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Consumer Perception And Marketing Strategies for Promoting Bio-Degradable Polymers in Transition Towards Circular Economy

Dr. Poonam Singh[1], Namita Mane[2]

[1]Assistant Professor (MBA), JSPM'S KIMR, PUNE
[2]Assistant Professor (Commerce), JSPM University, PUNE

Abstract:
Bio-degradable polymer base plastics represent an innovative solution over synthetic non-biodegradable plastic derived from fossil fuels, non-renewable energy, and feedstock that has the potential to provide considerable environmental benefits. The prefix "bio" indicates that biopolymers are biodegradable. The word "biodegradable" means that materials can be decomposed by bacteria, fungi, and yeast to the final products of biomass under anaerobic conditions—hydrocarbons and methane. Bioplastics are eco-friendly products that are not only highly bio-gradable and compostable, but also have robust rheological properties compared to fossil-based plastic products.The demand for biodegradable polymers is growing, owing to rising oil prices, which is the primary feedstock for plastic made from petroleum, as well as the difficulty of removing waste plastics from the environment. Biodegradable polymers have several advantages over synthetic polymers, including the ability to breakdown into non-hazardous chemicals in the environment. A new epoch of biodegradable polymers made from **urban organic waste is now theoretically conceivable**. This research is one of the novel approaches to examine what might lead to commercial acceptability of this biodegradable polymer from the perspective of customers rather than manufacturers. Conceptual model is developed to uncover psychological motivations that may cause customers to migrate from a linear to a circular economy, with the goal of better understanding what motivates customers to **switch to bio-degradable plastic made from municipal organic waste.** We discovered that having a green self-identity has a beneficial impact on perceived value, which leads to a shift in buying behavior intention. Self-congruity also helps to control the relationship.

Keywords: Bio-degradable, Polymer, Circular economy, Green environment, Organic

Introduction:

Environmental friendliness is a key ideology nowadays. The use of biopolymers from renewable resources could solve global plastic pollution. For many years, researchers have been trying to develop and design packaging materials based on natural biopolymers.

Plastic pollution has become a global environmental crisis, with an estimated 8 million metric tons of plastic waste entering the oceans each year. To combat this issue, there has been a growing interest in the development and manufacturing of biodegradable plastics. Biodegradable plastics offer a

sustainable alternative to traditional plastics by breaking down naturally in the environment, reducing their impact on ecosystems.

The global environmental crisis, driven by plastic pollution and the depletion of natural resources, has necessitated a shift towards sustainable practices and a circular economy. In this context, the adoption of bio-degradable polymers presents a promising solution. Bio-degradable polymers, also known as bioplastics, Polymers are made from long chains of molecules that can be broken down into their individual components through chemical processes. Unlike traditional plastics, which take centuries to degrade, polymers can break down much faster and with less harm to the environment have the potential to reduce the environmental impact associated with traditional petroleum-based plastics. However, their successful integration into the market depends on consumer perception and effective marketing strategies.

Bio-degradable polymers are those polymers which get decomposed under aerobic or anaerobic conditions, as a result of the action of microorganism/enzymes. The materials develop it like starch, cellulose, and polyesters. Aliphatic polyesters are the most commonly used polymers of this type.

Objective of the Study

- To Create awareness bio-degradable polymer derives from municipal organic waste and its benefit to society using marketing edge.
- To formulate the Statistical model (moderated mediation analysis model) on the present status of bio-degradable polymers.
- To examine the factor that contributes consumer willingness to pay & buy bio-degradable plastic converted from organic waste.
- To develop the conceptual model to uncover the psychological motivation to migrate consumers from linear economy to circular economy.
- To develop general prospective of bio-degradable polymers & its marketing benefit towards sustainable environment. To demonstrate the importance and application of such products to derived equation between higher perceptual value, self-realization, and individual congruence

Literature Review:

Previous studies have shown that consumer perception plays a crucial role in the success of environmentally friendly products. Factors such as product knowledge, perceived environmental impact, price sensitivity, and convenience influence consumer choices. Understanding these factors is essential to the successful promotion of bio-degradable polymers in the transition to a circular economy.

