



Plastics and our food



Plastics are part of our lives

Plastics are light, cheap, long lasting, come in different forms, simply: they are convenient. They have become an integral part of our lifestyle and the amount of plastics around us seems to be increasing. This is not a deception. In fact, the worldwide plastic production has increased from 2 to 460 million metric tonnes from 1950 to 2021, plastic production has doubled in the last two decades alone, and future projections indicate a 70% increase in plastic production by 2040, a rate that will outpace population growth [1]. As shown in Fig. 1, the global plastic production has been increasing exponentially, i.e., very rapidly [2].

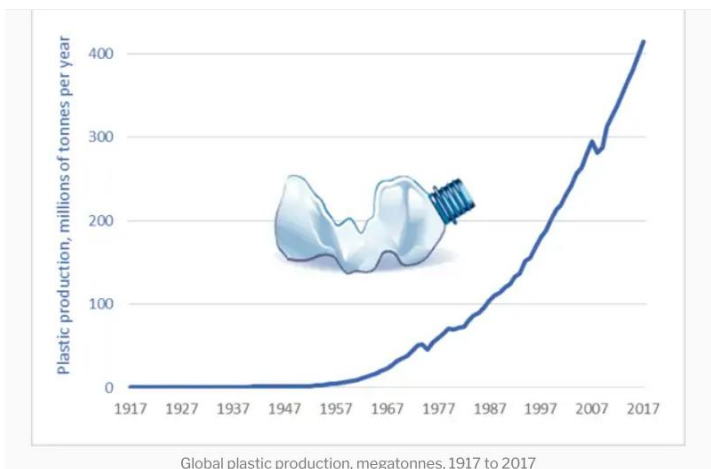


Figure 1 shows the rapid increase of the global plastic production over the past 100 years. Note that synthetic plastic production started in 1907. The figure is reprinted with permission [2].

Fig. 1

The lifetime of plastics outlasts us

Plastics, which are synthetic polymers, have a long lifetime of hundreds of years. Plastics do not truly decompose (biodegrade), but they break down into smaller pieces. They often break down into very small particles of micro (< 5 mm) and nano (< 1 μm) size. All of these particles are still plastics. Due to their long life time, plastic stays with us. They spread in our environment, disperse into the ocean, soil, air, and can enter our food.

1. H. Ritchie et al., *Plastic Pollution*, [Our World in Data](https://ourworldindata.org/plastic-pollution), February 2026
2. D. Qualman, *Civilisation Critical*, Fernwood Publishing, 2019.

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Plastics and our health



The negative impact of plastics on animal health, specifically fish, birds, and marine mammals have been reported for decades. Less is known about the health impact of plastics on humans. Studies report plastics to have been found in many parts of our bodies. For example, they have been found in lung tissues, blood, placenta and they have also been found in our stool and urine [3].

Studies of the impact of plastics on our health are still rare and insufficient. It is known that in sufficient amounts the plastic additives: Bisphenol A (BPA) and phthalates negatively affect our health. BPA can be found in hard plastics made of polycarbonate and epoxy resins used to e.g., line metal food cans. In 2010, the Government of Canada (GoC) restricted the use of BPA for baby bottles and sippy cups and many manufacturers stopped using BPA for hard food storage containers [4]. Phthalates, also referred to as stabilizers, are added to make plastics flexible and transparent and have been found to enter food by leaching. According to a 2021 GoC report, phthalates can still end up in e.g., ready to go meals, vegetable fats and oils, although overall the levels were observed to be decreasing from 2012 to 2021 [5]. This may be due to mitigation strategies implemented in manufacturing processes. As of 2020, the GoC considers the levels of phthalates found in food in Canada safe for human health [6].

Another type of plastic that is often discussed are the “forever chemicals”: per- and polyfluoroalkyl substances (PFAS). Non-stick frying pans are often coated with “forever chemicals” such as Teflon (PTFE), a type of a PFAS. “Forever chemicals” have an extremely long lifetime of hundreds to thousands of years and can stay in our bodies for several years. It is thought that we are exposed to PFASs on a daily basis [7].

3. N. Chartres et al., *Effects of Microplastic Exposure on Human Digestive, Reproductive, and Respiratory Health: A Rapid Systematic Review*, Environmental Science & Technology, 2024, 58 (52), p. 22843-22864, DOI: 10.1021/acs.est.3c09524.

