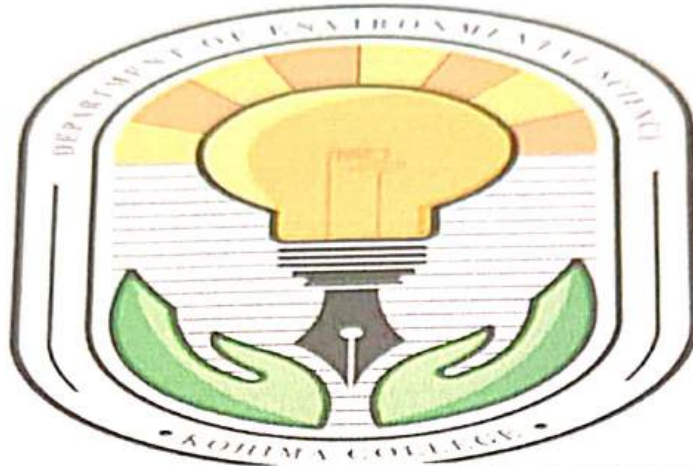


KOHIMA COLLEGE KOHIMA



PROJECT ON ENVIRONMENTAL SCIENCE

TOPIC : ALTERNATIVES TO USING PLASTIC AND REASONS BEHIND BEING BETTER ALTERNATIVES

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Introduction

Plastic. It's ubiquitous in our lives, from the water bottles we sip from to the packaging that surrounds our groceries. Its versatility and low cost have made it a dominant material, but at a significant environmental cost. Plastic pollution has become a global crisis, choking our oceans, littering our landscapes, and endangering wildlife. The sheer volume of plastic waste generated each year is staggering, and its persistence in the environment for centuries demands a fundamental shift in how we approach this material.

This calls for a multi-pronged strategy. While responsible waste management and improved recycling infrastructure are crucial, the most impactful solution lies in reducing our reliance on plastic altogether. Fortunately, a wave of innovation is bringing forth a new generation of alternatives – materials that are not only functional but also more sustainable.

This essay delves into the various alternatives to plastic, exploring their potential and limitations. We'll examine reusable options like glass, metal, and natural fibers, assess the promise of bioplastics and compostable materials, and consider the growing role of innovation in developing next-generation solutions.

- **BETTER ALTERNATIVES TO USING PLASTICS AND REASONS BEHIND BEING BETTER ALTERNATIVES**

Reducing the use of plastics is imperative for addressing environmental challenges such as pollution and climate change. Plastic pollution poses significant threat to ecosystems, wildlife and human health. While the production and disposal of plastics contribute to greenhouse gas emissions and depletion of finite resources. Transitioning to alternatives to plastics is essential for mitigating these impacts. Various alternatives to plastics and the reason for being better alternative are discussed below:

1. **Biodegradable Plastics:** Biodegradable plastics are made from renewable sources such as corn starch, sugarcane or cellulose. Unlike traditional plastics, they can be broken down by microorganisms into natural elements like water, carbon dioxide and biomass. Biodegradable plastics offer the convenience of plastic while minimizing environmental harm. Polyethylene derived

from sugarcane (bio-PE) is one example of biodegradable plastic with similar properties to conventional polyethylene. Bio-PE can be processed using existing infrastructure and offers a lower carbon footprint compared to its fossil fuel derived counterpart.

2. **Reusable Containers**: The use of reusable containers for food storage and transportation reduces reliance on single-use plastics. Unlike single-use plastics, reusable containers can be used multiple times, reducing the demand for disposable packaging and minimizing the accumulation of plastic pollution in the landfills and oceans. We can also conserve valuable natural resources such as petroleum which is used as a primary feedstock for plastic production. Additionally, the energy and resources required to manufacture, transport and dispose of single-use plastics are saved when using durable, reusable containers. Reusable containers help mitigate the environmental impacts by reducing littering, preventing plastic pollution in waterways and minimizing the negative effects of plastic ingestion and entanglement on wildlife.

3. **Natural Fibers:** Natural fibers such as cotton, bamboo, hemp and jute can replace synthetic fibers in various applications and can be replenished through agricultural processes. It can be utilized in wide range of applications including clothing, construction materials, packaging and even automotive parts providing versatile alternatives to plastics in various industries. Many natural fibers are inherently non-toxic and do not release harmful chemicals into the environment during decomposition. In contrast, plastics can leach toxins as they degrade, posing risk to the ecosystem and human health.

4. **Glass:** Glass containers are an excellent alternatives to plastic packaging for food and beverages. Glass containers are fully recyclable and can be recycled endlessly without the loss of quality, while plastics often ends up in landfills or pollutes the environment taking centuries to degrade. Glass is inert and does not leach harmful chemicals into the food or drinks especially when exposed to heat or sunlight. Moreover, glass is easier to clean and sterilize than plastics, as it is non-porous and less likely to harbor bacteria or odors. Glass containers tends to have

longer lifespan than plastic ones reducing the need for frequent replacement and ultimately saving resources.

