Utilization of coconut coir sack waste as eco-friendly canvas material

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Abstract. Sacks made from coconut coir are usually used by farmers and plantations as sacks for delivery of tobacco, cloves, coffee, tea leaves, etc. Many of us find used sacks made of coconut coir that have been damaged, torn and wasted. Using coconut coir sacks aims to reduce waste, protect the environment and eco-friendly. This study uses a qualitative descriptive method and with an action and research model. The action model taken is to design works of art and paintings on canvas made of used sacks made of coconut coir. Requires a special technique by coating waterproof paint to fill the pores of the holes in the sack. The research model was observing to available waste sacks made of coconut coir and testing the strength of the sack into canvas and analyzing the durability and service life of coconut coir against paint.

1. Introduction
The estimation of amount of coconut coir produced by Indonesian reaches 1 million tons/year [1]. This time only a small portion of coconut coir is used, among others, as filler for seats, cars, mattresses and doormats. Most of the coconut coir is disposed of and becomes waste. Coconut fruit consists of coir (exocarp), shell (endocarp), flesh (endosperm) and coconut water. The composition of components of the coconut fruit is coir 35%, meat, 28%, water 25% and shell 12% [2]. Coconut coir is the yield component with the largest percentage and has benefits for sacks, crafts, agriculture. Coconut coir can be distinguished based on its size and utilization, namely; Mat/Yarn coir is a long and fine coir (suitable for making mats, rugs and ropes). Bristle coir is a coarse coir (for making brooms and craft materials) [3]. The product form of coconut coir processed in this industry is long coir (bristle coir), short coir, ash or soft cork (dust).

Currently, coconut husk is mostly wasted as waste and as fuel. The results of combustion will produce smoke and pollution, air pollution affects the environment and adds CO2 in the air, the longer the oxygen reaction will occur and there will be large pollution and there is a possibility that climate change will occur. The current process of coconut coir waste is usually for agriculture, a mixture of planting media, natural pots, propagation media, and some are processed as industrial raw materials and household furniture. In addition, coir is very useful for making planting media, such as being made into grow bags. Grow bags made of coir and grow bags filled with coir can help facilitate plant growth and strengthen your plants’ roots. In general, grow bags offer superior functionality over traditional plastic and clay pots. To their porous exterior surface, grow bags have superior ventilation, temperature control, and water drainage abilities. Coir is the fibrous part of coconut husks, a waste product of coconut harvesting. Traditionally, coir has been used to make ropes or burned to be added to fertilizer, but recent studies
have shown that coir has many practical uses for gardening and erosion control. Its biodegradability, nutrient-richness, and water retention abilities make it ideal for landscaping and agricultural projects. Potential using coir as a growth medium soil amendment for agricultural, These qualities make coir an ideal growth medium. The coconut husk’s singular function in nature is to protect the coconut [4].

Research before is to create value-added opportunities that utilize coconut shell powder and coconut husk coir to make polymeric composite materials that can be competitive in high volume industries like automotive parts or building construction materials [5]. The use of coir coir instead of agar during the initial phase of seed germination and seedling development offers a less costly alternative for cultivating [6]. Coconut coir has benefits for agriculture and horticulture, besides that it is also a planting medium that can fertilize plants, because plant roots will develop and grip tightly on the coconut coir media. Also, this coconut coir can be developed into various products, including coco peat, coco fibre, coco mesh, coco pot, coco coir board and coco coir [7].

In addition, coconut coir is also processed into sacks. Sacks made from coconut coir are usually used by farmers and plantations as sacks for delivery of tobacco, cloves, coffee, tea leaves, etc. The problem here is the amount of waste in the form of coconut coir sacks. This waste is wasted and much of it is no longer used because it is damaged, torn, has holes in the bottom, and can no longer be used as a container. This waste is thrown in the trash and burned. The results of combustion will make air pollution. The waste of coconut coir sacks actually still has the durability and lasts a long time, it's just that it has been torn due to packing errors and becomes a waste value. The utilization of coconut coir sack waste that will be designed is for the media of artwork and turning it into a substitute for painting canvas. The research was conducted to generate artwork and data related to the process of waste coconut coir sacks and to analyze the ability of the paint to adhere to the canvas coconut coir sacks waste after being stretched and pulled on the spanram.

Figure 1. Coconut Coir and grow bags processing, exocrap coconut coir (A), coconut coir in drying process (B), coconut coir has been drying process (C).

Figure 2. The process of craft working for grow bags (A), Other craft of the pouch from coconut coir waste (B), Other craft of the bag from coconut coir waste (C).
2. Methods
The research for potential to be developed coir waste sack for action research to less pollution. This research was an action research with a descriptive study method using a qualitative approach and action research data. Data collection was carried out through several methods, including site observation, in-depth interviews, document study methods. The sampling technique was carried out by using purposive sampling method [8]. Data were analyzed using an interactive analytical model. The action that will be taken is to try to use the research results in a prototype work related to the utilization of the coir waste sack into canvas was environmentally friendly works of art with a coir waste sack which is considered more durable, long lasting and strong, attractive and expressive. In addition to action research, analysis, this research also used method to assess coir waste sack potential to support the canvas development of eco-friendly eco-art (Attractions), coir waste sack utilization can be accessed (Accessibility), facilities currently exist and facilities need to be provided to support development of coir waste sack, as well as activities utilization for coir waste sack sites and eco-art production [9].