4. [Bisphenol A \(BPA\) GoC report](#).

5. Canadian food inspection agency, *Phthalates in ready-to-eat meals, vegetable fats and oils – April 1, 2020, to March 31, 2021 Food chemistry – Targeted surveys – Final report*, 2021.

6. [Phthalates GoC report](#).

7. [Per- and polyfluoroalkyl substances \(PFAS\): Information sheet](#).

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Plastics and our health



We may not fully understand the impact of plastics on our health. However, we know that we are exposed to them. After all, the plastics we release into our environment can circle back to us.



Fig. 2

Figure 2 Overlapping circles: Plastic, which is incorrectly disposed (not recycled) enters the environment, and can circle back to us. Figure 2 is reprinted with permission [8].

What can we do?

We can minimize plastic waste by following the plastic Rs: Refuse, Reduce, Reuse, Repair, Repurpose, Recycle. But still, reducing the use of plastics and dealing with plastic waste can feel overwhelming. There is no doubt that we need to reduce our overall plastic use to significantly reduce them in our food, air, water and soil. However, we can start gradually and make changes on a day to day basis, e.g., in our kitchens and change our shopping habits to start minimizing sources that can introduce plastics into our environment and food.

8. M. Morrison et al., *A growing crisis for One Health: Impacts of plastic pollution across layers of biological function*, in *Frontiers in Marine Science*, 2022, 9:980705, DOI: 10.3389/fmars.2022.980705.

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But, first learn how plastics can enter our bodies through food



Plastics and at the same time plastic additives can enter our food in many ways such as by contamination during the production process, from the packaging, being taken up through the roots of growing vegetables, fruits and grains, through the feed into poultry and meat and from the water into fish and salt. Plastics can also be introduced into our food in our kitchens, when we prepare and store food or handle food packaging.

From soil:

Plastics can end up on our fields through e.g., sewage sludge used as fertilizer, thus potentially ending up in our food. Another source is plastic mulch, e.g., geotextiles, which are thin plastic sheets used to protect soil and reduce weed growth. They break-down into microplastics and are released into our soil.

Through the water system:

Clothes and other textiles made out of synthetic materials release microplastics during the washing process, which when not caught with a filter enter the “water” system and end up in our environmental and health circle.

Production process:

Plastics can also end up in our food through the production process e.g., through synthetic conveyor belts, by abrasive processes from equipment, and when stored and wrapped in plastic containers and plastic wraps.



Minimising plastics in our kitchen



Food storage:

Temperature:

Plastics and plastic additives can enter our food through storage in plastic containers and/or plastic wraps. Exposure to low and high temperatures are of particular concern as in both cases the release of microplastics and leaching of chemical additives are enhanced. Even freezer bags labeled safe for freezing are being scrutinized and today's view is that they are not safe for long term storage.

What you can do:

Avoid microwaving and freezing your food in plastic containers or plastic bags.

In case of microwaving: use a plastic-free container like a glass or ceramic dish.

For freezing or storage in the fridge: use glass storage containers, replace clear wrap with e.g., beeswax covered cloth, use beeswax covered cloth bags to freeze solid items like bread and glass jars can be used to freeze liquid foods. Silicone freezing bags are also an option, but they can be expensive. Contact ACRE's sewing group if you want to learn how to make your own beeswax covered cloths or cloth freezing bags. To freeze foods in glass containers it is recommended to use a straight jar and leave 1-2 inches of head space. You can also find advice on the internet on how to freeze food in glass jars.

General storage: replace clear wrap with beeswax covered cloths, or simply use a plate to cover a bowl. Beeswax covered cloths or bags made out of natural fabrics can also serve to wrap and store various food items as e.g., sandwiches, nuts and bread.

Use glass, stainless steel or ceramic food storage containers instead of plastic ones. They are available in many stores including Canadian tire, hardware stores and can also be found in some Dollar Stores.



Minimising plastics in our kitchen



Be aware:

The more you open and close, twist and turn a plastic, the more likely you are to increase small pieces of plastics into your food and drink. For example, plastics released from the cap have been found in bottled drinks.

Cutting boards, cooking utensils and bowls:

We have become accustomed to using plastic cutting boards and cooking utensils. However, with each cut using an e.g., sharp knife small pieces of plastic can break away from these boards, which then may end up in our food.

