

Innovation for Empowering Activated Charcoal Tea Using Hyacinth, Husk, Moringa Leaves as Chemical Absorbents

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Abstract-The cause of Banjar Regency frequent flooding is because the low location of Banjar Regency from above sea level causes the flow of water on the ground surface to be hampered. As a result, some areas are always inundated (29.93%) while others (0.58%) are periodically inundated. Areas that are categorized as prone to periodic flooding are on a slope. This area consists of Sungai Pinang, Mataraman, Astambul, Gambut, Aranio, and Pengaron sub-districts. The area affected by the flood is estimated to be 104.53 hectares or a potential flood of 23.31. The Astambul area has a lot of waste and plants that can be used as absorbents to improve physical, chemical and bacteriological qualities by adsorption of gases and certain chemical compounds or their selective adsorption properties, depending on the size or volume of pores and surface area because the absorption of activated carbon is very large, which is 25-1000% by weight of activated carbon. Activated carbon is often used to reduce organic contaminants, synthetic organic chemical particles, but activated carbon is also effective for reducing inorganic contaminants such as radon, mercury and other toxic metals. Community empowerment in the health sector carried out in the treatment of clean water in the Astambul sub-district is carried out in order to meet the physical, chemical, bacteriological qualities, namely by filtration and adsorption methods can use natural materials that grow such as water hyacinth and Moringa and the rest of community activities around the community such as coconut fiber, shells coconut by making absorbent pads due to waste and plants because it contains nine amino acids, sucrose, D-glucose, alkaloids, waxes, quercetin and kaempferate are also rich in potassium and calcium. Moringa leaves contain vitamins, carotenoids, polyphenols, phenolic acids, flavonoids, alkaloids, glucosinolates, isothiocyanates, tannins, saponins, and oxalates.

Index Terms-Activated Charcoal, Moringa Leaf, Water Hyacinth, Husk

I. INTRODUCTION

According to WHO, each person needs between 60-120 liters of water/day, while in developing countries, including Indonesia, each person needs between 30-60 liters of water/day. Many problems with the quality of groundwater and well water do not meet the requirements so that the water that is not suitable for consumption by the community can have an adverse impact on the health of the community. Clean water according to Permenkes 32 of 2017 must comply with quality standards or good quality standards including physical (color, odor, taste, temperature, and turbidity), chemical (pH, Fe, Mn), microbiology (1).

Riskesdas 2018 data shows that the proportion of clean water usage < 20 l/person/day is 2.2%, meaning that in Indonesia there are still 2.2% where access to clean water is very lacking and minimal. Data for South Kalimantan with very poor access is about 3% and for Banjar Regency as much as 2.41% with details < 5 liters 0.43% meaning that access is very low, the health risk is very high, 5-19,9% as much as 1.98 l/ people/day means less access, high health risk. The use of good quality water can have an impact on health in the short and long term. Poor quality water will have short-term health impacts in the form of vomiting, diarrhea, cholera, typhoid or dysentery and stunting. Health impacts that may arise in the long term due to poor quality water are bone loss, tooth corrosion, anemia, and kidney damage. This happens because the water is contaminated by heavy metals which are usually toxic and precipitate in the kidneys. Data on diarrhea cases were 170 cases in Banjar Regency and 248 cases of stunting in 5 villages in Astambul District (1, 2).

Efforts are being made to overcome the problem of the availability of clean water by empowering the community by using natural materials found in the area which are cheap and able to improve in quality and quantity. Community empowerment in the health sector carried out in the treatment of clean water in the Astambul sub-district is carried out in order to meet the physical, chemical, bacteriological qualities, namely by

filtration and adsorption methods can use natural materials that grow such as water hyacinth and Moringa and the rest of community activities around the community such as coconut fiber, shells coconut, charcoal market by making Absorbent Pads. Each has advantages in improving water quality, such as Moringa leaves (*Moringa oleifera*) can be used to purify water because they contain nine amino acids, sucrose, D-glucose, alkaloids, wax, quercetin and kaempferate are also rich in potassium and calcium. . Moringa leaves contain vitamins, carotenoids, polyphenols, phenolic acids, flavonoids, alkaloids, glucosinolates, isothiocyanates, tannins, saponins, and oxalates. Plants and environmental waste found in the community environment can be used as activated carbon such as charcoal and ash to adsorb certain gases and chemical compounds or their adsorption properties are selective, depending on the size or volume of the pores and surface area because the adsorption capacity of activated carbon is very large, namely 25-1000% by weight of activated carbon. Activated carbon is often used to reduce organic contaminants, synthetic organic chemical particles, but activated carbon is also effective for reducing inorganic contaminants such as radon, mercury and other toxic metals (3).

