

Microbeads & Microfibers

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What is Microbeads ?

- Microbeads are manufactured **solid plastic particles** of less than one millimeter in their largest dimension.
- Most frequently made of **polyethylene** but can be of other petrochemical plastics such as polypropylene and polystyrene
- Microbeads are added as an **exfoliating agent** to cosmetics and personal care products, such as soap, facial scrub and toothpastes

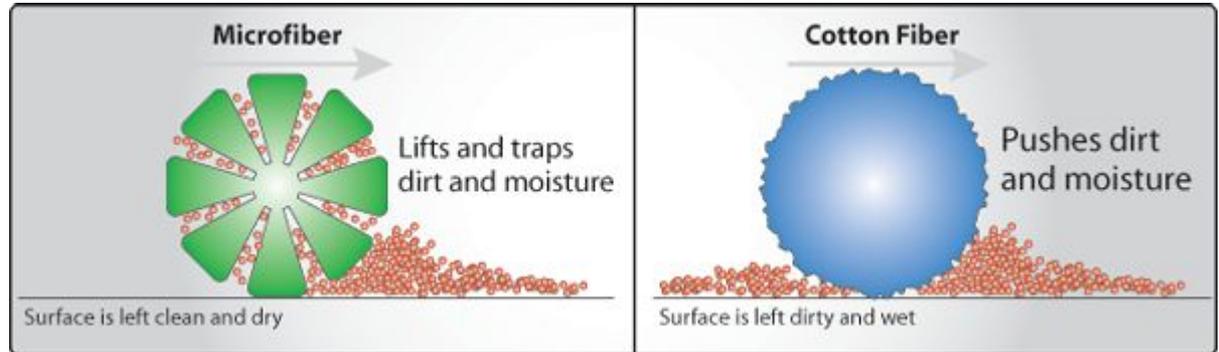


Microbeads History

- The initial commercial began with the advent of World War II in 1939
- Early patents for microbeads in personal care products began in the late 1960s
- Natural rubber was in short supply and extensive research was completed to develop alternatives
- Large-scale production of polyethylenes in the late 1970s reduced natural rubber's costs dramatically, and new applications were discovered – from cars to personal care products.

What is Microfiber?

- Microfiber is smaller than the diameter of a strand of silk, which is itself about **1/5 the diameter of a human hair**
- Made of several different materials : polyester, polyamide (nylon), and other fabrics in various combinations.

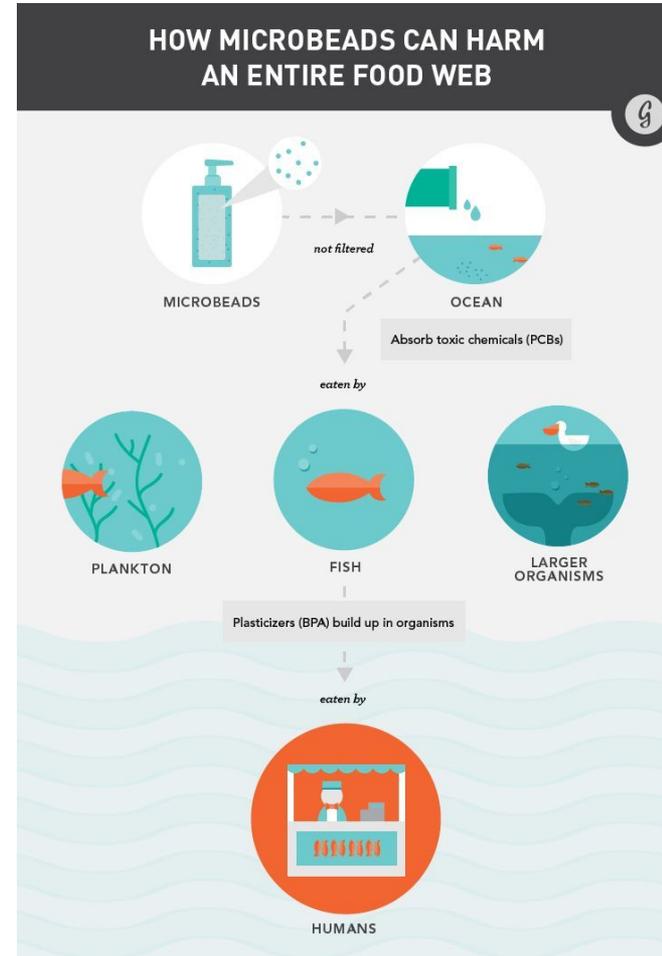


Microfiber History

- Some say it was invented by the **Japanese** during the mid-1970s while others claim it was first introduced in **England** around 1986
- Third argument can be made that **Sweden** marketed the first around 1990
- Japanese scientists first developed microfiber about **40 years ago**- looking for a new fabric for women's sports apparel, especially for swimwear
- Lightweight fabric that attractively conformed to the body
- European scientists continued developing about **10 years later** - could be ideal for cleaning purposes
- The product was further refined and the marketing of microfiber to the professional cleaning industry began around 2001

