

Wädenswil/Switzerland, June 2020

The illusion of protection from viruses through plastic

OceanCare has been working to combat the global plastic pollution crisis for more than 10 years. In tackling the root cause of the problem, plastic production and consumption of single-use plastic must be significantly reduced. Reuse and refill systems form an essential part. The COVID-19 pandemic has triggered some questions among consumers whether environmentally friendly reusable solutions are still safe to use, amid contrary and misleading claims by the plastic industry. What does science say about this? Fabienne McLellan, lead of the plastic programme at OceanCare has asked Jane Muncke, Chief Scientific Officer and Managing Director of the Zurich-based Food Packaging Forum.



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Fabienne McLellan: Jane Muncke, does single-use plastic packaging of food protect against viruses, such as COVID-19?

Jane Muncke: The key factor is not the packaging, but the shop personnel's hygiene. Everyone who comes into contact with products, whether packaged or not, might transmit the virus or get infected. Plastic packaging does not protect you from infection. There are scientific findings that the virus remains contagious on plastic surfaces for several hours. However, there is no hard scientific evidence about this issue yet. For persons that are members of high-risk groups, it is recommendable to wash packaging with soap water at home or to remove it and then wash hands thoroughly with soap.

Is there evidence already on how the corona virus spreads through plastic?

The virus itself is not a 'living being', it needs a host to reproduce. Soap, ethanol, UV radiation or heat of 60 degrees Celsius destroy the virus. A laboratory test in the USA examined the persistency of the virus on various materials. The test showed that it remains longest on plastic, but only for a short time on copper, and that virus activity sharply decreases after 24 hours. However, this is just a first, simple laboratory test and not yet a comprehensive study. It is therefore not yet known whether the virus remains infectious on plastic packaging for two days.

There is a widespread acceptance in Switzerland for reusables. However, during the Corona crisis there were claims made that using environmentally friendly reusable containers was dangerous. What does science say?

This nurtures the illusion that disposable packaging is more hygienic and would protect us from infection. In our view, however, nothing rational speaks against using reusable bags or containers. If the well-known basic hygiene rules are followed consistently, the risk of infection can be reduced easily: washing hands regularly, effectively cleaning the reusable containers or bags before and after use. It is important to reduce the consumption of disposable packaging also during a pandemic, because plastics put a strain not only on the environment, but also – depending on the material – on our health.

Plastic is everywhere. We can hardly imagine life without it. Why is plastic so harmful to our health?

Plastic is light, cheap and multifunctional. And while we know that plastic can contain harmful substances that have been proven to negatively impact our health, we tolerate this, as long as the quantities of the various chemicals are below their specified limits. However, the actual problem is the cocktail of chemicals in plastics. Depending on the type, plastic contains hundreds of substances that can have a negative effect, for example, on fertility. Unfortunately, there are no routine checks of these mixtures of chemicals. Therefore, when you eat healthy food from a supposedly hygienic plastic package, you are in fact ingesting an untested and unknown cocktail of chemicals.

The health effects of plastic packaging have certainly not yet been conclusively researched, but there is solid evidence that endocrine disruptors (hormonally active substances) such as Bisphenol A (BPA) migrate from food packaging in harmful quantities and thus enter the human body. Tests on animals have shown that these substances impair the immune system, affect fertility and can contribute to obesity, breast cancer or testicular cancer.

Plastic pollution is a global problem. If plastic packaging ends up in the ocean, its consequences are not limited to marine wildlife. What exactly is happening there?

Plastic is a very durable material. When it is released into the environment, it is not decomposed by naturally occurring micro-organisms, as is the case with natural materials. Instead, plastic breaks down into smaller and smaller fragments, which are mistaken for food by animals and enter their bodies. And while larger plastic fragments are excreted, smaller ones are likely absorbed by the body. There is every reason to be concerned that plastic fragments transport toxic and non-degradable chemicals from the environment into living beings. Studies show that many fish and other marine animals are already contaminated by pollutants. The chemicals in plastic add to this and the problem lands on our plates.

What exactly is the Food Packaging Forum working on?

Since our foundation in 2012, we have been dealing with the effects of food packaging on human health. Many people are not aware of the problem of toxic chemicals in food packaging. Our work builds awareness for this issue. We analyse existing knowledge and make it available to authorities, industry, the media and, of course, the public. We thereby contribute to finding solutions that prevent chronic diseases that may result from toxic substances migrating from food packaging into our food.

What makes this work so important in these days?

Many people are aware that plastic packaging pollutes the environment, causing CO₂ emissions (when incinerated) and a huge amount of plastic waste when it enters the environment directly. But unfortunately, when discussing new packaging solutions, we often ignore the fact that chemicals from packaging enter our food and thus can affect our health. In the past, this has already resulted in purportedly "environmentally friendly" alternatives, which involved health risks, such as some recycled paper or plastic. The Food Packaging Forum is advocating the development of holistic solutions that benefit the environment AND human health.

The Food Packaging Forum is based in Zurich. Is its work limited to Switzerland?

We are working globally, as many manufacturers of food packaging materials produce for the global market. We cooperate with scientists, NGOs, companies and the media, locally and internationally.

The key facts in brief

1. Are reusable containers safe to use even in times of a pandemic?

Yes. But you must make sure to clean them properly – in the dishwasher, with soap, hot water or ethanol. Companies that offer customers to bring their own containers should take account of the current situation through a hygiene concept in their stores.

2. Is disposable packaging more hygienic than reusable containers?

The notion that disposable packaging is cleaner and protects us from infection is an illusion. In fact, with reusable containers it is in your own hands to make sure that they are clean and have not been touched by people whose hygiene standards or infection status you do not know.

3. Will the Corona virus paralyse the ZeroWaste movement?

No, I am optimistic that in the end scientific facts are more convincing than unfounded fears. Hopefully, we will get Corona under control in the mid-term. Solving the plastic problem, however, will require a lot of work in the long term.

4. Can I still go shopping in “zero-waste shops” with an easy mind?

Of course, but it is important that these shops observe the authorities’ hygiene recommendations. Clean the containers thoroughly before and after shopping. Shops that handle returnable containers should implement a hygiene concept.

5. Which reusable solutions do you recommend?

Personally, I only use containers made of stainless steel, glass or ceramic, i.e. materials that do not release any chemicals into the food.



Jane Muncke studied environmental sciences at the Swiss Federal Institute of Technology Zurich (ETH) and obtained a doctorate in ecotoxicology from the Swiss Federal Institute of Aquatic Science and Technology (eawag).

Since 2012, she has been Managing Director of Zurich-based Food Packaging Forum. She is also co-owner of Yes and Science, a consultancy firm for science communication.



Fabienne McLellan studied at the Zurich School of Economics (HWZ) and completed a master’s degree in environmental protection and sustainability at Monash University in Melbourne.

She joined OceanCare in 2014 and has been responsible for International Relations since 2018. She is also head of the plastics programme and animal and species conservation issues.