Harmful Substances in Cosmetics and Impact on Ocean

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Abstract. The article expresses the toxicological profile of micro plastics, heavy metals and active ingredients on cosmetics. The focus is on pollution hazards to the biosphere, humans and the environment. Animals easily absorb plastic particles, which not only spread throughout the food chain, but have also been shown to exist in humans. While the micro plastics in cosmetic bags themselves can leach toxins into the ocean, synergies between micro plastics and other pollutants can increase the toxicity of micro plastics to living things. Cosmetics are also harmful in the use of processing additives, polypropylene like absorb organic pollutants. In the future, in order to reduce the environmental pollution of cosmetics, we should use green cosmetics and reduce the use of packaging bags.

Keywords: Cosmetics; Impact; oceans.

1. Introduction

Cosmetics are hidden nature killers. They have an impact on the process of producing these products in addition to their ingredients. It is no secret that the cosmetics industry uses packaging and chemicals in such quantities, in fact many industries do, that these harmful substances cause immeasurable damage to marine life and extremely fragile ecosystems. Cosmetic bags are also known as plastic polymers. Chemical reactions form polymer chains and structures composed of monomer units [1]. Most microplastics are produced from larger plastic products that gradually break down into fragments when they enter seawater and do not actually biodegrade [2]. Polymers are also important ingredients in skin care and cosmetic products (PCCPs) [3], which are essential for the production of cosmetics and are discharged into the oceans through wastewater. Each of these substances is associated with various health risks. Currently, more than 74 per cent of pollutants enter the oceans from various water streams between May and October each year [4].

Scientific studies have proven the presence of many pollutants already in various oceans. These cosmetic pollutants can be harmful to the entire biosphere [5]. Micro plastics are one of the most significant factors that can cascade to organisms throughout the food chain. Pollution from cosmetics is killing the ecosystem and the oceans are becoming a place where this is most evident [6, 7]. Pollution from plastic bags used to package cosmetics also combines with persistent organic pollutants (POPs) and metal pollutants to produce toxins [8].

The purpose of this article is to want you to understand the dangers of cosmetics to the marine environment. Now that the trend of acid sea and sea level rise is becoming more and more obvious, we need to stop it in time. Promote green cosmetics in the future. Green cosmetics are those that use less chemical raw materials, which not only makes them harmless to human health, but also reduces the use of natural resources and protects the environment. Next is the internal and external packaging of cosmetics. Reduce the use of packaging and use biodegradable packaging.

2. Harmful Substances in Cosmetics

2.1. Plastic Packaging

Micro plastics caused by plastic packaging are widely distributed in the oceans, the surface water isa good example, deep-sea environments and sediments [9]. Firstly, micro plastics are tiny fragments formed by the ongoing degradation and shrinkage of plastic products in the environment. As large plastics enter seawater and gradually break down into smaller fragments over time, smaller molecular

particles are converted from polymers (e.g., oligomers and dimers) [10]. Degradation of synthetic polymers includes photo-degradation (ultraviolet [U.V.] radiation), biological and chemical degradation [11]. Aging of polymers under prolonged U.V. irradiation leads to polymer bond breakage, which results in polymer embrittlement. Thermal oxidation usually occurs when plastics are subjected to sustained high temperatures. Most of the plastic pollutants on land make their way to the oceans, especially in bags made of plastic Micro plastics are transported into the oceans by rain or rivers, and then carried by ocean currents to accumulate around the globe and on the coastlines where they meet the currents. This process of transport distribution and accumulation of plastic pollutants is less labor intensive than ocean currents. Micro plastics can be affected by strong ocean currents drifting along the ocean floor. MPs in the upper layers of seawater are captured by the currents and transported to the center of the ocean where they accumulate. In addition, huge seafloor sediments can transport small particles along deep canyons to greater depths. There is no doubt that MPS have entered the food chain of the biosphere. This means that plastic packaging leads to the accumulation of micro plastics in living organisms.

