FOOD PACKAGING
CONTEXT AND EUROPEAN POLICIES

Packaging is defined by Eurostat as "any material which is used to contain, protect, handle, deliver or present goods. […] Items like glass bottles, plastic containers, aluminium cans, food wrappers, timber pallets and drums are all classified as packaging".

Nowadays, the impact of households' food packaging (FP) waste on the environment is significant. Indeed, the amount of food packaging has increased in recent years, partly because of its practicability and convenience. Furthermore, foodstuff is the only product that is consumed 3 times per day by any humans, which necessarily intensifies food-packaging waste.

Despite the convenient character of FPs, much of them are unnecessary and only used once. As a consequence, producing, transporting, distributing, using and wasting food packaging may have an important environmental cost.

More and more analyses are made regarding the life cycle of such FPs in order to quantify FPs' environmental costs. For example, such costs can be expressed in terms of gas emissions in the air, in the water or in soil or in terms of raw materials and energy consumption. The environmental problems caused by FPs, including plastic containers and bags, are numerous and many of them have now been acknowledged for quite some time. They begin with the necessity of using fossil fuels to manufacture them – a process in itself not free of damaging environmental consequences, as does the extraction process of said fuels – and end with the problematic issue of their disposal. In this regard, critical situations can arise especially in large urban areas, where a high number of packaging is consumed and the issue of their disposal can pose serious threats to both health and the environment.

Indeed, after plastic containers have served their purpose they are in the best-case scenario recycled, but more often, as the Directorate-General for the Environment (DG ENV) stresses out, they may finish their life cycle being landfilled or worst, thrown into nature. In this case, chances are high that containers will end up poisoning, injuring or killing living beings, as the example of the great pacific garbage patch famously illustrates. Lastly, the possibility of the plastic containers simply being burned raises the question of the smoke's toxicity to surrounding plants, as well as for people's lungs. This problem is still unresolved in underdeveloped countries, where there is no legislation to discipline the disposal and recycling of plastic in line with current international standards and treaties.

According to Eurostat estimates, in 2014 the average annual domestic waste of packaging in the European Union (27 countries) was up to 163.89 kg. As an

example, in Luxembourg the average domestic waste of packaging is 195.17 kg per year.

In 2014, about 82,501,766 tonnes of domestic packaging waste were generated in the entire European Union, including 33.9 million tonnes of paper and cardboard and 15.2 million tonnes of plastic packaging materials.

The **Packaging and Packaging Waste Directive 94/62/EC provides objectives for reducing such waste.** Member States can take any necessary measure to comply with their related targets established by the Commission Directive 2004/12/EC. The latter also provides the corresponding deadlines to achieve these goals.

In January 2015, "As You Sow" and the "Natural Resources Defense Council" (NRDC) released a report by which packaging practices and policies of 47 companies were investigated. Those companies are developing in three sectors that are fast-food restaurants, beverages and consumer grocery. This report clearly indicates that, despite some examples of virtuous packaging leaderships, most of the investigated companies do not prioritize source reduction and recyclability:

"Besides wasting valuable material, failing to recycle plastic packaging contributes to the problem of pollution of our lakes, rivers, and oceans, another problem of growing concern. A recent study published in the journal PLOS One estimated that 5.25 trillion plastic particles weighing about 269,000 tons are currently floating throughout the world's oceans. An estimated 60-80 per cent of marine litter originates on land, and most of that is plastic. Single-use packaging, including "to go" food and beverage packaging, accounts for most of the waste that's cleaned off our beaches, according to International Coastal Cleanup Data. Plastic pollution affects every waterway, sea and ocean in the world, and has severe impacts on our environment and our economy. Seabirds, whales, sea turtles and other marine life ingest or become entangled in plastic in our oceans and waterways. Scientists are investigating the long-term impacts of toxic pollutants absorbed, transported, and consumed by fish and other marine life, including the potential effects on human health. This pollution also has huge costs for taxpayers and local governments. The best way to stop plastic pollution in our oceans and waterways is to prevent it from reaching the water in the first place."[1].

