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The Use of Gondok Cigarette Into Brickets as Fuel Products in Replacement of Alternative Energy Sources at Soko Glagah District

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Abstract
Geographically, Soko Village is in Glagah District of Lamongan Regency. Regency of Morocalan in the north, Gempol Pendowo in the east, Punan Village in the south, Blawi Village in the west. In general, the livelihoods of Soko villagers are identified in several sectors, fishers, traders, civil servants, employees and others. Most of the work of the residents is fish seed entrepreneurs. One of the factors that influence fish growth is irrigation. Watering is one of the things that affect the growth of fish, but the ponds in the village of Soko filled with water hyacinth that can inhibit the growth of fish. If this is not addressed, then it will have a fatal impact on the growth of the fish itself. The results of the work program held by the Industrial Engineering program group 4 by executing the manufacture of water hyacinth briquettes can help reduce the water hyacinth waste in the pond. Moreover, also the village government should be able to conduct an in-depth review to provide progress and mutual benefit for both the community and government.

Keywords: Fisherman pond, Water hyacinth, Briquette.

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Introduction

The use of excessive fossil energy sources can lead to the depletion of the availability of these energy sources. Indonesia's dependence on fossil energy makes oil production decline dramatically. This situation is driven by the increase and growth of the industrial and population sectors. The depletion of fossil energy reserves must be immediately balanced with the provision of renewable alternative energy, abundant in number, and cheap in price so that it is affordable by the wider community (Elfiano et al., 2014).

Various solutions have been made by scientists to overcome dependence on non-renewable energy sources. Among these various solutions are utilising renewable energy such as biomass. Biomass energy using the briquette method is to convert the solid raw material into a form of compacting that is easier to use (Husada, 2008). The use of bio briquette as a fuel is one of the alternative solutions for saving fossil fuel use and in sustainable use can reduce the impact of carbon emissions (Saputata et al., 2013).

Bio-bricket is a briquette made from biomass as a substitute for charcoal or coal (alternative fuels). Examples of biomass waste are used between bagasse, coconut shell, and so on, and eceng gondok. Bio-bricket compared to biomass combustion directly produces higher heat of volume union and facilitates transportation because Bio-bricket is made by suppressing biomass waste into a form and is denser. Compared to fossil fuels, Bio-bricket has a low total greenhouse gas emission because its components are part of the short carbon cycle.

In addition to suppressing biomass waste into a substantial size, Bio-bricket is also made by drying, carbonization, and pyrolysis so that it can produce higher energy. By making a cavity in the middle part of the briquette can cause the briquette surface area to be larger so that the combustion rate is higher.

Making briquettes from biomass raw materials is expected to overcome environmental problems as well as a solution for fuel scarcity because the briquette production process is relatively easy and does not require special skills. The main ingredient

that must be contained in the raw material for making briquettes is cellulose, the higher the cellulose content, the better the quality of briquettes. Water hyacinth is a waste in the waters that can damage the balance of aquatic ecosystems because of its rapid growth, which can reach 3% a day. The cellulose content of water hyacinth is quite high at 64.5% of its dry weight (Joedibroto, 1980).

Water hyacinth (Eichhornia crassipes) is a water plant that lives in fresh water that absorbs nutrients for its growth. Absorption of large amounts of nutrients results in water hyacinths absorbing liquid waste, N-nitrates, metals researchers are trying to study these plants to assess the ability and other organic wastes or even toxic compounds in the waste (Djenar and Budiastuti, 2008).

Water hyacinth (Eichhornia crassipes) is a weed plant in the waters that live floating on deep water. Water hyacinth has a high growth speed, so this plant is considered as a weed that can damage the aquatic environment. Water hyacinth breeds very quickly, both vegetatively and generatively. Vegetative propagation can double twice in 7-10 days (Gunawan, 2007).

However, behind the severe threat above, there are opportunities for alternative energies, especially for renewable energy. Relatively renewable alternative energy sources in Indonesia, one of which is biomass or organic waste materials. Biomass or organic waste materials can be processed and used as alternative fuels.

Therefore, the KKN team of the 4 Industrial Engineering study programs carried out innovations by utilizing water hyacinth waste processed into briquettes as a product of charcoal substitute fuel. With innovation as described, it is expected to reduce organic waste and increase the supply of alternative energy.

1. Formulation of the problem

From the description above can be formulated the problems that occur in Soko Village, Glagah District, among others:

a. The absence of information about the use of water hyacinth.
b. Helps reduce organic waste in ponds.
c. Lack of expertise in waste management**.**

2. Writing purpose

The purpose of the writer choosing this title is:

a. Making water hyacinth briquettes as an alternative fuel.
b. Reducing the waste of water hyacinth in the pond.

3. Restricting the problem

Given the extent of the problems involved in this writing, the author will only discuss:

a. Only add tapioca flour as an adhesive.
b. Drying utilizes solar heat.

Method

1. Settlement Framework

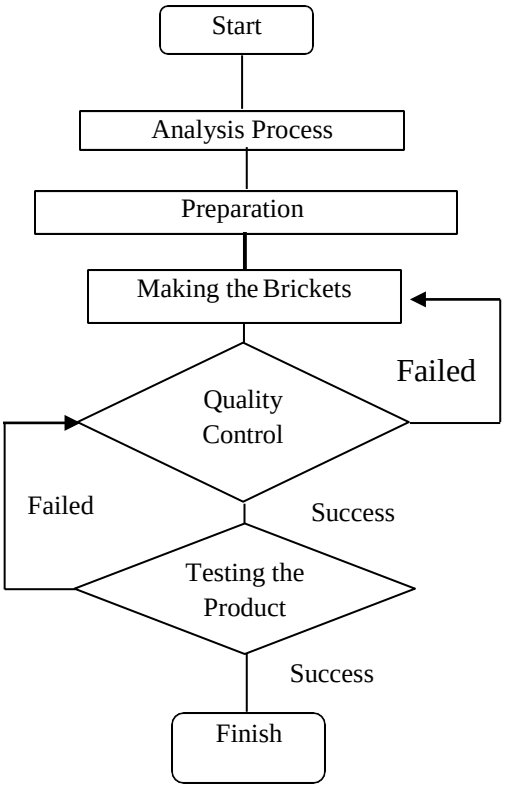

Figure 1 Problem Solving Flowchart

The method of activity of group 4 KKN Industrial Engineering Study Program in preparing the KKN report in Soko Village is in the form of Utilization of Water Hyacinth into Briquettes as a Charcoal Replacement Fuel Product.