2.2. Heavy Metal

The ingredients in cosmetics come from the natural environment, and with that comes heavy metals. In some cosmetics with whitening effects, heavy metals are added as an ingredient that lightens the skin. Heavy metals can pollute coastal waters outside. However, there is growing concern about ocean acidification due to increased atmospheric carbon dioxide concentrations as a result of human activities. Since the pre-industrial era, the amount of dissolved CO_2 in the oceans has been increasing, resulting in a decrease in the pH of the surface water of about 0.1 units, and according to the RCP 8.5, a further decrease in pH of about 0.4 units by the end of the century according to RCP 8.5. Secondly, heavy metals are an artificially caused multiple pollution for the marine ecology. Individual heavy metals are essential for the growth processes of living organisms. Other heavy metals in low concentrations are also toxic. They enter the organism's body through food, or leach directly into the organism through contact with the skin.

2.3. Active Ingredients in Sunscreens

Firstly, the UVB filter is made up of octyl methoxycinnamate (OMC), also like octyl octanoate and 2 ethylhexyl 4 methoxycinnamate. This compound has been approved in the United States as an ingredient in sunscreens at concentrations of 7.5-10%. Second, sunscreens also contain up to 6% benzophenone 3, a common organic filter. It is added to sunscreens as a UV filter because it absorbs UVB and UVA rays. However, methylbenzylidene camphor (4-MBC) will used as a UVB filter sunscreens and cosmetics. Although this compound is allowed to be used at a maximum concentration of 4% in countries other than the USA. In the present day, these compounds are widely used in many sunscreen products. As people are becoming more aware of the importance of sun protection and the risk of UV sunburn. As a result, the market for sunscreens has shown a clear trend towards a significant increase in sales. Widespread used of sunscreen has led to high levels of sunscreen compounds in many aquatic biospheres.

3. Impact of Cosmetics

3.1. Organisms

Coral supports nearly 25% of marine life, and by causing coral bleaching, sunscreen is tantamount to coral indirectly killing 25% of marine life. Coral supports nearly 25% of ocean organism, and by causing coral bleaching, sunscreens indirectly kill 25% of sea life. The amount of sunscreen released in areas where coral reefs are located globally can be approximate estimate based on the average daily use of coral reefs and the number of visitors. For a 1.0 m^2 whole body surface, an average sunscreen dose of 2 mg/cm^2 was used. Statistics show that 90% of tourists visit coral reef areas for recreational activities such as scuba diving, so it is estimated that 10% of coral reefs globally will experience

bleaching under the influence of sunscreen. Drop-shot fluorescence microscopy analyses showed that zoobenthos released from corals exposed to sunscreen lost photosynthetic pigments and membrane integrity (30-98% of offtake of plants released from stag horn corals were locally or completely damaged, glaucous and transparent), whereas corals that had never been exposed to sunscreen were unchanged (68% of the off take published data showed well-defined shapes and reddish fluorescence), as shown in Fig. 1. Therefore, sunscreens have a rapid action destroys algae and shellfish that live together, causing coral bleaching.

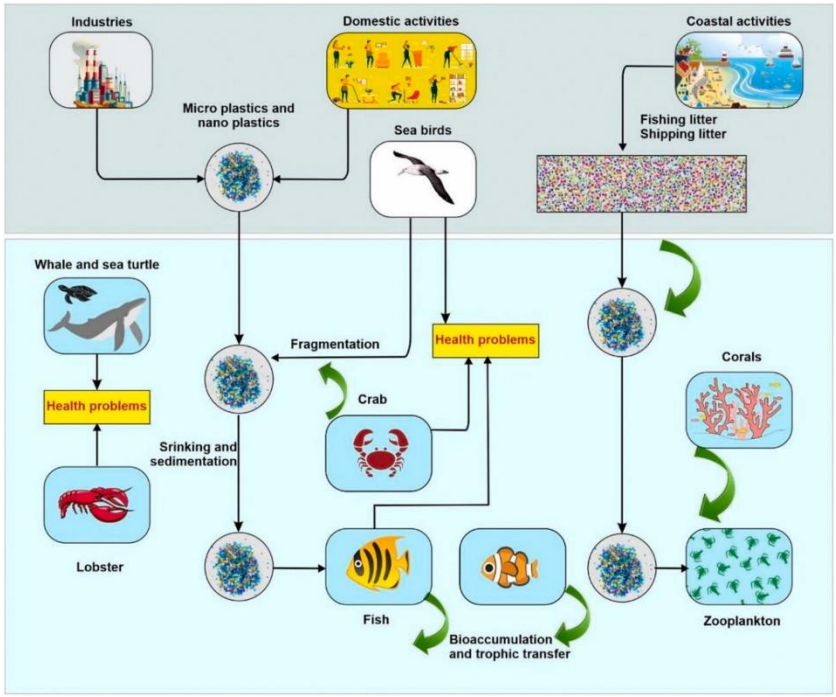

Fig 1. The overall environmental journey of micro- and nanoplastics.
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3.2. Human