The chemical composition of coconut shells is as follows: Cellulose 26.60%, Lignin 29.40%, Pentosan 27.70%, Solvent extractive 4.20%, Uronic anhydride 3.50%, Ash 0.62%, Nitrogen 0, 11%, and 8.01% Water. The active ingredients in water hyacinth consist of 60% cellulose, 8% hemicellulose, and 17% lignin. The active ingredients in coconut fiber include cellulose, lignin, pyroligeous acid, gas, charcoal, tannin and potassium. One coconut produces 0.4 kg of coir which contains 30% fiber which is rich in trace elements. The active ingredients contained in alaban wood are water content, juice content, pH, viscosity,

saponins, flavonoids and tannins. Moringa leaves contain vitamins, carotenoids, polyphenols, phenolic acids, flavonoids, alkaloids, glucosinolates, isothiocyanates, tannins, saponins, and oxalates (4).

II. RESEARCH METHODS

The implementation plan of this activity will be carried out in Astambul District, Banjar Regency. Community service activities include 11 materials on techniques for making activated charcoal tea, water hyacinth, husks, and Moringa leaves as chemical absorbers in improving the quality of clean water that does not meet the requirements and quality improvement techniques. simple clean water. The implementation of this activity includes the implementation stages described as follows:

- 1) The strategy used in this program is the ABG community approach (Advocacy, Community Development, and Community Movement).
- 2) The next activity is the implementation of activities in the form of training on the manufacture of water hyacinth activated charcoal tea, husks, and Moringa leaves as chemical absorbers by burning completely, how to pack activated charcoal.
- 3) Evaluation, Assessment of the success of this program is seen from short-term and long-term evaluations. The short-term evaluation was assessed to determine community knowledge about clean water treatment using pre-test and post-test questionnaires which then compared the results. A long-term evaluation is carried out to see if the community applies absorbent pads

III. RESULTS AND DISCUSSION

Pre-test scores (Maximum Score 8)	Post-test scores (Maximum Score 8)
4.43	4.57

Evaluation of extension activities in the form of pre-test and post-test showed an increase in the average value of correct answers from respondents after being given counseling and demonstration of clean water treatment. This means that there is absorption of knowledge conveyed at the time the counseling takes place.

Based on table 5.1 the level of initial knowledge about clean water in most of the community is quite good, reaching a value of 4, this can be due to socialization about clean water obtained from media such as television or other media. The results of the post-test there is an increase in knowledge in the community which can be seen from the average value of all respondents. Especially on knowledge about the impact of dirty water, efforts to improve water conditions and natural materials that can be used to purify water which have increased the number of correct answers are quite large.

The lecture and discussion methods are quite effective in delivering counseling materials to the public by displaying

enough pictures rather than writing to attract attention. Coupled with direct practice regarding the material presented, it will be easier for the public to remember the information obtained.

One of the media that can be used to facilitate outreach activities is lectures.

The development of public health is a joint task that cannot be done by medical personnel alone, the participation of the community is also needed considering the vast territory of Indonesia. Empowering the community can be an extension of health agencies such as health centers to assist in community health development efforts. Counseling and training to the community should be carried out on an ongoing basis because the sources of information obtained by other media are still quite limited. The results of outreach activities on water treatment materials to the community showed positive results in the form of better post-test scores than pre-tests based on the table,

IV. CONCLUSION

The results of the extension activities have a positive impact on the community where it is seen that there is an increase in public knowledge between before and after being given counseling. Counseling is more effective because the material delivered is directly practiced so that the information obtained is easier to remember and accept by the community. Empowering the

community to be able to treat clean water by utilizing local natural resources, such as rice husks, water hyacinth and coconut shells. The participation of the government and local health facilities is also needed in supporting clean water treatment and facilitating its activities.

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