Use cutting boards made out of wood or tempered glass instead of plastic cutting boards. Make sure you buy cutting boards that are not made of individual fibers glued together. A single solid wood or tempered glass board is your best option.

Using plastic utensils to e.g., stir food in a pot or flip a food item in a frying pan, also scraps the plastic, again resulting in the release of microplastics potentially into our food. Ideally use spatulas made out of wood or metal spatulas. Be aware that metal spatulas will scratch plastic coatings and can also damage ceramic surfaces over time.

Scrubbies:

You can make your own plastic free scrubbies out of sisal or jute. The sisal and jute scrubbies are compostable and they can be cleaned by rinsing or boiling them in hot water. Some people also clean them in the washing machine. Ask the ACRE sewing group if you want to learn how to make a scrubby out of sisal or jute. Plastic free scrubbies made out of plant based fibers are also available from commercial suppliers. Make sure that they are 100% compostable certified.

Frying pans/Woks:

Use forever chemicals free versions, as stainless steel and cast iron pans, e.g., check out: [Meyer Canada](#).



Minimising plastics in our kitchen



Backware:

Pyrex glass and ceramic baking dishes offer plastic free options as compared to non-stick baking pans, trays and muffin forms. Uncoated metal pans in combination with parchment paper or silicone mats are also considered a safer option. Note: that technically silicone is a type of polymer. Silicone mats still have an environmental impact, although they are considered less harmful than traditional plastics. They are stable to temperatures as high as 450 and even 500 Fahrenheit when high quality mats are used.

Drinks:

Be careful when you drink tea. Depending on the manufacturer, teabags can contain microplastics, which are released into your tea while brewing. You can counter this by using loose tea leaves or select a tea brand that certifies using plastic free bags. Loose tea leaves can be bought at various local stores in bulk, like the bulk barn, La Forêt, Aladdin. Drying your own herbs to make herbal teas is also an option.

Coffee filters are often plastic free, but some are glued and can release microplastics into your coffee, i.e., learn about your filter before you use it. You could also use a paper free filter made out of e.g., stainless steel.

Plastic lined cups, which are often used as take out cups, can release plastics in your drink specifically when hot liquids are placed into the cup. A safer option is to not use a plastic lined cup. If you want take out, bring your own cup. Use a ceramic cup when consuming the beverage in the coffee or tea shop. Saying no to single use cups is a good idea. We, in Canada, throw away an estimated 1.5 billion single use cups annually [9], of which 30-35% are single use take out cups. These cups mostly end up in landfill.

9. [Circular reusable packaging.](#)

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Minimising plastics in our kitchen



Cook from scratch:

It is likely that you end up with less plastic and plastic additives in your food if you cook from scratch rather than opting for pre-prepared and highly processed items.

When you shop:

Avoid buying food wrapped in plastic. If you can buy vegetables and fruits open and bring your own food packaging bags. You could make such bags out of old bed sheets or other used clothing. Ask the ACRE sewing group if you are interested in learning how to make them.

Buying fruits packaged in fruit nets is another source of bringing microplastics into your home. You may have noticed the tiny red plastic particles they leave all over the kitchen, which can easily end up in our food.

Did you know? In Canada only 7-9% of plastics are recycled [10].

Did you know? You can help reduce plastic waste by practising the plastic Rs, but the best way of reducing plastic waste is to use a plastic-free alternative.

Did you know? Labeling a plastic biodegradable is often a misnomer. A biodegradable plastic is tested to decompose under certain laboratory conditions, which may not exist under real conditions. Only place plastics into the compost bin when it is 100% compost certified.

Tip:

Inform yourself before you opt for a plastic free alternative. For example using paper straws instead of plastic ones can contribute to greenhouse gas emissions if the paper ends up in landfill. Also, not all paper straws are plastic free.

Be also aware of what materials are suited for different types of food. Glass is suitable for many foods, while acidic foods can break down beeswax cloths and leach metals from metal kitchenware. Metal pots exposed to salt for extended periods can pit the surface of aluminum and stainless steel pots. Health Canada has many useful sites on how to use different materials, as e.g., “The safe use of cook- and bakeware” site.

10. [Environment of Canada How to reduce plastic waste and pollution.](#)

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