

# Micro plastics effects on human health

Stage 2

Certain

Uncertain

**Bio-plastics 1939s**  
The first practical biodegradable plastic, Biopol, was developed in Britain. It was first used in a Wella shampoo bottle.

**Fossil fuels - early 20th century**  
The petroleum and chemical industries began to form alliances in companies like Dow Chemical, DuPont, and BASF. These companies are still the major producers of raw material resins for the plastics industry today. These alliances were driven by the desire to make use of waste material from processing crude oil and natural gas.

**Synthetic plastic 1937**  
Dowkita contained two chemicals, formaldehyde and phenol, under heat and pressure. It opened a consumer boom in affordable yet highly desirable products. It could be easily mass produced, making it ideal for bringing new design trends to the masses.

**Cellulose (and derivatives) 1900-79**  
It is the first synthetic plastic material, developed from a homogeneous colloidal dispersion of nitrocellulose and camphor. It is tough, flexible, and moldable material that is resistant to water, oils, and dilute acids and capable of low-cost production in a variety of colors. By the 1930s, manufacturers were using it to create combs and books to imitate tortoiseshell, ivory and other expensive natural materials.

**Parkesine 1932**  
In the wake of centralized goods production, some animal-derived materials had become increasingly scarce. Inventors attempted to tackle this environmental and economic problem by developing new semi-synthetic materials based on natural substances. One of the earliest was Parkesine, promoted as an inexpensive replacement for rubber. It was moldable, transparent and maintained its shape after cooling.

**Natural plastics - Antiquity**  
Natural plastics such as horn, tortoiseshell, amber, rubber and shellac have been worked with since Antiquity.

RUBBER TO MICROPLASTIC ODYSSEY

## Types of plastics

**Relatively SAFER:** (Green to Red scale)

- 45 PP - Polypropylene**  
Used for: packaging of food and non-food containers, margarine tubs, microwaveable meal trays.  
**Harms:** This type is relatively safe and stable but can leach plastic additives and has been linked with causation of occupational asthma.
- 44 LDPE - Low Density Polyethylene**  
Used for: bin liners, packaging film, squeezable bottles and carrier bags.  
**Harms:** Comparatively safer, however it is still known to leach endocrine disruptor monomers, particularly under sunlight.
- 42 HDPE - High-Density Polyethylene**  
Used for: milk bottles, bleach, detergents and some shampoo bottles.  
**Harms:** Although it is usually considered safe for usage in limited quantity, studies have shown that some 2 plastics can leach monomers, especially when exposed to sunlight, which is an endocrine disruptor.
- 41 PET - Polyethylene Terephthalate**  
Used for: fizzy drinks, water bottles and salad trays.  
**Harms:** Can leach styrene, which is known to be a carcinogen. It can also impact one's nervous system and brain. Some studies that were conducted on animals also showed that some 6 plastics can harm lungs, liver, genes and negatively affect one's immune system.
- 40 PS - Polystyrene**  
Used for: packaging protection whilst in transit, hamburger boxes, egg cartons, and yogurts.  
**Harms:** Can leach BPA, which is an endocrine disruptor and can affect one's estrogen hormones. It can affect sperm production in men and chromosomes in women, can lead to disruption in puberty, affect one's behavior, immunity, neurological functions and even cardiovascular health. It is also carcinogenic in nature and can cause breast cancer and prostate cancer. It is also responsible for infertility, diabetes, obesity, metabolic disorders and resistance to chemotherapy.
- 43 PVC - Polyvinyl Chloride**  
Used for: manufacturing of carpet backing, pipes, window and door frames and fittings within the home.  
**Harms:** It is the most toxic and the most harmful form of plastic. It contains BPA, lead, phthalates, mercury, dioxins and cadmium. It can cause endocrine disruption, ADHD, asthma and allergies in children and is also known to be carcinogenic in nature, contributing to various types of cancer. If it is burnt, it releases dioxins, one of the most toxic chemicals known. They can cause cancers and are organic pollutants.

<https://www.ofindia.com/life-style/health/fitness-photo-stories/toxicity-alert-know-the-7-types-of-plastic-and-which-is-the-most-dangerous/photo-story/54828668.cms?pid=54828669>

<https://www.pureplanetrecycling.co.uk/types-of-plastic/>

## Effects

None different types of microplastics have been found in the human intestine and in feces. Although there is no evidence of immediate effects on human health, researchers are concerned about plastic additives that can be harmful to human health.