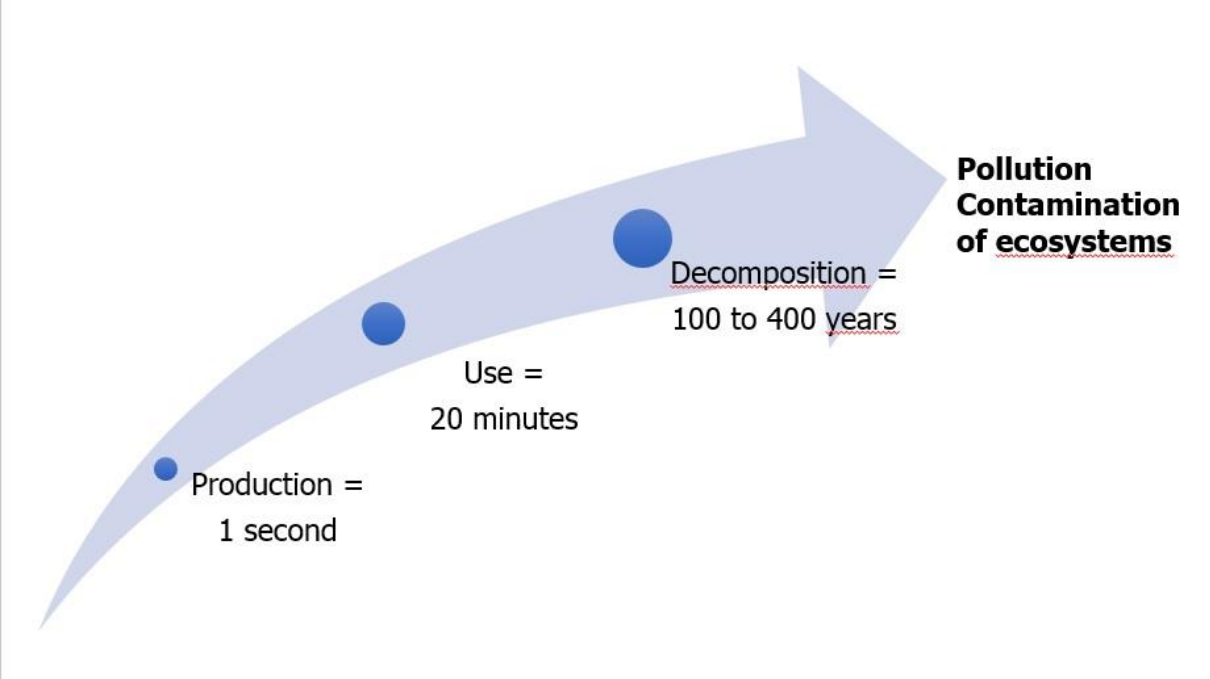
Darby Hoover, report project editor, made a statement saying that "single-use food and beverage packaging is a prime component of the plastic pollution in our oceans and waterways, which kills and injures marine life and poses a potential threat to human health".

More and more, we should develop the 3R's hierarchy with regard to food packaging. That is to say: Reduce, Reuse and Recycle. Among the solutions to reduce food-packaging waste, bulk retail sales and delivery of solids and liquids would help eliminate unnecessary packaging. As an example of reusing, one can

[1] Darby Hoover, « New Report Suggests Packaging Sustainability Improvements for Fast Food, Beverage, and Consumer Goods Companies », January 30th 2015, NRDC website https://www.nrdc.org/experts/darby-hoover/new-report-suggests-packaging-sustainability-improvements-fast-food-beverage

clean, sterilise and reuse glass jars to store dry food products. As to recycling, this clearly involves national and local authorities.

PLASTIC BAGS LIFE CYCLE



In order to deal with this environmental issue, **Directive 2015/720 aims at reducing the consumption of lightweight plastic carrier bags to 40 bags/person/year by 2025**. In principle, this Directive required Member States to take any necessary measure to implement such requirement in their national law by November 27th 2016. Yet on such date, only 10 Member States had announced detailed plans, and some countries such as Greece and Cyprus were very late.

In addition to those environmental issues, there are other issues that may rise from an excessive consumption of FPs. Indeed, according to a report from the European Parliament, food packaging, recipients, utensils or crockery may contain no less than 15 000 varied substances, the majority of which is not known. This can pose serious problems because, **once a food product is wrap in a packaging, a certain amount of substances in the packaging may migrate into food.** Since it is impossible to know every substance contained in such packaging, including their impact or toxicity, this situation raises important health issues.

This is one of the reasons that urged SAFE to elaborate a **bi-annual strategy regarding food packaging reduction**, as **some of these substances – such as Bisphenol A (BPA) – can be toxic or disturb endocrines.**

Bisphenol A is a chemical found in many items that come into contact with food and that consumers may ingest through food or beverages, absorb it through the skin or inhale it. This substance may be found in plastic materials, which are almost automatically used as food packaging because they are usually more permeable than other materials such as glass or metal, which need added closure devices limiting permeability. It is also lighter and less breakable than glass.

The danger of Bisphenol A (BPA) was first noticed with animal studies. In rats prenatally exposed to BPA, scientists observed an increase in estrogen feedback as well as development of precocious puberty via inhibition of tyrosine hydroxylase activity in rostral preoptic periventricular neurons[2].

France and the EU banned baby bottles made with Bisphenol A but France went further by introducing, in January 2015, a law banning the use of BPA in all food packaging. Yet, the European Food Safety Authority (EFSA)'s re-evaluation of Bisphenol A concludes that there are not any human health risks in any age group (including unborn children, infants and adolescents) at the current exposure levels. EFSA concluded that, based on their studies, exposure to BPA is under the safe level (the tolerable daily intake or TDI). However, research has shown that high doses of BPA may likely cause liver and kidney damage in humans.

