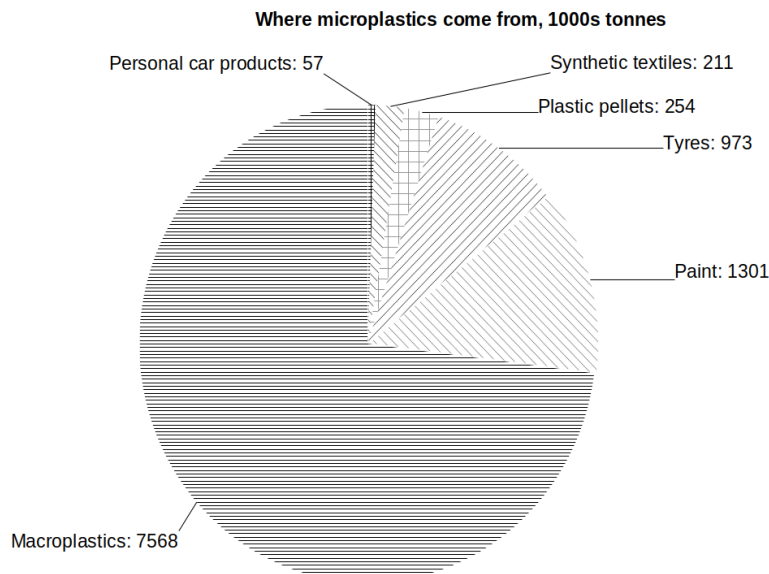


The Unseen - Microplastics

Items made from synthetic materials, plastics, are everywhere and they are so embedded in our lives that they are almost irreplaceable. We all know that most of the plastic that has ever been made is still out there somewhere as it degrades so slowly. A lot of the 'plastics' are used to make solid items, such as children's toys, car dashboards, computer bodies and so on. Then there are more synthetics in clothes, such as polyesters and acrylics. Other plastics are used in paints and vehicle tyres also contain of synthetic materials.



All of these materials gradually breakdown into smaller and smaller pieces, known as microplastics. Microplastics are defined as plastic pieces that are less than five millimetres across. Some are made intentionally as abrasives in sandblasting and cosmetics but most come from the breakdown of larger items. Large plastic items shed particles all the time they are in use and when they are discarded, they gradually break into smaller and smaller pieces. Every time we wash clothes that are made from synthetic fibres, particles are shed into the waste water most of which goes down the drain. Microplastics can breakdown into even smaller particles called nanoplastics. We have now found micro- and nanoplastics in every part of the world, even as far as Antarctica.



ongong, Australia, 2024

Research over the last few years has shown that microplastics can get everywhere and into living things. They are usually washed into the sea, where they are taken up by various organisms. Microplastics have been shown to slow the growth of plankton, which is the base of some food webs. They decrease the fertility of soils, so limiting plant growth. The smallest particles, nanoplastics, may even be absorbed through our skin. It has been estimated that we each may consume 39,000 to 52,000 particles each year and it has

been found that people who had more particles in their arteries were at a higher risk of serious heart disease than those who had lower levels. Recent research has shown that nanoplastics can get into human brains,. Even if they are chemically inert, they may cause inflammation which leads to ill health, particularly dementia.

Vehicle tyres are a major source of microplastics. In 2024, there were 448 million tonnes of tyres manufactured in Europe and, according to David O'Loughlin of the Medical Council Research (MRC) Toxicology unit in Cambridge, about 0.5 million tonnes of tyre particles are emitted annually. A car sheds roughly 100 mg (milligrams) of tyre per mile. The particles are very fine so spread rapidly. Tyres are made from rubber with a mixture of chemicals that give the required performance and some of these are known to be toxic. Once in contact with soil or when washed into water, these substances leach out and can poison wildlife. This problem is likely to get worse as the new electric vehicles have to have heavier duty tyres to support the added weight of the batteries. More rubber in contact with the road and greater stresses on the tyres means that more particles are generated.

Climate change and plastic production are closely linked. Many of the ingredients in plastics are derived from oil during refining so disposing of them by burning increases atmospheric carbon dioxide. Even letting them decay naturally, over very long time scales, releases carbon dioxide. Now we are finding that plastics, as microplastics are having a more insidious effect. It is probably too late to remove microplastics from the environment but we can do things to reduce their continued release. Plastics manufacturers need to find ways of reducing the amount of plastic and the amount of particles that are shed in use and afterwards. Improved waste collection systems can also help. As consumers, we need to think about how we use and dispose of plastic items. We must try to avoid single use plastics, especially food packaging, which is one of the biggest source of pollution. It is harder to stop using some types of materials that form microplastics, for example car tyres. If we used glass and metal to contain goods instead of plastic, it would increase the number of vehicles need to transport the goods. Similarly, if we wore clothing made only from organic cotton, the environmental impact of growing more would be significant.

There is an international effort to reduce plastic pollution. In 2022, the UN Environment Assembly resolved to develop a legally-binding instrument on plastic pollution. It was resolved to have a comprehensive approach that addresses the full life-cycle of plastic from production, through design and disposal. The final agreement will seek to cap the production of the primary material and design in re-use and recycling. It aims to extend the responsibility of producers and follow the principle of 'the polluter pays'. The agreement will be legally binding on signatory countries but will also recognise the challenges facing developing countries and their populations.

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