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## Nurdles - An Imminent Risk in the Ocean

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### Abstract

Approximately 80 million tons of plastic end up in marine environment every year and causes considerable amount of danger to the marine environment. Plastics, less than 5 mm called Nurdles pose a significant threat to marine environment as it is being mistakenly consumed as food by marine organisms. This leads to their death. These nurdles changes and affects the nature of turtle nesting sites and also caters as a reservoir of pathogens, causing adverse impacts on human health. This article efforts to bring out the impacts of nurdles in the marine environment and human health.

### Introduction

Plastics due to their durability and low-cost are being widely used all over the world. But every year 14 million tons of plastics end up in the ocean making 80% of the ocean debris. Plastics become small, smaller and turn out into nurdles. They are the growing source of ocean pollution and are stockpiles of toxins and harmful chemicals. They start from industries and end up in our dine causing several health impacts.

### Nurdles and Their Severity

Nurdles are microplastics, with size smaller than 5 mm (Rodrigues *et al.*, 2019). They are called primary micropastics as they get into the ocean in the form of microplastics. Though nurdles start as small fragments, over time, they become weathered and fragmented into more smaller particles like all other plastics. UV, oxygen, wind and wave action are the factors that make plastic more brittle, causing discoloration and forming fragments. In marine environment, plastics take decades to degrade.

These plastics usually enter the gastro intestinal tract of animals as they are taken as food by fishes, birds and other sea animals, due to their smaller size mimicking food particles. Small organisms like plankton at the bottom of our food chain, consume these plastics when they become smaller, at the size of a grain of sand. After consumption, these microplastics enter into the blood stream of organisms and get deposited in their tissues.

Large sized plastics such as plastic bottles, fishing nets, polyethylene bags and other products has several ways for their removal from the sea, whereas microplastics like nurdles does not have such removal methods. This signifies the need for immediate action to be taken against nurdle pollution in the sea.

### Source of Pollution

Accidental spills are the major source of nurdle pollution in the marine environment. Starting from nurdles production, transportation, manufacturing and till

recycling, this can happen at any stage of this process. Nurdles due to their small size and light weight can be easily blown and washed into drains. When these drains are not properly cleaned, nurdles enter into the sea and spread rapidly.

### Nurdles - A Deep Repository for Harmful Chemicals

The most toxic chemicals like Persistent Organic Pollutants (POPs) have many adverse effects on human health and the environment. They accumulate in the animal and human tissue causing long term health problems. Nurdles and other plastics in the sea acts as a toxic sponge by attracting chemical toxins like POPs and other harmful chemical contaminants on their surface. Though the production of POPs - Polychlorinated biphenyls (PCBs) and DDT are reduced at present, the decline of Killer Whale population is still attributed to their concentrations in the marine environment.

### Impacts on Wildlife

Nurdles because of their tiny size and clear colour resembles fish eggs or other small organisms. This attracts the seabirds, fish and other marine animals to consume the nurdles as food. Environmental pollution can cause a severe threat to habitats in the decades to come. Currently nearly 220 marine organisms are found to have traces of microplastics in their body. This causes ulceration and reduces food intake of animal. This may lead to starvation followed by mortality. Harmful chemicals and toxins are transferred from microplastics to body of the animal and enter higher level of organisms through food chain. Plastic pellets also affect the ecosystem indirectly by changing the characteristics of the sand such as temperature and permeability. This change in nature of soil also affects the incubation of eggs laid by sea turtles (Duncan *et al.*, 2018). Nurdles in the marine environment provide hard surface on which biofilms can be easily formed. Nurdles also acts as "rafts" by colonizing harmful bacteria such as *E. coli* and *Vibrio* sp. They transport these bacterial colonies from sewage and industrial waste to bathing water bodies and shellfish beds causing shellfish poisoning (Rodrigues *et al.*, 2019).

### Recent Nurdle Spill

On May 2021, the M/V X-Press Pearl cargo ship burst into flames while anchored 18 km off the west coast of Srilanka. This accident causes a spillage of approximately 1,680 tons of nurdles (5 mm, white in colour). The small pieces of plastics were the result of burnt nurdles and other plastics in the cargo during ship fire. Due to fire, these nurdles was exposed to carcinogenic combustion products

and leads to the production of additive degradation products. These burnt nurdles acts as a warehouse for carcinogenic PAHs and other pollutants causing marine environment pollution (de Vos *et al.*, 2021).

### Preventive Measures for Nurdle Pollution

The recommendations to aid in control the ongoing and future nurdle spill and the damage caused by unprecedented nurdle spill are given below.

- Ensure the seaworthiness of cargo ship before voyage.
- Account the cargo in the ship before sail to better gauge threats from wreck.
- Encourage the local people on coastal clean-up efforts.
- Educate and empower citizen about the serious impacts of nurdle pollution.
- Approach other means of transport for plastic raw materials.

### Conclusion

Though this plastic causes global pollution making marine litter and decrease in sustainability and survival of marine world, the world is waking up to the problem and the society is starting to act on this. The way in which plastic is being viewed, widely accepted, used and recycled can be changed by raising a wide public awareness. Many projects and policies are being initiated by the government to reduce the use of plastics. As our part we should spread the word and keep doing our part to stop our planet from drowning in nurdles and Microplastics.

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