Microplastics in our environment: the risks and solutions

Story by Natalie Muller, Neil King • 7mo • 5 min read

Microplastic has been found just about everywhere that scientists have looked for it
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Tiny particles of plastic have spread to every corner of the planet — from the deepest parts of the ocean to the heights of Mount Everest.

"We find microplastics in just about every animal species that we've studied," Tamara Galloway, professor of ecotoxicology at the University of Exeter in the UK, told DW.

drinking water.

And it turns out we are drinking more plastic than we knew.

New research this week has revealed there are 100 times more plastic particles in bottled water than previous studies showed.

The report, published in the US journal Proceedings of the National Academy of Sciences, found an average of over a quarter of a million plastic particles per liter of bottled water, 90% of which were nanoplastics.

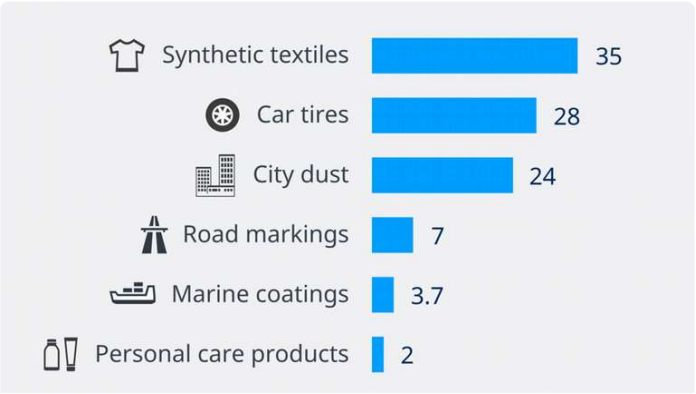
Researchers used new technology to accurately analyse nanoplastics which are smaller than a micron in size — or less than 80 times the width of a human hair. Nanoplastics are believed to be more toxic than larger microplastics as they can more easily enter the human body.

Every year, about 430 million tons of plastic products are produced around the world — a figure that could triple by 2060.

Only around 9% of plastics are actually recycled. The rest is incinerated, goes to landfill or ends up in the environment, where it can take centuries to degrade. But, even then, it never fully disappears. Most discarded plastic splinters into microplastic — tiny fragments that are less than 5 millimeters in diameter.

Related video: Turn Plastic Waste into Wonders: Ultimate Recycling! (Smartest Workers)

Microplastics usually start their journey on land, but eventually are carried by rivers and wind to the world's oceans. They can come from cosmetics, city dust, road markings, and engineered plastic pellets. But the bulk of the primary microplastics in the world's oceans are from the laundry of textiles (35%) and the abrasion of tires while driving (28%), according to the International Union for the Conservation of Nature.



Provided by Deutsche Welle

Microplastics in our food, water and air

Once in the environment, microplastics can accumulate in animals, including fish and shellfish, and are consequently also consumed as food by humans.

And it's not just seafood. Our wastewater also contains microplastics. Research has found that up to 42,000 tons of microplastics are sprayed onto European farmland every year, because sewage sludge containing the pollutants is used in agriculture as fertilizer.

Microplastic particles can endure in farmland soils for decades, contaminating food crops

They're also in food crops. A 2020 study from Italy found apples had the highest level of microplastics among fruits, while carrot was the most contaminated vegetable.

Provided by Deutsche Welle

So what does this mean for our health?

Plastic particles are in the air we inhale, the food we eat and water we drink. So inevitably, they're ending up in our bodies. Studies have found microplastic in human blood and breast milk, and it's been shown to cross the blood brain barrier in mice.

Galloway says it's long been known that plastic additives such as bisphenol A and phthalates are in people's systems, but "the surprising thing is that we're now finding tiny pieces of plastic itself within the human body."

"What we don't know is what they're doing there. We've got some ideas, but we haven't been able to prove any of those things yet."

There isn't conclusive data about what impact microplastic exposure is having on human health. It's a difficult thing to isolate and trace, because we all typically encounter a range of chemicals and substances in our daily lives.

But Galloway says tiny plastics embedded in human tissue would likely "cause irritation and inflammatory reactions."

"There's also the potential for the slow release of chemical additives that are in the plastics — things like plasticizers, mordants, additives, antioxidants, dyes," she adds.

