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The effectiveness of coconut coir absorbent power from Java, Kalimantan and Papua Land as substitute of baby diaper material through scientific approach

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Abstract. The handling of baby diapers is a significant concern. This study aims to determine the effectiveness of infant absorption powder based coconut powder from the soil of Java, Kalimantan, and Papua. The image quality of coconut fiber absorption from these three islands provides an illustration of the differences in soil culture, the intensity of sunlight, and the type of coconut produced. This research uses a quantitative method of an experimental type. Each coconut husk powder sample used in this study was 200 mg wrapped in filter paper. Water used in the form of mineral water as much as 200 mL. A large amount of residual water from filtration shows the quality of the coconut husk's absorbency. The data collected from the three islands is analyzed to determine the effectiveness of its absorptive capacity. That was found this coconut coir powder has a good quality of absorption and is characterized by each soil culture as a distinct planting medium on these three islands. This research was expected that was deepened with the manufacture of baby diaper products made from coconut coir powder.

1. Introduction
Coconut is a plant found in any area, but the quality of coconut it positively that was influenced by the mineral elements and other substances contained in the soil where the coconut grows. The coconut produces the fruit that has the fiber part as a packing of the fruit flesh. These coconut fibers can absorb water. Coconut fibers are processed to become powder and then analyzed its absorption. Coconut coir powder has an absorption capacity of 1.5% which can increase the absorptive strength of the coconut fiber [1]. This indicates that the potential of water absorption by coconut husk is quite good. The addition of coconut coir to a specific concentration can increase the strength and addition of coconut coir at optimum concentrations suitable for use in building materials [2]. Also, coconut husk can also be used in a variety of furniture and used certain communities as anti-flood.

This study has differences with other coconut coir absorption studies. Comparison of the coconut coir powder that absorption capacity of three coconut coir producing islands in Indonesia. Coconut coir is derived from coconut and has a different texture between old coconut and young coconut. Old coconut...
is characterized by yellowish-brown with thicker and stronger fiber texture. Absorption ability of old coconut tends to be better than young coconut fiber because of the difference of fiber contained in it. Coconut fibers are made up of fibers, and corks connect one fiber to another. Each coconut contains 525 grams of fiber (75% of the fibers) and 175 grams of cork (25% of the fibers) [3]. This shows that the fiber contained in coconut husk is so high that the coconut husk absorption is undoubtedly more significant too. To determine the coconut absorption with three islands in Indonesia, coconut husk obtained and processed came from three islands.

This study aims to analyze various types of coconut fiber absorption from various regions in Indonesia. Coconut fiber was producing areas traced in this study, namely Java, Kalimantan, and Papua. The high absorption capacity of coconut fibers shows excellent quality to be used as a substitute for baby diapers so that the results of this study can recommend Coconut Producing Island is best as a substitute for baby diapers. In according to [4],[5],[6] and [7] stated that in the utilization of industrial materials that are focused on environmental materials, carefulness that was needed, because there is a need for more detailed checks regarding the effects produced from the materials used.

The replacement of baby diaper material is intended for people to process their homemade diapers by exploiting the potential available in their environment. This is to minimize the waste of baby diapers that become a phenomenon in Indonesia. With the use of coconut fibers as a substitute for baby, diapers will produce products that are environmentally friendly. To produce this product must first more in-depth research related to coconut fiber absorption. This research is expected to add ideas and can provide stimulus in generating innovations in the form of making baby diaper-based products of coconut powder.

2. Numerical Methods
This research method is in the form of quantitative-experiment research. This research begins by selecting the old coconut fruit that has a yellowish-brown fiber. Furthermore, the three coconuts taken fibers are set aside and dried in the sun to dry for approximately 2-3 days. Once confirmed to dry, then the fibers are smoothed to become powder. The fine coconut fiber powder weighed. Repetition of this process done until the fine coconut coir powder accumulated as much as 200 mg.

Coconut coir powder is wrapped using filter paper from consumptive pampers and positioned on dry measuring cups. Furthermore, 200 mL of water slowly was poured onto the encapsulated powder. As an illustration, the flowchart of the process of determining the water absorption of coconut fiber dust that represented in Figure 1 below.

