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Quarter of a million tiny pieces of plastic could be floating in your water bottle

Story by Joe Pinkstone • 8mo • 3 min read

Water bottle
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A bottle of water can contain a quarter of a million pieces of plastic, a study has found.

Scientists have found a new category of plastic pollution called nanoparticles, which are created when microplastics break down even further.

It had previously been impossible to tell how many particles smaller than one micron, one seventieth of the width of a human hair, are in water due to analytical restrictions.

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However, a technique developed by Columbia University has shown that the actual amount of plastic pieces floating in water is up to 100 times more than previously thought when including nanoplastic particles.

A standard litre of water contains 240,000 detectable plastic shards, data show, with the number possibly being as high as 370,000.

Nine in 10 of the plastics are nanoplastics and therefore smaller than one micrometre, or micron, which is one millionth of a metre, or 1/25,000th of an inch.

A 2018 study found there to be 325 nanoparticles per litre, but this estimate has been revised upwards since and now the inclusion of nanoplastics has seen the true extent of marine plastic pollution laid bare.

Amount of nanoplastics 'not totally unexpected'

Scientists targeted seven common types of plastic polymer and fired lasers at them to detect the mass and amount of nanoparticles in a volume of water.

PET, or polyethylene terephthalate, was one of the commonly seen plastics which is the same material used to make plastic bottles. It is thought that tiny pieces of the material break away during use and subsequently get into the water supply as the ketchup, sports drink or soda bottles degrade.

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Naixin Qian, a Columbia graduate student in chemistry who was lead author of the study, said: "It is not totally unexpected to find so much of this stuff.

"The idea is that the smaller things get, the more of them there are."

The real amount of plastic in water, however, may be much higher than this as the team say the seven types of plastic only account for about 10 per cent of all plastics found.

It is possible the true extent of water pollution is millions of nanoparticles per litre, they warn.

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‘It’s not size that matters – it’s numbers’

Polyamide is a more common pollutant than PET and the type of nylon is often used as a filter to purify water before it gets into the bottle. It is possible the main component of nanoparticle pollution comes from the device intending to clean it before consumption.

Microplastics still make up more water pollution than smaller chunks by weight, the scientists found, but the sheer number of the tiny shards is itself a cause for concern.

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“There is a huge world of nanoplastics to be studied,” said study co author Wei Min, a Columbia biophysicist who invented the technique used to analyse plastic pollution.

“It’s not size that matters, it’s the numbers, because the smaller things are, the more easily they can get inside us.”

The health implications of plastic pollution in food and drink remains relatively unknown and is hard to study but plastics have been found in organ tissue, bloodstreams as well as in the tissue of plants and animals that we eat.

The smaller particles are more freely able to seep through the intestines and blood vessels which allows them to spread deeper into the body and into various tissues, including the brain, where they are likely able to do more harm.

The team now hopes to study tap water to see the level of pollution out the tap and they also hope to study microplastics and nanoplastics that end up in wastewater when people do laundry which may be releasing tens of millions of shards per wash.

The study is published in the journal Proceedings of the National Academy of Sciences.

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