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Analysis on China's Plastic Control Based on Promotion Challenges of Plastic Ban and Degradable Plastic

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Abstract. The production of plastics has made many aspects of modern life easier, but at the expense of the environment in ways that cannot be reversed. Since every country began enacting its own set of regulations to curb the manufacturing and consumption of conventional plastics, the question of biodegradable polymers has been at the forefront of public discourse. The use of biodegradable plastic is fraught with difficulties that need for decisive measures to be taken in light of extensive research. The paper highlights the urgent need to stress plastic pollution, and it analyzes the progress and current barriers of China's pushing plastic ban and degradable plastic. The paper also focuses on the urgent need to stress plastic pollution. In addition, the paper offers recommendations for China's policies and activities, serving as a point of reference for the treatment of plastic pollution and the prevention of it in a manner that is environmentally responsible.

Keywords: Microplastic, Degradable Plastic, Implementation Barriers, Policy Suggestions.

1. Introduction

Plastics have made previously unimaginable levels of convenience possible; however, the plastics industry is controversial as a result of the enormous quantities of plastics used and the fact that the disposal process creates numerous issues, such as the destruction of the soil structure and the production of highly toxic and carcinogenic substances that are difficult to recycle.

In recent years, China has made significant strides toward banning some plastics and has actively promoted the use of biodegradable plastics. A new version of China's "New plastic ban" was put into effect on January 1, 2020. This new version made it abundantly apparent that the particular requirements of banning and regulating plastic products were to be put forward while also forcefully promoting biodegradable plastics [1]. Under the auspices of the national plastic ban policy, some academics predict that the biodegradable plastics industry will enter a phase of accelerated development. This will occur against the favorable backdrop of the national plastic ban policy. As soon as the challenges in terms of performance and cost can be overcome, it will undoubtedly take the place of conventional plastics and make its way into everyday life, so putting an end to the issue of white pollution at its root [2-3].

This paper begins by discussing the dangers that plastics pose to ecosystems and human health from a biotoxicological and ecological point of view. Next, the author examines the current situation in China as well as the barriers that stand in the way of the development of biodegradable plastics there. Finally, the author suggests relevant countermeasures and offers suggestions for the elimination of plastic use in

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China. This work gives a contribution to the research being done on biodegradable plastics in China, and it will provide suggestions for other nations as well.

2. The disadvantages of using plastic products

Plastic pollution is becoming an increasingly serious threat to the environment, as evidenced by the fact that approximately 1 billion marine creatures lose their lives as a direct result of plastic waste, and that approximately 8 million tons of waste plastic are dumped into the ocean each year in a variety of different ways. In recent years, unsustainable practices in marine resource extraction have led to an increase in the amount of marine plastic trash that may be found both on the surface and below the water. Marine plastic litter not only results in visual pollution that has a negative impact on the tourism industry and clogs the power systems of ships, but it also entangles organisms and poses a threat to the safety of marine life, particularly endangered species. Furthermore, marine plastic litter degrades and breaks down in the environment to produce microplastics, which can have a more lasting impact on biological health [4]. This has the potential to threaten the safety of over 500 marine species around the world. In addition, the discovery of microplastics in human tissues and excreta, particularly in newborns over the past several years [5-7], has led to widespread public concern regarding the effect that plastic pollution has on human health.

3. Biodegradable plastic

3.1. The products of biodegradable plastic and their features in China

The China Light Industry Federation (CLIF) formulated and published the Guide to Classification and Labelling of Degradable Plastics in September 2020. This guide defines degradable plastics as plastics that are degraded in nature, such as soil, sand, freshwater, seawater, under specific conditions such as composting or anaerobic digestion, by the action of microorganisms that are present in nature, and eventually degrade completely into carbon dioxide or/methane, water and its constituent elements Plastics are separated into their respective categories based on the many ways in which they degrade. They are able to be classified according to the various processes of degradation, and can therefore be separated into the following four primary categories: water-degradable, biodegradable, photodegradable, and photo-biodegradable. However, due to the immaturity of the technology and the high costs, photodegradable plastics, biodegradable plastics, and photodegradable plastics all have fewer product types than biodegradable plastics do, making biodegradable plastics the most common type of degradable plastic available on the market.

Table 1. Comparison of the main types and properties of biodegradable materials.

Types	Thermal resistance	Transparency	Main Applications
Starch-based	relatively low	Midium	Packaging, food containers, toys, etc.
PBAT	High	Low	Film type
PHA	High	Low	Packaging, medical, etc.
PLA	relatively high	High	Film, cutlery, etc.
PCL	relatively low	relatively high	Medical, fibre, etc.
PBS	high	low	Packaging, tableware, medical, etc.

As can be seen in table 1, several kinds of biodegradable material have distinguishable qualities, such as levels of thermal resistance and degrees of transparency.

3.2. The policy environment in China

The General Office of the State Council published a "Notice on Restrictions on the Production and Sale of Plastic Shopping Bags"("Notice") towards the end of 2007, and it went into effect in early 2008.

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According to the notice, beginning June 1, 2008, there was to be a statewide prohibition on the production, sale, and use of plastic shopping bags with a thickness of less than 0.025 millimeters, and no plastic shopping bags were to be distributed free of charge at any retail business that sold goods.

