

Recycling Plastic Waste Into Something That Has A Selling Value

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ABSTRACT

Plastic waste is the most waste in every country, including Indonesia. In Indonesia alone, the use of plastic reaches thousands of tons every day, the high rate of plastic use has been made by Indonesia, one of the countries that produces the most plastic waste in the world. this should be of particular concern to every community in order to reduce the plastic waste. the community can utilize the plastic waste into something that has selling value. With the open mind of every community about this, the community can open business opportunities with this plastic waste. In addition to opening business opportunities, the use of plastic waste will slowly reduce the amount of plastic waste around the community. This research method uses the library method. research, namely through the first 3 stages of recording, integrating and analyzing.

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INTRODUCTION

Plastic waste is the most discarded waste by humans because many people use plastic for their daily needs, be it individuals, shops, or large companies. For example, shopping will definitely require plastic to carry groceries, if the plastic is not used, will it be stored? Nope. What are they doing? throwing and burning that's what they do. Disposal of plastic waste into water and soil has added to the level of natural misery. Why is that? Plastic waste is made from inorganic materials. These inorganic materials are very difficult and impossible to decompose by decomposing bacteria. When buried in the ground to decompose it takes millions of years. And if it is burned it will only become lumps and it will take a long time to decompose. And do you know the consequences if the plastic waste is buried in the ground for too long and piles up? One, there is global warming which has an impact on human life itself. Two impacts on marine animals that ingest plastic waste that is carried into the sea, etc.

Plastic is widely used in everyday life, because it has advantages such as being strong, light and stable. However, the plastics on the market today are synthetic polymers made from petroleum which are difficult to decompose. From survey data from one of the "greenliving" accounts posted on online mass media, if in one day the amount of waste generated per individual is 9 plastic, 3 styrofoam and 1 single-use bottle, assuming that there are around 228 million people in Indonesia. So in a day Indonesia produces 2,052,000,000 plastic bags, 684 million styrofoam and 228 disposable bottles.

Small movements carried out by all components of society in reducing waste certainly have a big impact on reducing the amount of plastic used in everyday life. Like recycling plastic for example. Many household appliances have been found that come from recycling plastic waste, but this effort is considered insufficient when looking at the condition of waste in Indonesia. Therefore, training is needed on how to manage plastic waste, especially plastic bottles that are widely used by the public to be recycled into useful items.

In processing plastic waste there are several stages, namely; separation, cutting, washing, melting and molding. In general, all the stages are carried out in different places, this is very inefficient in terms of industry because moving the results to another place requires a lot of time and

effort. Therefore in this study, researchers want to provide steps Management of plastic waste is something that has a selling value in order to reduce the high number of plastic waste waste.

METHODS

This study uses a qualitative research method with the type of library research, namely by carrying out three important stages. First, by recording all findings regarding the use of plastic as paving blocks from previous studies. Then the second stage is combining all the existing findings, and the third stage is analyzing all the findings obtained in existing studies, by sorting out the strengths and weaknesses, and then the researcher criticizes previous research by contributing new thoughts. Sources of library research are taken from scientific publications related to plastic waste management both from articles, news or final assignments.

RESULTS AND DISCUSSION

Plastic waste

Plastic is an object that we often encounter and use in everyday life. Goods, ranging from household furniture, food packaging, to knick-knacks that we often use, are mostly made of plastic. Nevertheless, the excessive use of plastic has a negative impact on human life. As noted by Science Direct, plastic waste used for human consumption has now accumulated and has even reached almost 7 miles below sea level. The result of this is a threat to environmental sustainability. Excessive production and consumption of plastic contributes to greenhouse gas emissions, devalues marine ecosystems, and threatens the lives of marine animals.

Types of Plastic Waste

- a.) Polyethylene Terephthalate (PET or PETE) PET is the most common type of plastic used. Has light, strong, usually transparent properties and is often used in food packaging and fabrics (polyester). Examples: Beverage bottles, food and clothing bottles/jars or polyester rope.
- b.) High-Density Polyethylene (HDPE) In general, polyethylene is the most common plastic in the world, but it is classified into three types: High-Density, Low-Density and Linear Low-Density. HDPE is the strongest type and is resistant to moisture and chemicals, which makes it ideal for cartons, containers, pipes and other building materials. Examples: Milk cartons, detergent bottles, cereal boxes, toys, buckets, park benches and pipes.
- c.) Polyvinyl Chloride (PVC or Vinyl) This hard and rigid plastic is resistant to chemicals and weathering, so it is widely used as a building and construction material. It is not capable of conducting electricity, so apart from being a building material, PVC is also often used for high-tech applications, such as cables, medical devices, and others. Examples: Plumbing, credit cards, toys, rain gutters, IV fluid bags and medical tubing, and oxygen masks.
- d.) Low Density Polyethylene (LDPE) LDPE is a softer, clearer, and more flexible version of HDPE. It is often used as a liner in beverage cartons, as well as for its outdoor properties for corrosion. Examples: sandwich and bread bags, bubble wrap, trash bags, grocery bags, and drink cups.
- e.) Polypropylene (PP) This is one of the most durable types of plastic. PP is also more heat resistant than others, which makes it ideal for things like packing food and food storage made to hold hot items. Examples: Straws, bottle caps, hot food containers, wrapping tape, disposable diapers and DVD/CD cases.
- f.) Polystyrene (PS or Styrofoam) More commonly known as Styrofoam, this rigid plastic is low cost and very well insulated, which has made it a staple in the food, packaging, and construction industries. Like PVC, PS is considered a hazardous plastic because it can easily release harmful toxins such as styrene (a neurotoxin), which can then be easily absorbed by

food and thus ingested by humans. Examples: Glassware, Styrofoam food containers, product shipping and packaging, egg cartons, cutlery, and building insulation.