5. **Metal:** Stainless steel, aluminum, and other metals can replace plastics in many applications. Metals are generally more durable and long lasting than plastics, making them suitable for application where strength and longevity are important. Metals are recyclable without loss of quality, reducing the need for virgin material extraction and minimizing waste. Metals are also generally inert and do not pose health risks when used in contact with food or water. By choosing metal over plastics, individuals and industries can reduce their environmental footprint, improve product performance and durability and promote sustainability.

Paper: Paper is a versatile material that can replace plastics in various forms, including bags, cartons and packaging. It is derived from natural fibers, primarily wood pulp which decomposes relatively quickly in the environment compared to plastics. When disposed of properly, paper products break down through natural processes, reducing accumulation of waste in landfills and ecosystem.

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Paper is also highly recyclable and can be processed into new paper products through pulping and reprocessing. Recycled paper reduces the demand for virgin wood pulp, conserves water and energy and minimizes green house gas emission associated with paper production. By opting paper over plastics, individuals and industries can support sustainable practices, reduce waste generation, conserve natural resources, and promote environmental stewardship. Additionally the versatility, safety and cost effectiveness paper make it a practical and eco friendly choice for various applications, contributing to greener and healthier planet.

7. **Beeswax Wraps:** Beeswax wraps are a natural alternatives to plastic to wrap food for storage. It is made from infused with beeswax, resin and jojoba oil, these wraps are reusable, biodegradable and provide a breathable barrier for food. It reduces plastic waste in the kitchen and promote sustainable living.

8. **Stainless Steel Water Bottles:** Stainless steel water bottles are durable, reusable and free from chemicals like BPA found in plastic water bottles.

They also help in reducing plastic waste eliminating the need for disposing plastic bottles.

9. **Package Free or Bulk Shopping:** Buying products in bulk or package free items for eating helps in reducing plastic waste which is better alternative to chips, sweets, etc. Bringing your own reusable containers to refill items like grains, spices , etc further minimizes plastic usage.

By incorporating these alternatives into daily college life, individuals can contribute to reducing plastic waste and promote sustainability. These options are not only better for the environment but also often more cost-effective in the long run.

Methods/Measures of better alternatives of plastic

There are several measures being explored as alternatives to traditional plastic to address environmental concerns. Some of these include:

- 1. Biodegradable Plastics:** These are designed to break down more quickly than conventional plastics, either through microbial activity or other environmental processes, reducing their impact on ecosystems.
- 2. Bio-based Plastics:** Made from renewable resources such as corn starch, sugarcane, or cellulose, these plastics aim to decrease reliance on fossil fuels and reduce carbon footprint.

3. Compostable Plastics: Designed to decompose under controlled conditions, compostable plastics offer a way to divert waste from landfills and can be turned into nutrient-rich compost.

4. Plant-based Alternatives: Products made from materials like bamboo, hemp, or algae provide biodegradable and renewable options for items like packaging, utensils, and containers.

5. Reusable Materials: Promoting the use of durable materials like glass, metal, or silicone that can be reused multiple times can significantly reduce single-use plastic consumption.

6. Edible Packaging: Innovations in food packaging involve creating edible films or coatings made from materials like seaweed or

starch, eliminating the need for single-use plastic packaging altogether.

7. Mushroom Packaging: Utilizing mycelium, the root structure of mushrooms, to create packaging materials that are biodegradable, sustainable, and can even be grown in custom shapes to fit specific products.

8. Paper-based Alternatives: Using paper and cardboard for packaging and containers offers a recyclable and biodegradable option, although efforts must be made to ensure sustainable forestry practices.

9. Water-soluble Plastics: These plastics dissolve in water, reducing the risk of accumulation in oceans and waterways, though careful consideration is needed to ensure they don't cause harm if ingested by marine life.

10. **Upcycling:** Repurposing waste materials, such as turning ocean plastic into new products, offers a creative way to reduce environmental impact and promote circular economies.

Each of these measures has its own advantages and challenges, and a combination of approaches may be necessary to effectively address the environmental issues associated with plastic pollution. Ongoing research and innovation are crucial in developing sustainable alternatives to traditional plastics.

- BASE ON OBSERVATION ON MAKING ECO BRICKS.

Ecobricks, as the name implies, are environmentally friendly bricks. Ecobricks are created from plastic bottle waste, which contains the leftovers of plastic waste that is no longer used, as opposed to traditional bricks. Russell Maier, a Canadian artist, was the first to come up with the idea for ecobricks. He was well aware of the hazards that plastic waste poses to the environment and human health, and he set out to find solutions to reduce plastic waste without producing other environmental issues. Then, over time, the actions to make these ecobricks become more popular, and individuals all around the world are doing more of them.