Only 3.7% of the 1,101 offline businesses that were assessed for the "Ten-year Plastic Restriction Order" - Research Report on Merchant Implementation, which was published in 2018, were found to be in compliance with all of the "Plastic Restriction Order's" requirements. A mere 3.7% of the 1,101 offline retailers that were assessed met all of the conditions of the Plastic Limitation Order, which is a far cry from the requirement that "plastic restriction" be met [8]. China issued a new version of the Plastic Restriction Order on January 19, 2020. It is titled "Opinions on Further Strengthening the Control of Plastic Pollution" and it sets the time frames for the ban on plastic pollution as 2020, 2022, and 2025 respectively. It also clearly specifies the scope of the ban on plastic pollution and builds a policy that covers the entire life cycle of production, distribution, consumption, and end-disposal. The policy framework addresses all aspects of an object's life cycle, including manufacture, distribution, consumption, and disposal at the end of its useful life [9]. It has been widely adopted across the country that the policy of plastic restriction, and the 14th Five-Year Plan for the Development of Circular Economy in 2021 suggested to aggressively and gradually promote biodegradable plastics. In the Catalogue for the Guidance of Industrial Structure Adjustment, biodegradable plastics have been included as an important product to replace traditional plastics. Biodegradable plastics have also become an important product to replace traditional plastics.

3.3. Advantages and barriers

Plastics that break down biologically offer the added benefits of being recyclable, degradable, and low in carbon emissions. They are anticipated to reduce the amount of white pollution that is produced and offer alternate advantages in applications such as packaging and agricultural films, which have a short lifespan and are difficult to recycle and separate. In addition to this, compost can be made out of biodegradable plastics, and the biogas that is created can be used as a source of renewable energy. It is impossible to deny the fact that biodegradable plastics may cause difficulties for the environment and provide challenges to their widespread use, despite their many positive attributes. First, pesticide spraying is required during the growth of the raw materials for plant-based biodegradable plastics (maize, soybeans, etc.), and toxic components may be included in the end product. This is one of the problems that occur throughout their life cycle.

Second, the high cost of biodegradable plastic items is a significant barrier to the widespread adoption of those products. This is an obstacle that must be overcome in order to make widespread use of biodegradable plastic. For instance, the price of PLA straws is around double that of standard plastic straws, while the price of biodegradable plastic bags is approximately three times that of traditional plastic bags.

Third, the use of biodegradable plastics does not help to promote or practice source reduction, and it is not capable of truly resolving the problem of plastic pollution. To be improved recycling system China does not have composting plants that are designed specifically for biodegradable plastics at this time, and the majority of biodegradable plastics take several years to degrade under natural conditions; the intermediate products of biodegradable plastic degradation are small molecule compounds, and the risk of environmental pollution is not yet clear. In addition, the breakdown process for some biodegradable polymers results in the emission of the greenhouse gas methane.

3.4. Policies and suggestions

At this moment, there are challenges in the production, distribution, usage, recycling, and disposal of biodegradable plastic items in China. These challenges can be broken down into five categories: As a result, it is of the utmost importance to shed light on the primary obstacles presented by the recently implemented ban on plastic in China and to implement specific solutions.

First, a reduction at the point of origin. Consumers should be guided and encouraged by society to adopt an attitude of "bring your own shopping bag" and "no disposable tableware," and should be

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equipped with the necessary knowledge to ban plastic, from "conceptual introduction" to "knowledge dissemination." Additionally, consumers should be equipped with the necessary knowledge to ban plastic. Consumers should be guided and encouraged to develop habits such as "bring your own shopping bag" and "not to use throwaway tableware" by the community as a whole, and the community should collaborate on this effort.

The second step is to enhance the recycling and disposal system at the end of the pipe. It is necessary to implement waste segregation and clarify the ways of collecting biodegradable plastic waste and disposing of it. Moreover, it might as well to make investments in infrastructure for the treatment of trash in order to fulfill the growing demand for the disposal of waste composed of biodegradable plastics. The third one is to look for other potential options. It is imperative to improve the quality and safety requirements of connected products while giving full regard to the environmental impact of the entire life cycle of various other alternative products such as bamboo and wood products and paper products.

4. Conclusion

Traditional plastics have been mostly superseded by biodegradable materials since their discovery and development, which has been a significant contributor to the reduction of environmental issues such as "white pollution." Although the performance and application of biodegradable materials are still limited and there are shortcomings, the research and use of biodegradable materials will continue to expand as China continues to implement its green and sustainable development strategy. This is despite the fact that there are still limitations.

Efforts should be made to construct an eco-friendly and resource-conserving society in China. This can be accomplished by actively engaging in research and development as well as application, enhancing the end of recycling and treatment system, developing and reducing the cost of biodegradable materials, and so on. Consumers need to establish a good knowledge of the need to reduce at the source and take the effort to minimize their usage of all types of plastic items in order to help the environment. While doing so, it is necessary to search for alternate solutions, such as products made of paper, bamboo, and wood, in order to address the problem of white pollution where it originates.

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