The literature review will encompass three main areas:

- **Circular Economy and Biodegradable Polymers**:

This section will provide an overview of the circular economy concept and its significance in achieving sustainable development goals. It will delve into the role of biodegradable polymers as a potential.

- **Marketing Strategies for Sustainable Products**:

Here, the focus will be on exploring various marketing strategies adopted by businesses to promote sustainable products, with a specific emphasis on biodegradable polymers. The review will highlight the importance of sustainable branding in influencing consumer choices.

➢ **Consumer Behaviour and Attitudes:**

This part will investigate consumer behaviour and attitudes towards sustainable products, particularly biodegradable polymer-based products. Factors such as perceived value, environmental benefits, product quality, price sensitivity, and trust in eco-friendly claims will be analysed.

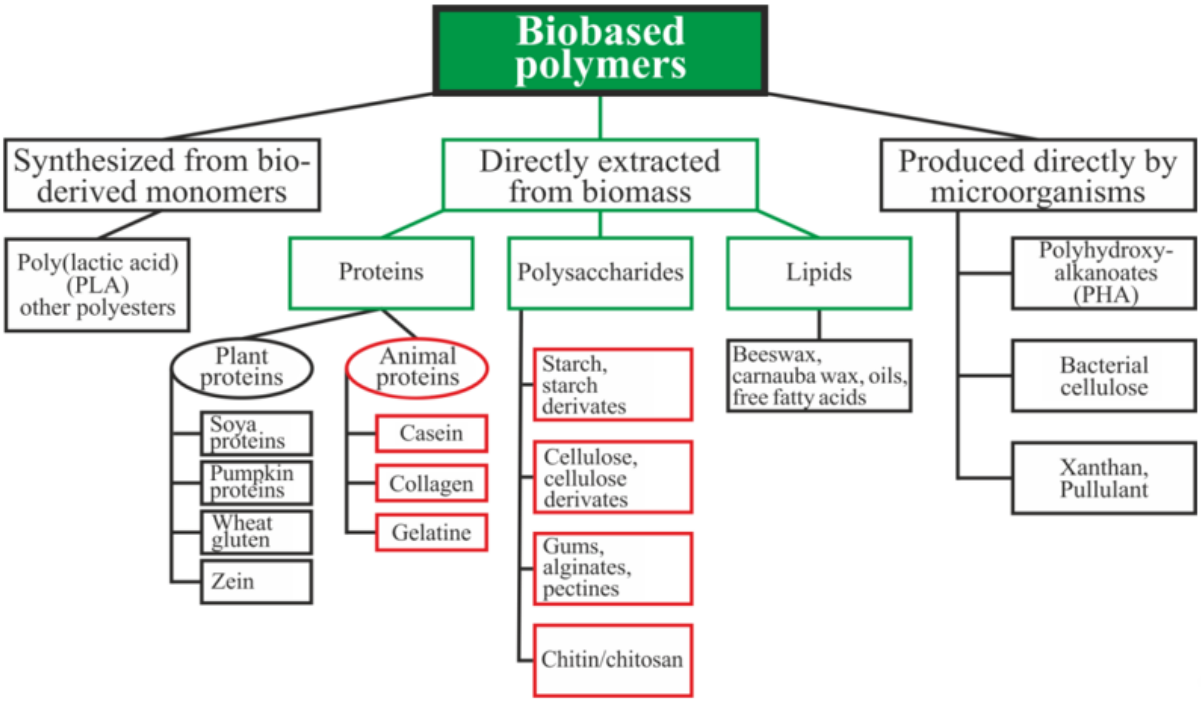
Types of Biodegradable Polymers

Biopolymers are simple macromolecules made from organisms that are fully biodegradable. Common examples of biopolymers include carbohydrates, proteins, DNA, RNA, nucleic acids, lipids, and peptides; since they are made from living organisms, they are totally carbon neutral and can be easily recycled or renewed. Moreover, biopolymers absorb the carbon dioxide plants emit instead of released into the atmosphere. There are four types of biopolymers: sugar-based biopolymers, synthetic biopolymers, cellulosic biopolymers, and natural polymers

Biodegradable plastics are plastics that may be made from biological materials, and which tend to decompose under a specific set of conditions with regards to timeframe and medium (compost, water, soil) of decomposition.

These types are classified based on their mode of degradation, and their composition.