**Routes of exposure:** Inhalation, Ingestion, Dermal Contact

**Effects:**

- NO SEX!** - production of sex hormones
- neurotoxicity**
- Inflammation**
- increase the risk of cancer**

## Vectors and Immune System

Bacteria on microplastics in our bodies is being exposed to the antibiotics we take, this is causing resistance and mutation making more dangerous strains 'superbugs'.

BPA binds to lymphocytes and inhibits the immune response.

Plastic provides breeding grounds for bacteria.

Plastic spheres in the layer of microbial life found on microplastics, they consist of thousands of organisms, including viruses and other infectious bacteria.

Found many bacteria in the genus *Vibrio*, which include some that can cause severe diarrhea and inflammation if ingested by humans.

Microplastics in air, water, foodchain

Microplastics carried by air, water, foodchain

Microplastics found in waste fish species

Microplastics in agricultural and fertilized lands, dried algalids, products from wastewater treatment, synthetic clothes fabric, industrial emissions, road dust, marine aerosol.

Consumer use Refining & Manufacture Waste Management Extraction and Transport

Anthropogenic contamination of tap water, beer, and sea salt

Developed countries 0.20 particles/l  
Less developed countries 4.25 particles/l

Mary Koussh, Sherri A. Mason, Elizabeth V. Weisenberg  
Published: April 11, 2018

The Environmental Agency in Austria tested the stool samples for 19 different types of plastic. They found nine of them, most commonly PET and polypropylene (PP), a common component of plastic food wrappers and synthetic clothes.

Jan Johan

## Consumables

PET, PP, PE

Asian salt brands contain the highest concentration

250 g/year

5 g of plastic a week = 1 credit card

Bottled and tap water

98% worldwide

Microfibers from synthetic fabrics are most commonly found in fish

Shellfish, fish, Seafood, Beer, Salt

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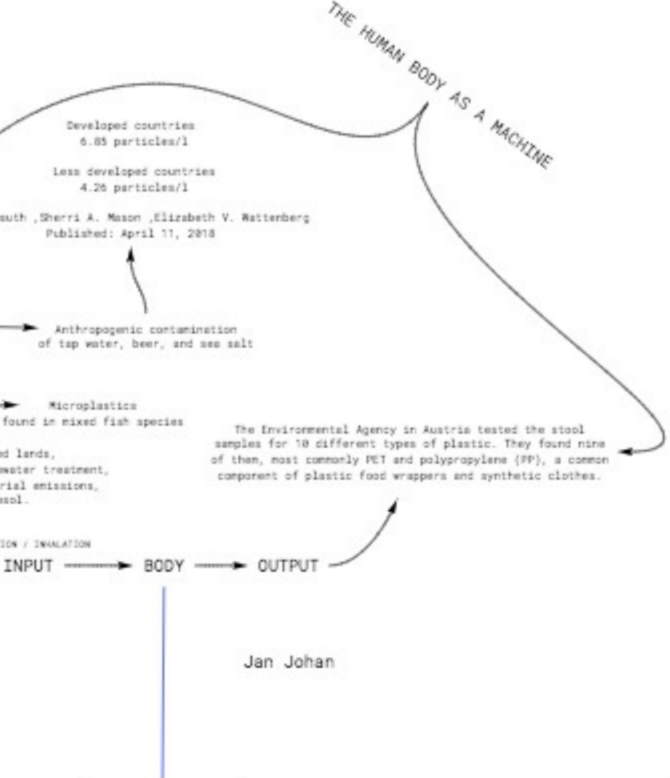
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## Input/Output



## Speculative

**Eating plastic**  
Thanks to the discovery of Isabella Sabatini, a PET-digesting enzyme  
<https://planetbeing.com/2018/01/01/>

**Living microplastics**  
In live organisms  
<https://www.facebook.com/PollutionWaterPollution/>

**Listening to the Future Ocean**  
Relaxing ocean sounds produced with the plastics found on them  
[https://www.youtube.com/watch?v=7m5CvYs\\_KX1](https://www.youtube.com/watch?v=7m5CvYs_KX1)

**Feeling Good - 994**  
Durborn tells the story of a whale searching for a new home planet after the plastic waste crisis made life on Earth uninhabitable.  
<https://www.wildand.com/8478125-8478028>

## Questions

- Is a narrative needed to vilify microplastics as vectors like we did with mosquitoes and other vector carriers?
- Is the idea of them being transporters less scary than that of breeding grounds?
- Are people more invested in their immune systems due to Covid?
- What do we need to see to change our mind?
- Do we need to rethink plastics?
- How can speculative design raise curiosity and provoke responses to the problem of plastics in the human health?

## Speculations