

# Analysis of Pollution Harm and Prevention Methods in Microplastics

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## Abstract

**Pollution in microplastics has become a new focus of current environmental governance and ecological protection. The pollution in microplastics is derived from white pollution. Compared with white pollution, the pollution in microplastics is more harmful to the environment and ecosystem. The main reason is that the particle diameter of microplastics is relatively small, which makes it easier to invade the soil and the sea, and microplastics will release some harmful gases through its own oxidative decomposition, resulting in air pollution. Micro-plastic pollution spreads all over many ecosystems, such as ocean, soil and atmosphere. Through material circulation and food chain, micro-plastic pollution will eventually enter the human body, posing a threat to human health. Based on the harm of pollution in microplastics, it is necessary to take comprehensive measures to curb pollution in microplastics.**

## Keywords

**Microplastics Pollution; Harm; Prevention and Cure Method.**

## 1. Introduction

Generally, plastic chips, fibers or particles with a diameter of less than 5 mm are collectively called microplastics, and their particle diameters range from several microns to several millimeters. Microplastics has different shapes, belonging to a kind of non-uniform micro-diameter plastic mixture, and it is difficult for human eyes to directly observe and distinguish it. Therefore, microplastics is vividly called the fine particulate matter (PM<sub>2.5</sub>) in the ocean [1]. The investigation shows that a large number of microplastics deposits on the seabed, and the seabed sediments contain a large number of microplastics particles, which have a serious impact on the marine environment. Although microplastics has been included in the monitoring scope of marine pollution at present, the progress of prevention and control of microplastics particles is still relatively slow due to their special properties. Compared with the ocean, microplastics pollution in soil is very serious, which is closely related to human land life and agricultural production. Therefore, in order to effectively prevent and control pollution in microplastics, we should not only attach importance to scientific research, optimize degradation technology, but also strengthen control at the source, restrict production and standardize use, and achieve the purpose of pollution control through comprehensive prevention and control.

## 2. Overview of Pollution in Microplastics

### 2.1. Pollution Distribution

The application of plastics can be seen everywhere in daily life, from commodity packaging to housing construction, all of which are inseparable from plastic products. In recent years, the demand for plastics has been increasing, and the production of plastics has been rising. However, the recycling and treatment of waste plastics are not in place, which leads to the long-term accumulation of waste plastics. These waste plastics can't be completely degraded, but they can be decomposed into finer particles, forming microplastics, which is accompanied by rainfall or deposited into the soil, rivers, lakes and seas [2]. Therefore, most of the pollution in microplastics in nature comes from plastic waste on land, so the distribution of pollution in microplastics has certain rules to follow. The areas with the most concentrated pollution are coastal waters, sewage discharge areas, industrial areas, port areas and river entrance areas.

### 2.2. Main Classification

According to the origin and nature, microplastics can be divided into primary microplastics and secondary microplastics. Primary microplastics mainly refers to the microplastics particles directly discharged into the water environment in people's production and life. For example, cosmetics and cleaning products commonly used in daily life, resin materials in some industrial raw materials all contain certain microplastics particles. These microplastics particles can't be treated by sewage treatment plants, so they will freely flow into natural water bodies with the treated sewage. Secondary microplastics mainly refers to microplastics particles formed by the decomposition of plastic waste under the action of physics, chemistry or microorganisms.

## 3. Harm of Pollution in Microplastics

### 3.1. Environmental Level

Pollution in microplastics will cause serious harm to marine environment, soil environment and atmospheric environment. Because the diameter and volume of microplastics particles are relatively small, the specific surface area of microplastics particles is larger in the same unit, and the larger the specific surface area, the stronger the adsorption capacity of pollutants. There are many kinds of organic pollutants in the ocean, soil and atmosphere. These organic pollutants accumulate and accumulate for a long time and are insoluble in water. Once microplastics particles enter the ocean, soil and atmosphere and meet these organic pollutants, they can gather together through their strong adsorption force, thus bringing greater harm to the environment.