1. Hydro- Biodegradable
2. Oxo-Biodegradable
3. Cellulose-Based Biodegradable
4. Protein-Based Biodegradable
5. Starch-Based Biodegradable
6. Synthetic Biodegradable



Use of biodegradable products

The potential of biodegradable polymers and more particularly that of polymers obtained from renewable resources such as the polysaccharides (e.g., starch) have long been recognized. However, these biodegradable polymers have been largely used in some applications (e.g., food industry) and have not found extensive applications in the packaging industries to replace conventional plastic materials, although they could be an interesting way to overcome the limitation of the petrochemical resources in the future.

The uses of biodegradable polymers are mentioned below:

- Packaging (food containers, wraps, nets, foams
- Plastic bags for collection and composting of food waste and as super market carrier bags.
- Catering products (cutlery, plates, cups straws etc.)
- Agriculture (mulch films, plant pots, nursery films etc.)
- Hygiene products (bottles, tea bags, air pillow, tissue etc.)
- Medical & Dental Implants (screws, pins and plates, material for pills and capsules etc.)

How to promote Biopolymer Products

Consumers are increasingly demanding natural products and social responsibility from vendors and suppliers through sustainability and green practices. More importantly, many are willing to pay more for these values and demands. Now it's manufactures' responsibility to provide them environment friendly products to save our earth and environment. These are the some solutions for marketing of Biopolymer products which are given below:-

1. **Apply sustainable practices across the whole organisation: -** Choose materials that are biodegradable, recyclable, or compostable, and make sure to communicate this on your packaging.
2. **Partnership with eco- friendly organisation: -** Keeping partnership with eco- friendly company will increase selling of product automatically and will reduce selling and distribution expenses.
3. **Replace traditional marketing with digital marketing: -** use only digital content for marketing your products use and promote paperless advertisement or if necessary use only recycled paper.
4. **Educate consumers for adopt eco- friendly product: -** Marketing campaign can also be helpful and aware customers for buying biodegradable products. For example you can offer discounts for customers who bring in their own reusable bags or promote paperless billing and transactions. This not only shows your company's commitment to sustainability but also encourages your customers to adopt eco-friendly habits.
5. **Support local vendors and environmentally focused organisation: -** For marketing strategy company should support local vendors to expand their business and marketing in all segment of market.
6. **Showcase your green initiatives: -** company's logo should be in Green colour it represents your Go Green campaign and natural product. Highlight any green initiatives your company has implemented, such as reducing energy usage or minimizing waste, in your advertisement. This shows consumers that your company is committed to sustainable practices beyond just its products.

Adoption of Circular Economy

A circular economy aims to eliminate waste, not just from recycling processes, but throughout the lifecycles of products and packaging. A circular economy aims to maximize value and eliminate waste by improving the design of materials, products and business models. A circular economy goes beyond recycling. The goal is not just to design for better end-of-life recovery, but to minimize the use of raw materials and energy through a restorative system.