Environmental Effects

- Microbeads & Microfiber can be washed down the drain
- So tiny that they can bypass wastewater treatment processes and end up in open water
- Remains for hundreds of years and resulting in water pollution
- A variety of wildlife mistake microbeads/microfibers for their food source
- Introduces the potential for toxicity not only to these animals but to other species higher in the food chain
- Human can indirectly ingest microbeads and microfiber.



Microbeads Locational Data

- Discharging Microbeads to our water: An Examination of Wastewater Treatments Plants in New York
- The Office of Attorney General (“OAG”) study confirms that microbeads are **passing through** treatment plants and entering New York waters.
- Back in the days there were **no proven effective treatments** to remove microbeads. Prevention of use in microbead products is a more efficient way to improve the problem
- Microbead-Free Waters Act of **2015**: companies **banned** from using microbeads by July 2017

Microfiber Locational Data

- Marine Pollution Bulletin: The Hudson river dumps **300 million clothing fibers** into the Atlantic Ocean each day (1 microfiber per liter of water)
- Abigail Barrow: Measured microfiber pollution across the entire Hudson river
- Pollution is uniform throughout the river
- Currently **no** cure plans or laws banning microfiber in New York

Microbeads Solutions

- **Ban** production & sales
- **Avoid** using products that contain: polyethylene, polypropylene, polyethylene terephthalate or polymethyl methacrylate
- Use **natural** substitute
- **Educate** people about ecological issue
micro-elements had brought



source: 5Gyres

Microfiber Solutions

NANO BALL

- A rubber ball thrown into a washing machine to attract and capture plastic fibers.
- picks up little dusts and microfiber in the washing machine and catch them in their stalks.

WATERLESS WASHING MACHINE

- Textiles are washed in pressurized carbon dioxide.

A FILTER ON HOME WASHING MACHINE

- Adding a filter on washing machine
- Washing machine industry is not ready to act
- Considered impractical because people are not willing to pay extra money to buy filters unless they are interested in microfiber issue



Experiment

Materials:

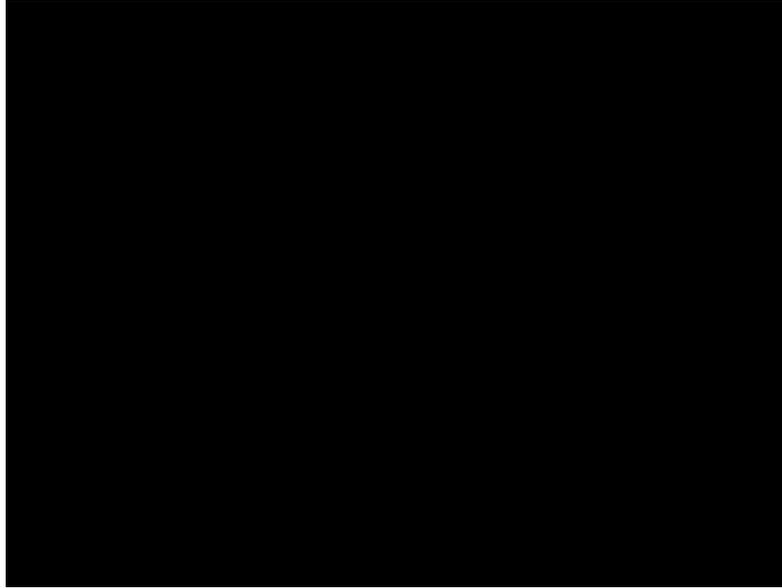
Baby powder, metal mesh, transparent container, cloth

- Since microfiber and microbeads cannot be seen by human eyes, we replaced them with baby powder.
- The metal mesh and cloth are two different filter sizes.

Purpose:

The experiment is to mimic the process of microbeads and microfibers being washed down the drain in real life.





Sources

<http://www.parish-supply.com/microfiber-history.aspx>

http://www.ijc.org/en /blog/2016/02/22/history_evolution_microbead_story2/

Thank You :)