The target of this program is the Soko Village community, especially adult men for the elderly. To carry out this activity well and directed, the method of activities is carried out and designed systematically. The stages that must be prepared are:

Prepare tools and materials for making briquettes as products of charcoal substitute fuels such as:

a. Scissor
b. Biscuit cans
c. Water hyacinth
d. Tapioca flour
e. Water

Then the stage of making briquettes is as follows:

a. First, prepare all the tools and materials as above.
b. Cut small wet hyacinth.
c. Dry the water hyacinth under the sun to dry.
d. Burn dry water hyacinth to become charcoal for about 1-2 hours in the furnace.
e. Mash the water hyacinth until it becomes coarse charcoal powder.
f. Filter the coarse charcoal powder until you get the same size of charcoal powder (fine charcoal powder).
g. Combine fine charcoal powder with starch (comparison of 80% charcoal powder mixture and 20% starch powder)
h. Add enough water to become the briquette mixture
i. Print briquette dough according to taste
j. Dry the briquettes that have been printed for 2-3 days under the sun to dry.

Figure 2 Water Hyacinth Drying Process

Figure 3 Water Hyacinth After Dried

Figure 4 The Process of Harvesting

Figure 5 Results of the Ruling

Figure 6 Results

Figure 7 Briquette Experiment Process

2. Implementation Method

Water Hyacinth Briquette Making	Information
Aim	It is expected to utilize water hyacinth for alternative fuels for the community
Benefits	Add information and insight into the processing of water hyacinth as briquettes to reduce the waste population of water hyacinth
Target	The various Soko Village communities
Participants	Soko Village Community
Event Activities	Processing of water hyacinth as an alternative fuel

Results Evaluation	Participants showed a good response by giving questions about the making of water hyacinth briquettes.

3. Research methods

To compile this work program, the author uses the following method:

a. Literature Method

Read books and look for journal references, and articles related to water hyacinth briquettes.

b. Interview Method

Hold consultations related to the title that has been taken with the field supervisor.

c. Question and answer method with Soko Village community.

4. Time and place

This work program is the first implementation in Soko Village by holding socialisation at Soko Village Hall in order to harmonise their thoughts and understanding of the importance of utilising existing natural resources to be used as charcoal substitute fuel products (Briquettes).

a. Experiments to make briquettes are done on:
Day: Saturday - Wednesday
Date: January 20 – February 14 2018
Time: Every 09.00 - 15.00 WIB
The place: Basecamp Regular KKN

b. Socialization of how to make briquettes
Day: Thursday
Date: February 15, 2018
Time: 19.30 - Done
The place: Soko Village Hall
Target: Soko Village Community (male aged ± 20-50 years)

5. Solution to problem

Currently, in Soko Village, there are still many ponds that have not utilized the water hyacinth waste as an alternative fuel because of the lack of insight and information received by the community. Not only that, there are still many people who do not know the benefits of using water hyacinth as an alternative fuel. The following are the benefits:

a. The price is low
b. Longer durability

Seeing many people who have not utilized the water hyacinth waste, the KKN Team in group 4 of Industrial Engineering Study Program provides a solution to make water hyacinth briquettes as an alternative fuel.

Analysis steps are taken:

a. Survey the pond
b. Analyze the obstacles faced by the community in making briquettes.
c. Processing data and making conclusions thoroughly based on the data obtained.

Results

The results of the work program held by the Industrial Engineering Program group 4 with the manufacture of water hyacinth briquettes as an alternative fuel.

Before carrying out the manufacture of water hyacinth briquettes, the first thing to do is to survey the location of the pond which contains a lot of water hyacinth. Next, take the water hyacinth in the right place. After that, prepare the tools and materials needed during manufacture. Then processed until briquettes are formed. Then socialized to the community to be implemented.

Discussion

The results and discussion of the work program held by the Industrial Engineering study program group 4 with the use of water hyacinth into briquettes as a product of this charcoal substitute fuel in Soko Village, Glagah District.

Based on the results of a survey conducted by the KKN team of 4 Industrial Engineering study programs showed that in Soko Village had not utilized water hyacinth as an alternative fuel because of the Soko Village community, in general, they had very little information about how to utilize existing natural resources.

Therefore, the group 4 KKN team provided information on how to use water hyacinth as a briquette. Because primarily in Soko Village area, water hyacinth plants are very abundant and become pests in ponds where ponds are one source of income for the surrounding community.

Conclusion

Based on the results of the discussion of the KKN Team of Group 4 Industrial Engineering Study Program and interviews with the Soko Village community, it was found that the community had not utilized the water hyacinth

which became a pest on their pond. After the socialization of the use of water hyacinth as briquettes, the community can understand that water hyacinth can be used as alternative energy, namely briquettes as a substitute for charcoal.

Suggestion

In the future, it is recommended that water hyacinth briquettes can be made by all Soko villagers so that it can reduce waste in rivers and can be useful as an alternative and environmentally friendly alternative fuel.

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