![Figure 1. Flow Chart of Water Absorption Determination Process on Coconut Fiber Powder](image-url)
To know the absorption of water by coconut powder using a principle that is almost similar to calculate the mass of irregularly shaped objects, with modification the following equation calculated it.

\[ V_{\text{Abs}} = V_1 - V_2 \]  

Information:
- \( V_{\text{Abs}} \) = Water Volume Absorption in Coconut Power
- \( V_1 \) = Water Volume First
- \( V_2 \) = End Water Volume (Water Residue)

To determine the ratio or absorption ratio of coconut fiber powder of Java, Kalimantan, and Papua determined by the following equation.

\[ \% R_{\text{Abs}} = \left[ \frac{A}{N} : \frac{B}{N} : \frac{C}{N} \right] \]

Information:
- \( R_{\text{Abs}} \) = Coconut Absorption Capacity Ratio
- \( N \) = Divisor of Both Numbers Compared
- \( A \) = Absorption Power of Java Coconut Coir
- \( B \) = Coconut Oil Absorption Absorption Kalimantan
- \( C \) = Coconut Oil Powder Absorption Capability Papua

This study analyzed the absorption capacity of coconut fiber on three different islands. The island, which has different topological and geographic textures, certainly has a different soil culture, so the coconut fibers in the three islands (Java, Kalimantan, and Papua) are considered suitable for research samples. In its implementation, this processing that was done on each island which is the object of study in this research.

3. Result and Discussion

This research data were taken by determining the control variable in the form of the mass of coconut fiber powder, and the amount of water shed on the wrapped coir powder. The mass value of coconut coir powder is 200 mg, and the volume of the watershed is 200 mL. The results of the data obtained on each of the islands subjected to the study are shown in Table 1 as follows.

| Island    | \( V_{\text{abs}} \) (mL) | Ratio |
|-----------|---------------------------|-------|
| Java      | 25                        | 5     |
| Kalimantan| 35                        | 7     |
| Papua     | 20                        | 4     |

From the results, it found that the absorption capacity of coconut coir powder of Java Island of 25 mL, and 35 mL of Kalimantan Island, and by 20 mL of Island of Papua, This shows that the comparison of Java, Kalimantan, and Papua island are 5: 7: 4. The data obtained is not much different because Java, Kalimantan, and Papua have the same type of soil which has the potential to grow coconut tree. It is alluvial soil. Alluvial soil is a type of soil that can make the planted coconut plant has the best productivity [8]. Alluvial soils were widely dispersed in Indonesia from Kalimantan, Sumatra, Sulawesi, Java and Papua [9], in this research have object research in Java, Kalimantan, and Papua. The results of this finding that was concluded that the water absorption in coconut coir powder on the island of Kalimantan compared with the absorption capacity of coconut coir powder in Java and Papua Island Sequence of coconut-producing island that has the absorption of coconut coir powder from high to low is Kalimantan Island, Java Island, and Papua Island. In according to [10] stated that the use of
baby diapers by utilizing environmental materials allows a smaller impact reduction, therefore the need for careful selection of products and materials to produce maximum results. Similarly than [5] & [6] stated that material for making baby diapers is possible was taken from materials that weren’t utilized by standards that have been determined by the relevant authorities so that in its selection a more in-depth assessment is needed regarding the material.

4. Conclusion
Based on the results of the research was done, it concluded that: the absorption capacity of coconut coir powder of Java Island of 25 mL, and 35 mL of Kalimantan Island, and by 20 mL of Island of Papua, this shows that the comparison of Java, Kalimantan, and Papua island are 5: 7: 4. The data obtained is not much different because Java, Kalimantan, and Papua have the same type of soil which has the potential to grow coconut tree and A large amount of residual water from filtration shows the quality of the coconut husk's absorbency. That was found this coconut coir powder has a good quality of absorption and is characterized by each soil culture as a distinct planting medium on these three islands. This research was expected that was deepened with the manufacture of baby diaper products made from coconut coir powder.

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