

IPEN global plastics monitoring project

The aim of the **IPEN global plastics monitoring project** is to raise awareness locally and globally about hazardous chemicals in recycled plastics used for consumer products. The project targeted recycled plastic pellets of high-density polyethylene (HDPE) sold from small-scale, local operations, since this is one of the most commonly used material for consumer products. These have been analyzed for UV stabilizers, Decabromodiphenyl ether (deca BDE) and PCBs.

Environmental Ambassadors for Sustainable Development participated in the project as IPEN participated organization. The recycling facility EASD used as project site is situated in north-west Serbia, and there are app. 75 employees. The facility was founded 15-16 years ago. 75% of products are for the export, to the Central European Countries (Poland, Czech Republic...). Other 25% is sold to the domestic plastic producers (placed around Serbia), which use these recycled plastic pellets to produce plastic products, but not for food storage.

There are several steps performed to produce recycled plastic pellet, from yield small pieces of plastic (flakes or fragments) to the pellet that is using in next steps of production cycle.

All secondary raw material is used in the recycling process (“zero waste” at the end of the process). They use plastic breakage and waste from its production to make plastic buckets for the construction sector, black colored.

The input plastic is coming from unformal secondary raw collectors, but the large number are also imported.

The samples of plastic pellets were used from the facility and sent to IPEN to be analyzed.

Photos from facility:



Collected secondary raw material



Plastic pre-treatment



Washing material zone



Process of plastic milling



Flakes or fragments



Material used for re-recycling

The results are shown in the study: [Widespread chemical contamination of recycled plastic pellets globally.](#)

Background

Plastics production includes many adding chemicals to provide certain properties to the material such as durability and flexibility. These additives include persistent organic pollutants (POPs) and other endocrine disrupting chemicals (EDCs) that are linked to cancer, cause harm to reproductive health, impair neurodevelopment and immune system functions, and, in many cases, persist in the environment for years.

The chemicals are retained in the plastic material, which means that they will carry over from plastics that have been collected and processed to create new “recycled plastic” pellets as feedstock for new products and contaminate these pellets. Industrial production of recycled plastic pellets is taking place at both large and small scale facilities, and even do-it-yourself units for home use have emerged. These are advertised as easy ways to recycle plastic and manufacture new plastic products. Typically, none of these practices takes the presence of chemical additives in the plastic into account.

Polyethylene (PE) is the most common plastic material used for consumer products. It is made through processing of ethene that is either extracted as natural gas or produced during the refining of crude oil. Polyethylene belongs to polyolefin family of polymers and is classified by its density and branching. Some of the most common types of polyethylene are:

• **Branched PE**

- o Low-density polyethylene (LDPE): commonly used for cling film, carrier bags, agricultural film, milk carton coatings, electrical cable coating, heavy duty industrial bags
- o Linear low-density polyethylene (LLDPE): commonly used for stretch film, industrial packaging film, thin-walled containers, and heavy-duty, medium and small bags

• **Linear PE**

o High-density polyethylene (HDPE): commonly used for crates and boxes, bottles (for food products, detergents, cosmetics), food containers, toys, petrol tanks, industrial wrapping and film, pipes and houseware The recycling process consists of three overall steps (sometimes with local modifications):

1. **Sorting:** the input plastics are sorted according to their different types before further processing
2. **Resizing:** The plastic material is crushed to yield small pieces of plastic that are called flakes or fragments.
3. **Compounding and Extrusion:** The small pieces of plastic are smashed and melted together into plastic pellets. These can be colored or transparent.