Cosmetics are a fashion favorite and have a place in people's daily lives. However, some cosmetic products use various toxic chemicals at levels that are beyond acceptable limits. These chemicals can have adverse effects on the skin and can also enter the body through the skin and cause damage to other organs. TiO_2 itself can be used as an inorganic UV filter. It is widely used in sunscreens, foundations and face masks. This protects against known UV radiation. However, nano TiO_2 made formulations (spray products and powders) may cause inhalation in human lungs. However, the absorption and toxicity of TiO_2 nanoparticles is limited after TiO_2 has been administered orally. Therefore, accidental oral ingestion of titanium dioxide nanoparticles while using lip balm can slightly cause adverse health effects. However, these chemicals have been reported to cause fertility, slow weakening of follicular atresia in females and testicular pathology, reduced sperm counts and fontal malformations in males.

3.3. Environment

Triclosan (TCS) is a fat-soluble antimicrobial agent that is used in cosmetics as a hair dye and sunscreen. It is also widely used as a commodity additive, stabilizer and preservative due to its antimicrobial properties. However, the rinsing of the product leads to the discharge of TCS into rivers along with large amounts of domestic sewage, which is one of the largest sources of water pollution. Reports show that TCS becomes among the 10 most common organic wastewater pollutants in terms of concentration. These As these sewage sludges are used as fertilizers in most of the agricultural fields, TCS are also found in the terrestrial environment. TCS has also been found in the contamination of terrestrial environments as fertilizer due to agricultural sewage sludge. Despite its

persistence in the environment, TCS can not only be transformed into other chlorinated compounds during wastewater treatment, but also some highly toxic compounds that are more persistent than the original ones. Secondly, due to its high stability, it has a potential tendency to bioaccumulate in plants, algae and animals (e.g. fish, snails, amphibious larvae and marine mammals). These suggest that it may have adverse environmental effects such as toxicity to algal species, alteration of bacterial composition, disruption of the endocrine system in fish, and lethality of malformed embryos.

The bags of cosmetics, also known as micro plastics in the oceans, have become a huge problem. Persistent organic pollutants (POPs) are not naturally degradable, which means that they can travel around the world all the time and also stay in one place for a long time. Seawater contains large amounts of POPs at low concentrations from agricultural and domestic wastewater, Incomplete cremate, industrial accidental spills and landfills. And PCBs was detected in all samples, covers all creatures and all depths currently known to research personnel. In addition, polyethylene and polypropylene are commonly seen in ocean, accounting for 38% of plastics and 24% of polypropylene encountered in the ocean. They have a high capacity to absorb POPs. On the other hand, the desorption of POPs in polyethylene and polypropylene was slower than in sediments, it means that polyethylene and polypropylene adsorb POPs and contaminate micro plastic forms that persist together. This can then enter the food web via microorganisms or arm many marine organisms.

4. Conclusion

Promote green cosmetics. Let the world's green cosmetics replace non-green cosmetics. Green cosmetics are those that reduce the use of chemical raw materials, which not only make cosmetics harmless to human health, but also protect the environment by reducing the use of natural resources. Cosmetics made with safe green raw materials can be recycled or used as fertilizer. Organic and natural cosmetic technologies can be combined into one, where raw materials extracted from natural ingredients (vegetables, plants, mineral products) are combined with organic substances (water, natural materials from agriculture, plant extracts) into products that are both environmentally friendly and biodegradable. Another point worth mentioning is the internal and external packaging of cosmetic products. In addition to reducing the use of packaging, green packaging (glass, aluminum, paper) and biodegradable packaging can be used. This solves the problem of micro plastics and reduces the need to incinerate large quantities of plastic, which can be recycled to reduce environmental pollution.

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