

## METHODOLOGY FOR SAMPLING PLASTIC PELLETS

- for POPs determination -



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## **1. GENERAL CONSIDERATIONS IN SAMPLING PLASTIC PELLETS**

When sampling and handling plastic pellets and/or microplastics for POPs determination the following general considerations should be taken into account:

- PCBs (polychlorinated biphenyls) and OCPs (organochlorine pesticides) are present at background levels in the atmosphere. These organic compounds are easily adsorbed on plastics, especially polyethylene, which is commonly used in passive sampling devices. Thus, once collected, the samples should be stored in closed containers to avoid further adsorption of organic compounds during the transfer process to the laboratory.
- The handling of the samples should be kept as low as possible before analysis. Any treatment of the sample, especially by heating or use of polar solvent (e.g. ethanol), must be avoided.
- Samples should be stored in the dark and exposure to artificial light, daylight or direct sunlight should be avoided.
- Samples should be stored in the fridge for short periods (i.e. few days) or in a freezer for longer periods (i.e. weeks to prevent the volatilisation of POPs).
- During the sampling and handling process of the pellets any kind of plastic materials (e.g. tweezers, etc.) should be avoided, with the exception of Teflon.

## **2. SAMPLING METHODOLOGY**

The plastic pellets sampling should proceed through the following steps:

1. Plastic pellets are collected from the beach with solvent-rinsed<sup>1</sup> stainless steel tweezers.
2. Collected pellets are wrapped in solvent-rinsed aluminium foil<sup>1</sup>. Paper bag can be used as an alternative.
3. Ideally, 3 to 5 replicates are collected per location with 10 pellets per replicate. According to the International Pellets Watch procedure, 100-200 pellets (at least 50) should be collected per location/beach in order to have a representative sample. If the required number of pellets cannot be reached, simply collect the maximum pellets possible.
4. During sample transportation to the laboratory, a temperature of 25°C should not be exceeded (e.g. by using a cool box).
5. The Annex I must be fill in.

## **3. POST-COLLECTION PELLETS TREATMENT IN THE LABORATORY**

Once in the laboratory, the plastic pellets must be handled as follows:

1. Removable particles (e.g. sand) must be softly wiped off from the pellets.

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<sup>1</sup>For all materials used (e.g. tweezers, aluminium foil, etc) triple rinses with acetone or ethanol (99%) is recommended. Alternatively, triple rinses with acetone followed by triple rinses with hexane could be made. In case the materials cannot be solvent-rinsed, it is also possible to 'bake' it at 450°C overnight in an oven (e.g. glass containers).

2. Adhering material (e.g. salt crystals) should be removed by gently rinsing the pellets with double distilled water (optional step).
3. Wet samples must be dried in the darkness, at temperature below 25°C prior to shipment. To this end, pellets are placed in a desiccator with silica gel. As an alternative, they can be placed for drying in the laboratory (i.e. avoid outdoor air), but far from turbulent air circulation (i.e. must not be placed under a hood) and rooms where POPs might be in use (e.g. storage of standards). The drying period must be as short as possible.
4. Pellets should be then wrapped in solvent-rinsed aluminium foil and placed in zip-lock bags.
5. If needed, the samples can be stored in the fridge at 4°C before being sent.
6. The samples are finally sent to Slovenia in paper envelop together with
  - a. A copy of the survey sheet for monitoring marine litter on beaches
  - b. Annexe I
7. The delivery address is:

*University of Nova Gorica  
Laboratory for Environmental Research  
Marilyne Pflieger (DeFishGear)  
Vipavska 13  
SI-5001 Nova Gorica – Slovenia*

#### **4. REFERENCES**

Endo S. et al., 2005. Concentration of polychlorinated biphenyls (PCBs) in beached resin pellets: Variability among individual particles and regional differences. *Marine Pollution Bulletin*, 50, 1103-1114.

Hirai H. et al., 2011. Organic micropollutants in marine plastics debris from the open ocean and remote and urban beaches. *Marine Pollution Bulletin*, 62, 1683-1692.

Ogata Y. et al., 2009. International Pellet Watch: Global monitoring of persistent organic pollutants (POPs) in coastal waters. 1. Initial phase data on PCBs, DDTs and HCHs. *Marine Pollution Bulletin*, 58, 1437-1446.

OSPAR Commission, JAMP Guidelines for Monitoring Contaminants in Sediments. (last access 2 April 2014:

[http://www.ospar.org/content/content.asp?menu=00900301400135\\_000000\\_000000](http://www.ospar.org/content/content.asp?menu=00900301400135_000000_000000))

**ANNEX I**

**Additional Information**

<b><u>SAMPLING SITE</u></b>
Air temperature:
Number of plastic pellets sampled:
Where did you find the pellets?
<input checked="" type="checkbox"/> At the surface of the beach (e.g. on the sand):
<input checked="" type="checkbox"/> Underneath the surface:
<input checked="" type="checkbox"/> Near the sea (e.g. partly or fully submerged, afloat):
<input checked="" type="checkbox"/> Other:
<b><u>LABORATORY</u></b>
Were the pellets rinsed with double distilled water?
Were the pellets dried? If yes, how?
<b><u>If you could not follow the exact procedure suggested here, please specify the applied alternative (e.g. light exposure, tweezers not solvent rinsed, temperature &gt; 25°C, etc.):</u></b>