### 3.2. Biological Level

Pollution in microplastics will endanger biodiversity and affect biological survival. Take marine organisms as an example. microplastics particles in the ocean are absorbed by plankton or marine shellfish, but cannot be digested. They will accumulate in these organisms for a long time. If microbial particles adsorb a large amount of organic pollutants, these toxins will be released under the action of biological enzymes, which will lead to the death of organisms. While these low-end plankton or shellfish are eaten by organisms in the upper food chain, then these microplastics particles will enter the whole food chain. If the content of microplastics particles in the bottom organisms is only 1%, then it will probably increase by 10 ~ 20 times when it reaches the top food chain after layers of decomposition and absorption [3], resulting in the illness and death of a large number of aquatic organisms, thus affecting biodiversity.

### 3.3. Human Level

Plastics are macromolecular compounds. In the production process, in order to enhance the performance of plastics, various chemicals will be added. People are at the top of the food chain. With the continuous improvement of people's living standards, a large number of aquatic products are served on people's tables, which makes microplastics particles enter the human body, thus affecting life and health. Investigation shows that microplastics particles in fish and shellfish will not be absorbed by human digestive system, but they will not be completely discharged. These microplastics particles accumulate in human body, which will do some harm to people's immune system, lymphatic system, nervous system, reproductive system and endocrine system [4]. If microplastics particles adsorb heavy metals, it will directly affect human kidney, thus causing various diseases.

## 4. Prevention and Control Methods of Pollution in Microplastics

### 4.1. Substitute

To achieve effective prevention and control of pollution in microplastics, we must first reduce the use of traditional plastic products, and reduce pollution accumulation at the source by promoting some alternative non-plastic products and degradable plastics. For example, Guangdong Shuntian New Materials Co., Ltd. has developed a kind of PBAT (poly (butylene adipate)) biodegradable plastic, which is the main raw material of biodegradable film. It has the characteristics of PBA (polybutylene adipate) and PBT (polybutylene terephthalate), and has good ductility, elongation at break, heat resistance and impact resistance, as well as excellent biodegradability. PBAT has good film-forming performance, and is usually mixed with PLA (polylactic acid) resin to make end products, which are used in plastic packaging, agricultural mulch film, disposable appliances, etc. Under composting conditions, it can be degraded into carbon dioxide and water by microorganisms, and the degradation process will not cause secondary harm to the environment [5].

### 4.2. Prohibition of Production

To realize the effective prevention and control of pollution in microplastics, besides promoting new materials, some cheap plastic manufacturers should be shut down from the perspective of limiting production. For some industries that need a lot of plastic products, such as express delivery industry, take-away industry, etc., it is necessary to establish strict plastic packaging certification standards, replace traditional cheap plastics with green packaging and new materials, and fundamentally curb the use of cheap plastic products [6]. By standardizing the industry management, it is forbidden for inferior and cheap plastics to flow into the market, so as to prevent and control the source of pollution in microplastics.

### 4.3. Centralized Processing

For the existing pollution of microplastics, effective centralized treatment methods should be adopted to avoid microplastics particles from entering organisms and reduce the harm to nature and organisms. For land plastic wastes, it is forbidden to pile them up at random, and special and centralized recycling treatment should be carried out, and they should be recycled and reused for packaging or building materials. For the marine garbage that is difficult to treat, we can develop or purchase special marine plastic garbage treatment devices to recycle and treat the plastic garbage in harbors and beaches [7]. At present, the mature marine garbage disposal devices mainly include marine garbage cans, marine garbage recycling boats, automatic collectors, etc.

#### 4.4. Biodegradation

For the existing plastic waste or microplastics particles in the ecological environment, in order to achieve effective treatment, advanced biodegradation technology can be adopted to reduce the harmfulness of waste plastics, reduce the content of microplastics particles and effectively control the pollution in microplastics. Scientific research has found that some fungi, bacteria and tiny organisms in nature have the ability to degrade polyurethane plastics. For example, *Tenebrio molitor* can chew foam plastics, and intestinal microbes can degrade polyethylene[8]. However, the application scope of biodegradation is relatively small, and its degradation efficiency is not high, so it can't be applied to microbial pollution control in the whole nature. At present, the urgent problem is how to apply biodegradation technology to industrial production and eliminate the pollution in microplastics from the root.

#### 5. Conclusion

Pollution in microplastics will do great harm to the ecological environment and human health, and it is a very prominent environmental pollution factor. At present, we should pay attention to the pollution control in microplastics, insist on source prevention and technological assistance, and effectively solve the pollution problem in microplastics.

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