



TYPE OF R+D RESULT

- New technology
- New product
- New service
- New knowledge or skill



COMMERCIAL MATURITY LEVEL

- Model or conceptual idea
- Proof of concept (design)
- Validated in a controlled environment
- Validated in a real environment
- Successfully implanted



PROTECTION LEVEL

- Non- applicable
- Patent
- Software
- Know - how
- Utility model

Invention title

DEVICE FOR
MICROPLASTIC SAMPLING
ES1270147 Y
02/17/2021
Granted
Spain

File number
Priority date
Status
Country

Description of the solution. Problem solved

The large amount of garbage in the seas, that represents a serious threat for marine ecosystems, is one of the greatest challenges facing humanity today. Although there are several types of waste, such as glass, oils, metals, etc.; plastics represent more than 80% of sea litter. Once plastics enter in the marine environment, they move around and accumulate over all the planet; so, the presence of floating waste islands all over the seas and oceans has been reported.

The persistence of plastics in nature may lead to severe risks for human beings and wildlife, causing changes in ecosystems; exposure to chemical substances that can be present in these plastics or that have been absorbed by them in the marine environment; as well as to lethal and sublethal effects for marine animals due to ingestion or entrapment of plastics.

In this sense, microplastics are very dangerous since they are very tiny particles which go largely undetected.

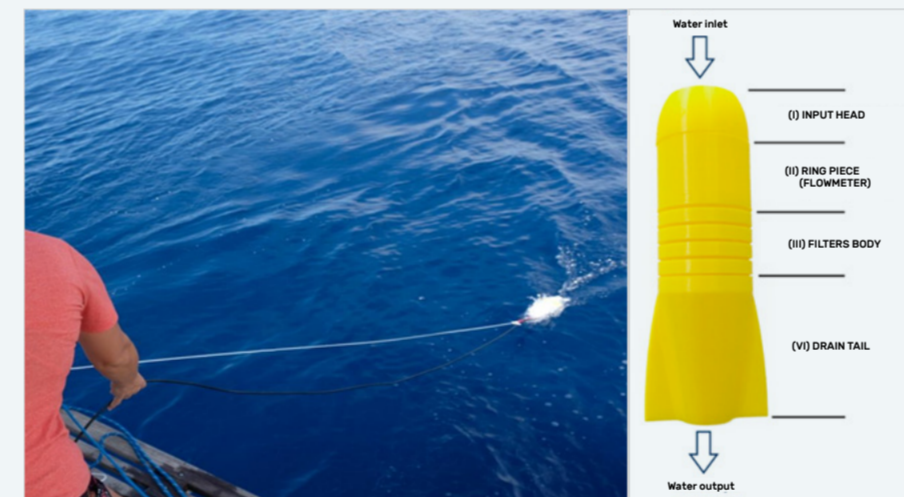
Added to this is the fact that large-scale sample methods for monitoring microplastics on open sea waters are still a challenge for oceanography. A large number of samples is required for understanding the distribution, abundance and destination of these particles in the marine environment, and, despite the fact that the oceans accumulate most part of plastic waste, there are relatively few studies specifically focused in this environment due to the inherent difficulty to get samples.

Current methods used for sampling are mainly based in a system of collection by towing a plankton net. Under this alternative some less favourable effects remain, such as its inaccuracy when calculating the volume sample due to the turbulence in water or its inefficiency to recover microplastics smaller than 300 microns due to limitations on the net size.

In order to solve this challenge, we introduce you to MuMi (protected by utility model 202100078), a device that allows to collect water samples of microplastics up to 50 microns size (the diameter of a human hair), solving this way some of the disadvantages of current systems. Also, this

device makes easier researching on the abundance and distribution of microplastics and it increases as well the possibilities for sampling, since it only requires a 12V power supply connection for its functioning.

MuMi is a lightweight and small sized device (smaller than 50 cm), which makes it ideal for being towed by small scale boats such as boats for marine recreation, sport fishing or nautical tourism. It has been made using 3D printing technology and built in polylactic acid, which is a biodegradable plastic. This device has several swappable filters in different sizes. In addition to this, the device also has a flowmeter that using a connection cable and an embedded screen enables the visualization of filtered water directly from the boat and in any time.



No complex technical specifications are required for its installation, being able to be used by a wide range of sampling platforms.

Thanks to its hydrodynamic design and light weight it keeps afloat during navigation, filtering this way all the particles found on the water surface.

In this image we can see how the device is used on boat for sampling by a simple towing vehicle.

Fields of commercial application

Since it is characterised by its simplicity operation, MuMi can be used by a vast array of platforms and sampling small-scale boats. It may be useful for the following users:

(1) **Scientific community**, on sampling expeditions in which there is no oceanographic vessel.

(2) **Public bodies and departments** that are in charge of conservation policies and proper development of the marine Strategy Framework in relation to marine litter indicators.

(3) **Companies working** on leisure activities and scientific or eco-tourism that offer rich and environmentally responsible content to their clients, such as offering experiences as interpreting the environment by using samples collected in situ with MuMi.

(4) **Marine-maritime productive sectors**, that incorporate this sampler to their routine, contributing to the enhancement of the environment where they obtain resources (e.g., artisanal fishing boats).

Market opportunity

The features offered by this device result in a considerable increase of the window of opportunity in sampling. This is reinforced by the versatility of all the possible platforms from where this device can be operated, leading to a real opportunity for improving monitoring of microplastics in oceans.

As a useful tool for this purpose, it would help to increase the sampling capacity in the less explored marine environment, as it is recommended in the report of the Technical Subgroup on Marine litter of the Marine Strategy Framework Directive.

Besides, sampling of marine litter and, particularly, microplastics may result in an educative resource complementary to recreational and nautical activities that are done in the marine environment. This way, environmental awareness would be increased among those who enjoy this fragile ecosystem.

Also, it must be highlighted that marine litter are an intersectoral global challenge that does not know of geographic or politic borders. Their negative ecological and socioeconomic impact is a serious threat to the marine and coastal environment as well as human life, since they not only affect habitats, species and ecosystems, but also to human health and safety as well as economic sectors such as fishing, tourism and sailing. Un-

AUTHOR

Tania Montoto Martínez; M^a Dolores Gelado Caballero; Pedro Juan Cardona Castellano; José Joaquín Hernández Brito

CONTACT

Oficina Transferencia de Resultados de Investigación (OTRI)
@ arivero@fpct.ulpgc.es
☎ 928 45 99 56 / 43

<https://otri.ulpgc.es/>

doubtedly, marine litter has become one of the biggest contamination problems at global level of current times. For this reason, an increasingly social concern and imminent action of national and international managing bodies is needed.

Competitive advantage

- In this sense, this is an opportunity sampler, since it can work without interfering in the activity of the ship in which is installed. That means that the ship or boat will not need to stop or change its route or whatever other issues.
- It enables successive sampling with no need to go ashore.
- It is profitable and affordable, made with 3D technology.
- It has a coherent and environmentally friendly design, since it is not made of plastic.
- It is very versatile: it can be used at different depths and in different types of vessels.
- Easy to use and precise, solving inaccuracies in current techniques for knowing the sampled water volume.
- It enables sampling of microplastics up to 50 µm.