3. Results and discussion
Potential process to coconut cultivation, extraction and processing of coir for eco-friendly eco-art. Because Coconut husk or exocart consists of a water-resistant outer shell and a fibrous part or mesocarp consisting of strands of "vascular" coirs called "Coir". Coconut coir belongs to the natural cellulosic group and contains some parts of cellulose, lignin and other elements as forming cell structures in coconut coir. The "coir" cell structure is about 7 mm long and 0.02 mm in average diameter, the length of the arrangement of cells is usually up to 300 mm, depending on the coir extracted. Coconut husk processing is generally done in two ways, namely retting and milling. The retting process takes 4-12 months, the results obtained are good, long and clean white coirs. The milling process is known by two techniques, namely wet-milling and dry-milling. The wet-milling technique takes 1-6 weeks to produce long, short, brownish-colored coirs. While the dry-milling method without any soaking process or only moderately moistened with water, the resulting coirs are short, coarse and brown in color. The color of coconut coir that looks brown is influenced by the content of tannin compounds. In addition to producing a brownish black color, it also causes the appearance of a coconut that is rough and stiff. Tannins are phenolic compounds that can function as antioxidants for living things.

Coconut coir coir is diverse, there are advantages and disadvantages of each coir sack. The denser the sack, the stronger it will be, and for the weakness of natural coirs such as different coir sizes and the age factor of the coir greatly affects its strength. The development of natural coirs as a reinforcement of composite materials is very good considering the availability of natural coir raw materials in Indonesia are quite abundant [10]. Coconut coir coir combined with polyester as a matrix, will produce alternative composites that are useful for the industrial world. With variations in coconut coir alkaline treatment, it is expected to produce maximum composite mechanical properties to support the use of alternative composites.

Each coir has its own ability, so that in the manufacture of composites, it is very important to pay attention to the specifications of the coir to adjust to the treatment given. The strength of the composite is actually in coir. The adhesion of a coir actually increases when the diameter decreases, for example its tensile strength. Natural coir is an alternative reinforcement material for various polymer composites because of its advantages over synthetic coirs. Natural coirs are easy to obtain at low prices, easy to process, low density, environmentally friendly, and biodegradable. Coir composite materials have the main advantages, namely strong (strong), stiff (tough) and more resistant to heat and will last longer. The results of the previous test showed that the most optimal average tensile strength was at 20% coir weight percentage of 275.3 kg.f/cm. From this result, it is certain that the coconut coir sack has better strength than standard painted canvas made of canvas.

Coir is also very resistant to bacteria, fungus, and mold, and, since coir is inert, insects do not like inhabiting it. This makes painting using coconut coir sack media more durable, not moldy, and the coirs are denser covered with paint. The rough and strong texture is unique in the work of this painting, resistant to weather, water, heat and the result is a rough texture. Especially with abstract or surrealism
There is a special technique in using this used sack made of coconut coir, in the first way, namely in the paint block all parts with water prove content, the coir in the wider part of the paint is also multiplied, after drying the canvas of the coconut coir sack is ready to be painted. The table below is a breakdown of comparison of cloth standard of canvas with coconut coir sack waste canvas. When compared to regular or premium canvas fabrics, the quality of the canvas made from waste coconut coir sacks is stronger, thicker, and stronger, and more durable, especially since it has been coated with waterproof paint (Table 1,2).

**Table 1.** Comparison for durable of cloth standard of canvas with coconut coir sack waste canvas

| Type               | Results                          |
|--------------------|----------------------------------|
| Reguler cloth canvas | Bacteria, fungus, mold           |
| Premium cloth canvas | Durable, Fungus, mold            |
| Coconut coir sack waste | Durable, Anti-bacteria, Anti-fungal/mold |

**Table 2.** Comparison for quality of cloth standard of canvas with coconut coir sack waste canvas

| Type               | Result                               |
|--------------------|--------------------------------------|
| Reguler cloth canvas | Strong, mild, soft, thin             |
| Premium cloth canvas | Strong, mild, sleek, soft, thin      |
| Coconut coir sack waste | Very strong, heavy, less absorption, sleek, thick |

**Figure 3.** Canvas Material, Cloth of Canvas (A), Coconut coir sack waste (B), Detail of Stretching Coconut coir sack waste on span wood (C), Detail of Coconut coir sack waste (D), Stretching Coconut coir sack waste on spanram (E).
Comparison for durability and the quality of cloth standard of canvas with coconut coir sack waste canvas, with different of type has different to results. Cloth, canvas is less durable than coconut sour sack, because coconut is more durable, anti-bacterial, fungus, and mildew. In addition, they are stronger, harder, slippery and shiny. In the figure 3, seen that regular canvas is made of standard canvas fabric (A), coconut coir sack waste will be coarse and ugly, but has a more durable coir quality (B), after washing and drying, the canvas is made from used sacks, they stretched in a span and then in staples (C), the canvas coirs made from using coconut husk from sacks (D), the detail of the canvas stretched in a wooden span (E). After has been stretched, it is then coated with paint and coating to close the pores of the canvas from the coconut coir sack (Figure 4.5), after which the process of making artwork in the canvas with a blended painting, they combine with mix media (Figure 6.7).

4. Conclusion
Coconut coir is used in various products, such as for agriculture, a mixture of planting media or as horticultural grow bags, in addition, coconut coir is used as bags, sacks, ropes, mats, handicrafts, mats. There are also those who use coconut coir waste as industrial fuel, and the need for cooking fuel in households, but this becomes pollution and damages the clean air we breathe because of the increase in carbon dioxide and can damage the lungs and climate change. To reduce the waste of used sacks made from coconut coir, ideas and ideas are needed to use them as a medium for work. Utilization of waste
coconut coir sacks into painting canvas media and eco friendly media is one answer in reducing waste that pollutes the environment and air due to burning. There are many movements in the use of coconut coir, but this research focuses on reducing the waste of used sacks made from coconut coir. The results showed that canvas made from coconut husk sacks had stretch strength, was more durable, thick, not easily damaged by heat and water, not moldy and free of bacteria, and was very effective and inexpensive compared to conventional canvas made of thin fabric.

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