- g.) O (Other) This category includes all other types of plastics that are not included in any of the other six categories, or are a combination of several types. Type O plastic is often called plastic with recycling code #7, because it cannot be recycled. Examples: Glasses, baby and sports bottles, electronic coatings, CDs/DVDs, lighting fixtures, and clear plastic cutlery.

Plastic Waste Recycling Becomes Selling Value

a. Recycling plastic waste into a craft

1. Flower pots from used bottles

Used plastic bottles can be reused as cute flower pots with pictures of animals. The materials needed include a 2 liter bottle and dye or paint. Follow these steps to make it:

- Cut off the bottom third of the bottle
- On one side, cut the bottle into two triangular shapes so they look like ears
- Paint the bottle with the desired color
- Draw an animal face on the bottle, for example a cat or dog face
- Fill the bottle with soil and the plant you want to plant

2. A pencil case from an old bottle

Plastic bottles can also be recycled into pencil cases. The trick is to cut the bottle in half, then decorate it by coloring it and adding glitter. When finished decorating, insert a pencil or pen into the bottle cut.

3. Mosaic art of bottle caps

When someone makes crafts from used plastic bottles, the lid is rarely used. In fact, bottle caps can be used as mosaic art to enhance your home decor. How to make it namely:

- a. Collect as many used bottle caps as possible
- b. Prepare canvas or cardboard, glue, and paint
- c. Find the image you want to make a decoration for
- d. Paint the bottle cap according to the image you want
- e. Draw on canvas or cardboard using a pencil
- f. Place the painted bottle caps on the cardboard using glue
- g. When finished, hang the mosaic art on the wall

b. Recycling Plastic Waste Into Oil

1. Pyrolysis

To overcome the problem of accumulation of plastic waste, the pyrolysis method can be a solution to recover energy. The pyrolysis method is a good technique for converting mass to energy with high value liquid and gas products. Broadly speaking, the pyrolysis process begins with collecting plastic waste, then the collected plastic goes through a process of cutting and decaying. The plastic will be heated at high temperatures and catalyzed, followed by depolymerization. From the previous process, pyrolysis oil, black carbon and gas are produced. The results of this process are refined and refined to produce gasoline, kerosene, and diesel. Pyrolysis involves high temperatures to break down long-chain polymer molecules into smaller, less complex molecules. The pyrolysis process occurs in the absence of oxygen and in a short time. The oil produced can be used for various activities.

2. HDPE

High density polyethylene is a plastic with high strength polymer chains. Objects that are usually made of HDPE type plastic are milk bottles, containers, oil, and toys. (Ahmad et al, 2014) performed pyrolysis on HDPE with a temperature of 300°-400°C used a steel reactor and produced 80.88% liquid oil at a temperature of 350°. In another experiment conducted by Kumar and Singh on HDPE with a temperature of 400°-550°C using a semibatch reactor. At 550° it produces 79.08% liquid oil and 24.75% gas product at 550°. From these experiments it was concluded that HDPE treated at high temperatures would produce higher liquid oil.

However, if the temperature is too high it will reduce the amount of liquid oil and increase the production of gas products because the process passes the maximum thermal degradation point of HDPE. Liquid oil will crack to form gas when heated to 550°.

3. Polypropylene

PP has saturated polymeric linear hydrocarbon chains so that PP properties are chemical resistant and high heat resistant. The strength and stiffness of PP are high enough that they are widely used in the plastics industry. PP can be found in the form of car bumpers, buckets, boxes, containers, and so on. (Ahmad et al, 2014) conducted pyrolysis experiments on

(Ahmad et al, 2014) conducted a pyrolysis experiment on PP with a temperature of 250°-400°C. Known at 300° liquid oil produced as much as 69.82%. While experiments conducted by (Sakata et al, 1999) PP treated at 380° will produce 80.1% liquid oil, 6.6% gas product, and 13.3% heavy solid residue. Just like HDPE, PP treated at high temperatures will produce a higher amount of liquid oil. Liquid oil yield will decrease at temperatures exceeding 500°.

4. Polystyrene

Polystyrene is a compound that has a long hydrocarbon chain with a phenyl group attached to each carbon atom. PS has strong resistance and light weight so it is widely used. The suitable pyrolysis method for processing PS is pyrolysis using a pressurized autoclave reactor at a temperature of 300°-500°C, the pressure is 0.32 MPa-1.6 MPa, and the heating rate is 10°C. At 425° produces about 97.0% oil

CONCLUSION

Plastic waste is the most common type of waste found around us. This is because the material is strong and flexible. Plastic waste is a type of waste that is difficult to decompose compared to other types of waste. So to reduce the abundance of plastic waste, people can recycle this plastic waste into something of value, namely by turning the waste into handicrafts such as flower pots, pencil cases, and bottle cap mosaic art. In addition to turning them into handicrafts Plastic waste can also be recycled into oil. Utilizing plastic waste and recycling it can be a source of income for existing communities and reduce existing plastic waste.

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