooling medium in the condenser is the water that is circulated by the water pump from the water reservoir into the condenser tube. Water pumps are also used for the circulation of cooling water in vacuum pumps.

The next step is to turn on the heating stove, which is to open the gas regulator at the end of the LPG gas cylinder by turning the regulator in the opposite direction clockwise. Next, open the gas faucet first so that the gas flows to the heating end of the stove. After the gas flows with a hissing sound near the end of the stove, then the end of the stove is lit with a flame until the gas stove is on. The size of the heating stove flame is regulated by adjusting the gas faucet

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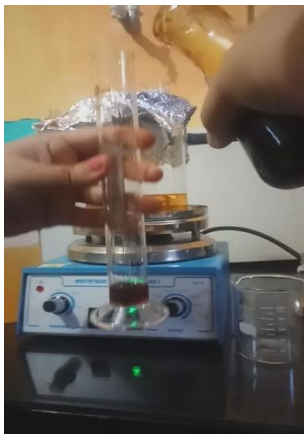
opening near the end of the stove. The heat from the heating stove heats the outer wall of the water tube because there is heat transfer, then the temperature of the water rises and boils so that hot steam is produced. The generated hot steam is channeled into the material storage tube through the hot steam line pipe. The temperature of the raw material, namely citronella rises and reaches a certain temperature, then the water and oil content in the test material will evaporate. The water vapor and oil produced by the test material then flows and passes through the pipes inside the condenser tube. When the mixture of water vapor and oil passes through the condenser, condensation will occur due to the temperature difference between the hot steam and the condenser so that condensate is produced. The condensate is then stored in a condensed liquid storage tube.

The process of distilling citronella oil lasts for approximately two hours. After the distillation process is complete, the first step is to turn off the heating stove by closing the gas faucet located near the end of the stove and closing the gas regulator on the top of the gas cylinder. Then, turn off the vacuum pump by turning the vacuum pump panel button to the left on the control panel box. Meanwhile, the water pump is left on for approximately 10 minutes from the time the heating stove is turned off. This is intended so that any remnants of hot steam that may still be present can be condensed in the condenser section. After that, the

water pump is turned off and the liquid (condensate) produced in the liquid storage tube is removed. Distilled condensate is a mixture of water and oil. The oil is in the top thin layer of condensate.

CONCLUSION

The program to develop the potential of lemongrass oil into multi-purpose oil has a strategic role in improving the economic welfare of former combatants of the Free Aceh Movement (GAM) in Blang Crum Village, Lhokseumawe. By utilizing modern technologies such as hydrodistillation, the program is not only able to improve the productivity and quality of essential oils but also provides added value to the final product that has the potential to compete in the national and international markets.

Training involving technical, marketing, and financial management aspects provides a comprehensive solution to overcome the limitations of resources and knowledge in the community. The implementation of this program is expected to create sustainable business opportunities, improve life skills, strengthen love for the homeland, and support regional and national economic development significantly.

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