So what can we do about it?

Galloway says people can limit their exposure to microplastics by eating less processed and packaged food and not repeatedly heating meals in plastic containers in the microwave.

Using plastic-free personal care products or ditching synthetic clothing for natural materials could eliminate a significant portion of the microplastics ending up in the ocean. And using the car less could reduce plastic particles from tire abrasion.

Scientists are also working to find ways to limit the influx of microplastics into the environment.

Capturing tire dust

In the UK, a startup called the Tyre Collective has developed a device that absorbs microplastics and other pollutants from tire friction on the road.

"We all know tires wear down, but I think we never made that connection or thought about where these particles actually go — it's getting into our air and our waterways," co-founder Hanson Cheng told DW.

His device sits behind the wheels, and uses electrostatics and air flow from the car's movement to attract and trap microplastic coming off the tire. These captured particles can then be upcycled into construction materials, 3D printing, and shoe soles, Cheng says.

The company, launched in 2020, is testing its device on commercial fleets, with plans to roll it out in London and the UK before targeting the EU and California
© Tyre Collective

A magnetic solution to plastics in water

Meanwhile, researchers from RMIT University in Melbourne, Australia, have developed a magnetic powder that can remove microplastics from water.

The substance is mixed into water, where it attracts plastic particles. A magnet then pulls out the adsorbent with the microplastic attached, leaving clean water behind.

Chemical engineer Nicky Eshtiaghi, who led the research, said the carbon-based powder is unique because it "removes 100% of the microplastics within one hour."

It can also function in salty or fresh water and extract plastics as small as 1 micrometer, or 1,000 times finer than a human hair.

Nicky Eshtiaghi (right) says the extracted particles could be processed to produce new plastic, or upcycled to make useful chemicals
© RMIT/University Australia

"There are multiple different applications for the process and it is easily possible to scale up," Eshtiaghi said. The team has partnered

with an oyster company, but she says the powder could also be used to clean up wastewater treatment plants, textile factories or laundry businesses, for example.

Plastics continuing to build up in the environment

The scale of the plastic crisis means it will take more than scientific innovations to solve the problem, though.

On an international level, the UN is working to have a global treaty on plastic pollution in place by 2024, with measures such as restricting hazardous chemicals and difficult-to-recycle plastics on the table.

"We need to end plastic pollution by 2040," Virginia Janssens, managing director of the trade association Plastics Europe, told DW.

"We want to support that through the creation of a circular economy, in which all plastic applications are reused and/or recycled and responsibly managed during and after use."

In the meantime, the production of new plastics — and the amount of it leaking into the environment — will continue to grow.

Sheila Aggarwal-Khan, director of the Industry and Economy division at the United Nations Environment Program says that's "a very big worry."

"Are we going to just keep waiting as the evidence starts to grow? And are we going to just end up with a legacy of plastic pollution that will not be manageable and that is not just going to affect the environment but human health as well?"

For more on microplastics pollution, listen to DW's On the Green Fence wherever you get your podcasts.

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the Mega Millions site.

The top prize has now soared to an estimated $740 million, with a cash option of $366.6 million, for the Friday, Sept. 6, drawing.

The latest winning numbers were 12, 41, 43, 52 and 55 with a Mega Ball 9.

Two lucky players in Kansas and Michigan won $1 million during the drawing, McClatchy News reported.

The Mega Millions jackpot hasn't been hit since June 4, when an Illinois player won the $560 million grand prize, lottery officials said.

If someone wins the $740 million jackpot, it would be the seventh-largest jackpot in Mega Millions history, according to lottery officials.

The top jackpot is $1.602 billion. A Florida lottery player won the record-breaking prize Aug. 8, 2023.

What to know about Mega Millions

To score the jackpot in the Mega Millions, a player must match all five white balls and the gold Mega Ball.

The odds of scoring a jackpot prize are 1 in 302,575,350.

Tickets cost $2 and can be bought on the day of the drawing, but sales times vary by state.

Drawings are held Tuesdays and Fridays at 11 p.m. ET and can be streamed online.

Related video: Mega Millions: No winners in Tuesday night drawing (FOX 10 Phoenix)