

Reuse than Recycle- for a Better Tomorrow

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ABSTRACT

Plastics are reasonably priced, lightweight and durable materials, which can readily be moulded into a variety of products that find use in a wide range of applications. As a consequence, the production of plastics has increased markedly over the last few decades. However, current levels of their usage and removal generate several environmental problems. A main portion of plastic produced each year is used to make disposable items of packaging or other short-lived products that are discarded within a year of manufacture. These two observations alone specify that our current use of plastics is not sustainable. In addition, because of the durability of the polymers involved, substantial quantities of discarded end-of-life plastics are accumulating as wreckage in landfills and in natural habitats worldwide. Reusing is one of the most vital actions currently available to reduce these impacts.

1. Introduction

In the past decades, the focus has been on air and water pollution, as well as on the decreasing availability of landfills for waste disposal. Waste disposal in landfills causes pollution of not only the land but also of the water tables, resulting in hazards and damages to the environment, wildlife and humans. Various proposals and schemes have been made to reduce the disposal of waste in landfills. Perhaps the most significant system for waste reduction is the one that promotes recycling and reuse of discarded items. Plastic bottles are one of the largest components of waste discarded by human beings.

Currently, there is an increasing focus on the importance of recycling and reuse in an effort to save the environment from the harmful substances that result from waste disposal activities in landfill locations, which are becoming less available with time[1]. Many cities have created a new system for waste collection where recyclables go in one bin, non-recyclables in another and food scraps go in a third. However, some of those recyclable items are plastic bottles. When disposed of in landfills they take hundreds of years to degrade rendering such lands unusable for those many years. In addition, as these bottles degrade they admit harmful chemicals into the environment. Thus, recycling and reuse is an important effort to reduce the amount of bottles being disposed in landfills. In recent years, several studies that deal with recycling and reuse have been published[2-4]. Also there have been several other studies that suggest the use of alternative materials such as biodegradable plastics.

2. Reasons for using plastics

Even though plastic is not good for the environment and is creating tons of garbage around the world, it still plays a very main role in our everyday life. Excluding for some disadvantages, plastic is surprisingly beneficial in different aspects.

Plastic is lightweight. Without plastics, 3.98 times more material by weight would be required for packaging; for every seven trucks needed to deliver paper to grocery stores, only one truck is needed to carry same number of plastic grocery bags. That means during transportation, a large amount of oil is saved and also less green house gases will be released. Plastic needs less energy in production process. Foam polystyrene containers take 30 percent less amount of total energy needed to build paperboard container; by using plastic in packaging, European product manufactures annually save the equivalence of 101 million barrels of oil. Although plastic is not very eco friendly, it does save energy and also lowers the amount of greenhouse gas emissions. Plastic is also durable and strong. Plastic lumber, made with recycled plastic, holds nails and screws better than wood and is almost maintenance free. Due to the way the plastics molecules arrange, it can continue intact for a long time as well as is very strong but not brittle. Plastics are also very easy to be moulded and shaped.

3. Health hazards of Plastics

Plastics may be easy and convenient for daily use. However, we cannot overlook their negative impacts on our health. In the long run, overuse of plastics and lack of appropriate recycling are going to yield many undesirable effects on our health. Plastics are harmful to manufacture, use, and pose a great challenge of recycling at the same time. Hence, when it comes to plastics, it is a complete circle of problems and challenges that has to be resolved.

One of the finest examples of the accumulation of plastic waste in the environment is seen in the Pacific Ocean. As the plastics from the waste of cargo ships float on the water and drift by the current, plastics accumulate and make huge garbage patch in the middle of the ocean. With size as big as Alaska, it contains many different kinds of plastics. Also as plastics do not merge but break into small and smaller pieces due to environmental forces like sunshine, wind and waves, many sea animals mistake them as food and consume them,

which deposit in their stomachs and can end up on our dishes as food. In a few cases, big plastic debris and fishing nets can also entangle ocean creatures and attracting other predators, it can further result in bigger problems.

4. Plastic Recycling

Plastic recycling needs a wide range of technologies. This may not be possible for an ordinary person. But plastic reuse is in our hands. One of the best reuse of plastic bottles is to grow garden using plants. Garden with plastic bottles is of many types like vertical, horizontal etc.

'Recycle plastic' has become the largely concerted, common buzz around today among the manufacturers and end-users of plastics. But recycling is not simple and cost effective option to address various environmental and economic concerns arising out of excessive utilisation of plastics. It poses numerous challenges like incineration of plastic waste materials results in emission of gaseous chemicals that pose a direct threat to the earth's vital and delicate ozone layer. Recycling plastics waste into reusable plastic palates involves use of high level of energy and huge amount of water.

Plastic recycling serves to convert the wastes into products of their own genre through industrial processing. But recycling needs an establishment and also cost effective, which is not possible by a common man. Moreover plastic reuse methods cause harm to environment to some extent. Plastic reuse does not harmful in any way to environment when compared to recycling process. So, we should go to reuse wherever recycle is not possible. It is eco friendly to reuse the wastes instead of adding them to nature.

Out of all ways plastic garden is the better option is building and using a Vertical Bottle Garden as it has many benefits, including, the garden is vertical and can be placed anywhere, cheap and easy to construct. We can have a high yield of vegetables and finally it looks beautiful.

5. Methodology

The following are the steps involved in preparing a garden with plastic bottles.

We collected two-litre bottles and removed the label sticker, rinsed out the bottles and cut off the bottom of the bottles about 6cm from the base. Removed the caps and made 5 small holes in the cap. This can be done by heating up a nail

to burn the holes and screw the caps back on the bottles. Make 0.25cm holes to the bottle and string the bottles for the horizontal line to a stand or mesh. Ensure you measure and mark the bottles correctly or else the bottles will hang skew. Make sure you align the bottles correctly otherwise the water flowing to the next bottle will not reach it. Do this process for the next 3 rows. Make a hole at the base of the bucket, feed in the 15mm elbow and glue it. Once dry, you feed the 15mm PVC pipe into the elbow and mount the bucket with pipe on the of the top horizontal Plank. Secure the PVC pipe to the centre underside of the plank. We could use some wire to secure the pipe. Burn a small hole in the pipe where it lies opposite the bottle. When you pour water into the bucket, it runs into the pipe and out the small holes and into the bottle garden. The water will now, through gravity, feed the bottle below and so on. Cut a hole in the top of the 40mm pipe to allow for the wastewater to be collected. The wastewater runs out and is collected in a container. This water can then be re-used to water the garden.

6. Preparation for planting

Collect small stones and place in the bottles. Fill to about 10cm from the cap. The stones assist with drainage. Fill the bottles with a mixture of coco peat soil and compost. You can now plant your seedlings or seeds. Fill the bucket with water. It will start to irrigate each bottle.

7. Results

We filled the bottle with cocopeat, loamy soil and sandy soil. We planted some pollution control plants in suitable bottles according to their growing height. We observed that the plants in coco peat are grown healthy and fast. It is also observed that less water is consumed for the growth of plants in coco peat than any other soil. Except in coco peat any other soil required watering twice a day.

As the plastic is not degradable in soil, no harmful effect can be expected for the vegetables grown in plastic bottles.

8. Conclusions

As recycling of plastic causes harmful effects on environment and also it may not be done by a common man plastic reuse is more preferable. Plastic bottle garden is better option to grow pollution control plants as well as vegetables.

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