With ecobricks, plastic waste can be stored properly in bottles and used for other useful things, instead of making plastic waste to be burned, buried, or left to pile up in landfills. When these plastics are burned, hazardous compounds like carbon monoxide are released into the air, putting people's health at risk and contributing to global warming. If left alone, plastic particles will be extremely difficult to break down, posing a threat to the environment, including soil and marine ecosystems. As a result, we must make every effort to decrease our consumption of plastic garbage. If we must use and create plastic waste, it is preferable to collect it so that it can be utilized in the long term into something valuable. The ecobricks we have created can be utilized for a variety of purposes, including

building walls, chairs, and other furnishings replacing the use stone or cement bricks.

Through making ecobricks we have learn that it is very much eco-friendly and reduce disposal of plastic as a sack of plastic can be inserted into a single litre bottle which is amazing yet it is time consuming on making the bricks but also it is not a loss in spending time on making it as it save a lots of life equally environmental friendly.

How to Make Ecobricks:

Tools and materials needed -

1. Plastic bottles
2. The plastic waste that have being collected
3. Sticks / similar tools for compacting the waste.

Steps in making Ecobricks:

1. Wash and dry all bottles and plastic waste that will be used to make ecobricks so that there are no bacteria.
2. Fill a bottle with plastic waste. If there are any large ones, use scissors/ other tool to cut them into smaller pieces.
3. Squeeze the plastic waste into the bottle area with a stick or tools. Check for any remaining voids to make sure the bottle is totally solid. One way to see it is to press on it from the outside. When pressed, good solid ecobricks will not deflate or produce a sound.
4. Making sure that no paper, no glass, no sharp metal is being inserted.
5. Close the bottle and have made one ecobrick.

ARGUMENTS FOR PLASTIC WASTE AND BENEFITS OF ORGANIC MATERIAL

Plastic waste has become a significant environmental concern in recent years, prompting discussions about the need for sustainable alternatives. One such alternative is organic material, which offers several benefits over plastic. By understanding the arguments and benefits, we can make informed choices that contribute to a cleaner and healthier planet.

Arguments For Reducing Plastic Waste;

1. Preservation of natural resources: Reducing plastic waste helps preserve valuable natural resources. Plastic production requires fossil fuels and consumes vast amount of water. By minimizing plastic usage, we can conserve these limited resources and promote sustainability.
2. Mitigation of pollution and climate change: Plastic waste contributes to pollution and climate change. Improper disposal leads to plastic litter that pollutes the environment, including water bodies and landfills. Additionally plastic production emits greenhouse gases. By reducing plastic waste we can mitigate pollution and minimize the carbon footprint associated with plastic.
3. Protection of marine life and ecosystem: Plastic waste poses a grave threat to marine life and ecosystem. Marine animals often mistake plastic debris for food leading to indigestion and entanglement. This not only harms individual animals but also disrupts the delicate balance of marine ecosystems. By reducing plastic waste we can safeguard marine life and protect the health of our oceans.

Benefits Of Organic Material;

1. Biodegradability and Compostability: Organic materials offer the benefits of being biodegradable and compostable. They can break down naturally over time, reducing waste accumulation and minimizing the environmental impact.
2. Reduced carbon footprint: Organic materials generally have a lower carbon footprint compared to their synthetic counterparts. Their production and disposal processes typically emit fewer greenhouse gases, helping to mitigate climate change.
3. Health advantages for humans and animals: Organic materials provide health advantages for both humans and animals. They are often free from harmful chemicals and toxins commonly found in synthetic materials, reducing the risk of adverse health effects. Using organic materials in products like food containers and textiles can promote safer and healthier living environments.

Conclusion: A Sustainable Future – Beyond Plastic

The transition away from plastic is not without its challenges. Consumer behavior needs to adapt, embracing reusable alternatives and demanding sustainable packaging from manufacturers. Additionally, ensuring the life-cycle sustainability of these alternatives – from sourcing raw materials to disposal – is critical.

However, the potential rewards are immense. By reducing our reliance on plastic, we can create a cleaner environment, protect wildlife, and conserve valuable resources. The alternatives explored in this essay offer a roadmap towards a more sustainable future. Embracing these solutions, coupled with advancements in technology and responsible consumer choices, can help us turn the tide on plastic pollution.

The journey beyond plastic is not just about replacing materials; it's about rethinking our relationship with consumption and waste. It's an opportunity to foster a circular economy, where

materials are valued and reused, minimizing environmental impact. As we move forward, collaboration between researchers, businesses, policymakers, and consumers is essential. By working together, we can create a world where convenience and sustainability go hand in hand, leaving behind a legacy of a healthy planet for generations to come.

This essay has provided a glimpse into the exciting world of alternatives to plastic. As research and development continue, we can expect even more innovative solutions to emerge. The future holds the promise of a world free from plastic dependence, a future where our choices reflect a deep respect for the environment and a commitment to building a sustainable future.