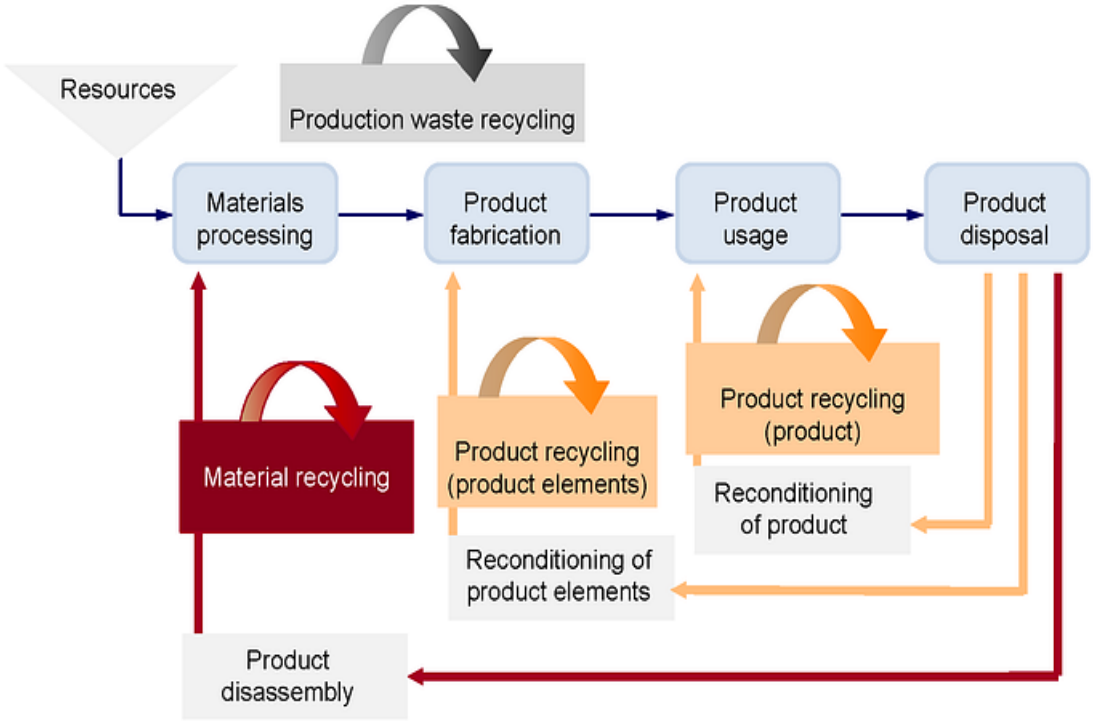


Figure: Overview of 'Circular Economy' in a circular economy, the value of products and materials is maintained for as long as possible. Waste is minimized and resources are kept within the economy when a product has reached the end of its life, to be used again to create further value.

Future scope of Biodegradable Products:

Demand for biodegradable polymers is increasing due to environmental concerns about the use of non-renewable materials. Industrial interest in biopolymer has steadily increased over the decades. The demand for new materials from future manufacturers of biopolymers is overwhelming. However, the material's cost-effectiveness needs to improve as it is explicitly made available for sustainable development. Bio-based polymers are closer than ever to traditional polymers. Today, with advanced research and development in biotechnology and public awareness, bio-based polymers are commonly found in various applications, from consumer goods to high-tech applications. Food packaging plays an essential role in protecting food from external contamination and maintaining quality, integrity, and safety throughout its shelf life. Materials based on synthetic polymers are used primarily as packaging materials in the food industry due to their ease of manufacture, versatility, affordability, functionality, lightweight, flexibility, and low cost. However, these synthetic polymers are not degradable, and most plastic scraps and debris pollute the environment badly. This requires the development and use of biodegradable polymer materials to solve these environmental problems. Biopolymers or renewable resource-based biopolymers include car boxy methyl cellulose, hemicellulose, pectin's, car boxy methyl

cellulose, starch, xanthan gum, pullulan, etc. Alginate, guar gum, gum karaka, agar, and gellan, etc., have great potential to replace traditional petroleum-based food packaging materials.

CONCLUSION

The transition towards a circular economy demands innovative solutions to address the environmental impact from traditional plastics. Bio-degradable polymers offer a promising alternative, but their successful adoption relies heavily on consumer perceptions and marketing strategies. This research paper outlines a comprehensive study that aims to shed light on consumer attitudes towards bio-degradable polymers and develop effective marketing strategies to accelerate their adoption. By achieving these objectives, this research will contribute to the sustainable management of resources and the promotion of a circular economy.

Researchers have done significant study of biopolymers with manufacturing prospective but futuristic research needed on starch-based polymers. Bio-degradable renewable energy-based polymer plastic has essential merits that it absorbed into soil and enriches the soil fertility. Bio-degradable polymers not only naturally degraded but also help prevent from incurring additional cost of required manpower for removal of conventional synthetic plastic from environment.

Pollution is one of the most pressing issues of modern times. Effluent in the world is escalating due to the exponential growth in the industrial and agricultural sectors. The wastes contain heavy metals, pesticides, and inorganic substances ultimately leading to the deterioration of the ecosystem. Biopolymers from natural and synthetic sources can be modified and used as per the requirement. Then it has been observed that very few industries are involved in this innovation, but it has been limited to their personal financial objective. It has been also observed that bio-degradable polymer product is facing higher pricing issue that has concern of future study to reduce its cost of product.

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