Another related health concern regards the presence of mineral oil hydrocarbons (MOH) in foods, whose major sources include food packaging and additives. Possible risks posed by the most dangerous type of MOH, mineral oil aromatic hydrocarbons (MOAH), include their potential carcinogenicity and their ability to alter genetic material and to disrupt the hormonal system. Since no level of consumption of MOAHs can be considered as "safe", **the European Food Safety Authority has established that any exposure to these substances through food presents a potential health risk**. Indeed, in its "Scientific Opinion on Mineral Oil Hydrocarbons in Food", published in June 2012 by EFSA Panel on Contaminants in the Food Chain, EFSA estimated that, in Europe, MOSH exposure ranged from 0.03 to 0.3 mg/kg b.w. per day, with higher exposure in children. After a comprehensive scientific assessment, EFSA's paper concluded that background exposure to MOSH via food was a potential concern as, under specific circumstances, foodborne MOAH may be mutagenic and carcinogenic.

Furthermore, recycled paper packaging may contain, in addition to mineral oils, more than 250 other potentially dangerous substances. Unfortunately, in lack of conclusive toxicological studies on all substances that could migrate from food packaging to food products, it is still impossible to assess the health risks associated with exposure to these chemicals, which could pose serious threats to human health.

[2] Rubin BS, Lenkowski JR, Schaeberle CM, Vandenberg LN, Ronsheim PM, Soto AM. Evidence of altered 4 brain sexual differentiation in mice exposed perinatally to low, environmentally relevant levels of bisphenol A. Endocrinology. 2006;147:3681–3691

ENDOCRINE DISRUPTORS

According to the World Health Organisation (WHO), endocrine disruptors (ED) are chemical substances, naturally or artificially present in some food products but usually not inherent to the human body, that can affect people's endocrine system and have a negative impact on their health and on the health of their future children.

These effects can take time – sometimes decades – before being tangible, but the more a person is in contact with one or several ED's, and the younger they are when it happens, the more likely they are to develop problems later in life, or to pass them on to their descendants.

Our nutritional habits and general living conditions have, in little less than a century, changed in so many ways that exposition of our bodies to EDs has drastically increased. The list of EDs found in some plastic food containers – and therefore potentially in consumed food products – is as large as that of their assumed threats to health. Phthalates, adipates, styrene or Bisphenol A, to name only a few, are increasingly believed by members of the scientific community to be key explaining factors of the ever-growing number of citizens suffering from type 2 diabetes, obesity, reproduction troubles, some kinds of cancer… a list that could go on even further. Indeed, as the WHO noted in its 2013 report on chemical ED's effects on humans, there may be other EDs that scientists could yet be unaware of, as well as other potential effects to add to those already on the list.

Yet, until now, no general legal definition of endocrine disruptors has been established at the EU level and there is not a comprehensive policy response to it. Only some aspects of this issue are addressed in legal texts such as the Waste Framework Directive or the Packaging and Packaging Waste Directive. However, the 7th Environment Action Programme, under the priority 3 "To safeguard the Union's citizens from environment-related pressures and risks to health and well-being" highlights that, by 2020, all relevant substances of very high concern, including substances with endocrine-disrupting properties, must be placed on the REACH candidate list. An urgent action to deal with such challenges becomes necessary, also to help the EU to reach the goals agreed in the major international conventions, such as Rio + 20 and COP21 and to ensure the minimization of adverse effects of chemicals on human health and the environment.

Unfortunately, **Regulation (EC) 1935/2004 on Food Contact Materials (FCM) only lays down general safety requirements for all FCMs and is legally binding for only four of them**: plastics (including recycled plastics), ceramics, regenerated cellulose and active and intelligent materials. Yet other materials, such as papers, cardboards, varnishes, metals, inks or adhesives remain at the Member States discretion, which creates different legislations and safety standards depending on each country. Consequently, even if such materials may also have some impact on health and environment, there is a real lack of legislation and scientific studies regarding such materials.

In October 2016, the European Parliament adopted a motion for a Parliament Resolution by 559 votes in favour. This document, based on a report drafted by rapporteur Christel Schaldemose, called on the European Commission to **address gaps in the EU legal framework for FCMs, in order to draft proper safety regulations for chemicals in all food contact materials**,

With this resolution, MEPs acknowledged that Regulation (EC) 1935/2004 is a solid legal basis. However, MEPs also recognized the necessity of taking specific measures regarding 13 materials that are not yet regulated at the EU level and the importance to address the gaps concerning performance and implementation of the applicable legislation. MEPs also urged the Commission to draft specific measures with regard to paper and cardboard, varnishes and coatings, metals and alloys, inks and adhesives, as a priority.

On April 28th 2017, MEP Giulia Moi (EFDD) asked whether the Commission had been making progress regarding the drafting of the aforementioned measures. On June 6th, Health Commissioner Vytenis Andriukaitis replied that the Commission was preparing specific measures to regulate printed food contact materials and to evaluate the effectiveness, efficiency, relevance and coherence of Regulation (EC) 1935/2004.