MICROPLASTICS

SAFE SUSTAINABLE SOLUTIONS

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Microplastics are defined by ECHA as solid or semi-solid particles, which are less than 5 mm in size and consisting predominantly of polymers. They can be divided into two main categories: primary microplastics (released directly into the environment, for example from washing synthetic fabrics or abrasion from tires) and secondary microplastics, which result from the degradation of larger plastic objects such as bags and bottles.

Microplastic pollution is a global challenge because these particles enter the oceans, the food chain and they can even be found in drinking water. Microplastics cause damage to the ecosystem and pose potential risks to human health.

EU Regulation 2023/2055 represents a significant step in the regulation of microplastics intentionally added to products. The regulation amends Annex XVII of the REACH regulation, introducing restrictions on the use of synthetic polymer microparticles. The regulation establishes a precise definition of microplastics based on their size (less than 5 mm in at least one dimension) and other chemical-physical characteristics.

The regulation also imposes bans on the placing on the market of products containing microparticles of synthetic polymers in concentrations equal to or greater than 0.01%. However, some products are excluded from these restrictions, such as diagnostic medical devices, medicines, fertilizers, and feed.

Secondary Microplastics Problem

Primary microplastics are responsible for approximately 15-30% of the environmental pollution, while secondary microplastics, although not yet regulated, represent the greatest danger, constituting about 70-85% of pollution. Currently, although the bans only concern primary microplastics, the focus is on secondary ones, **as it was highlighted by European and US bodies and institutions.** Being so widespread, especially in ocean pollution, the secondary microplastics degrade into nanoplastics, entering the food chain of marine species and causing serious toxicological problems.

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OUR SOLUTION

Food Contact Center's solution

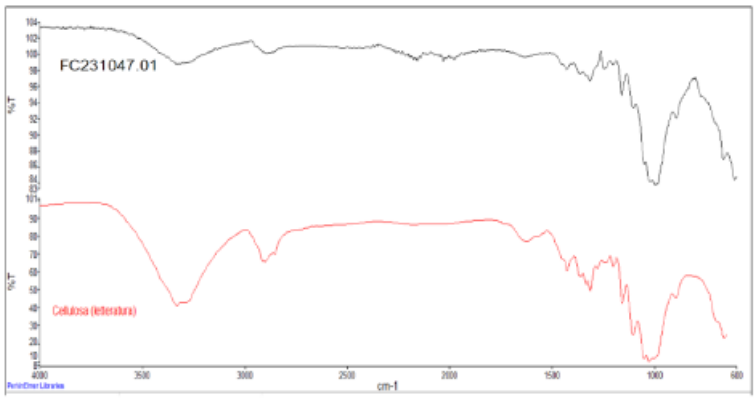
In the world there is an increasing sensitivity on this subject, so both in Europe and in the USA it is necessary to verify the compliance of their products with this issue. The FDA has even opened a web page on its website dedicated to the investigation of the presence of microplastics in food. In this process, MOCA manufacturers are also involved in the topic and they will have to start verifying the possibility that their products release these pollutants at the environmental or product level.

Food Contact Center **supports companies in their products control, by using the most advanced analytical methods currently available. Food Contact Center is present within associations and directly involved in working groups on this issue, including ILSI (International Life Sciences Institute) and Assocarta: this guarantees us to be able to offer our customers a service that is always updated to the latest national and EU trends, guaranteeing quality of information and activities.**

Food Contact Center Case Study: Presence of microplastics in products declared "plastic free"

A case study addressed by Food Contact Center concerns the evaluation of the presence of plastic, in oligomeric or monomeric form, in paper products declared "Plastic Free". The samples analyzed were paper straws and cups. The first test carried out was an FTIR analysis, which showed for straws a signal identical to that of pure cellulose, while for cups a trace was found attributable to a typical polymer used as a coating, thus questioning the possibility of declaring these products as plastic-free. FTIR tests have been confirmed by TGA-DSC surveys.

FTIR spectrum: black line sample of paper straw, red line characteristic spectrum of virgin cellulose



In addition, the same samples were tested by extraction in hot and cold water, in order to verify whether plastic particles migrated into the aqueous solution (the extraction was carried out following the UNI EN 645 and UNI EN 647 standards). The hot extraction showed that the straw sample released polymeric material, probably attributable to a dispersing agent used in the paper production phase.

	Acque destinata al consumo umano: 1047.01 A - FC231047.01 A			Acque destinata al consumo umano: 1047.01 B - FC231047.01 B			Acque destinata al consumo umano: 1047.02 A - FC231047.02 A			Acque destinata al consumo umano: 1047.02 B - FC231047.02 B		
	Particelle su campione (N/L)			Particelle su campione (N/L)			Particelle su campione (N/L)			Particelle su campione (N/L)		
	20-50um	50-100um	100-500um	20-50um	50-100um	100-500um	20-50um	50-100um	100-500um	20-50um	50-100um	100-500um
Polyethylene	0	0	0	59	0	0	30	30	30	0	0	0
Polypropylene	71	36	0	593	296	178	502	30	0	915	30	30
Polyethylene terephthalate	0	9	0	1482	0	0	30	0	0	30	0	0
Polycarbonate	27	0	0	415	0	0	0	0	0	0	0	0
Polystyrene	0	0	0	59	0	0	0	0	0	0	0	0
Polytetrafluoroethylene	0	0	0	711	59	0	30	0	0	30	0	0
Polyvinyl chloride	0	0	0	3497	0	0	0	0	0	0	0	0
Polyamide	53	0	0	16952	771	237	0	0	30	295	0	0
Polymethyl methacrylate	124	9	0	59	0	0	0	0	0	0	0	0
Polyurethane	9	0	0	5868	296	0	30	0	30	30	0	0
Acrylonitrile butadiene styrene	9	0	0	2312	0	0	0	0	0	0	0	0
Other particles	604	80	62	5157	771	415	1358	177	118	6554	295	30

Red circle: Presence of plastic material in the straw sample following hot extraction.

As a result, FCMs are reasonably investigated for the microplastics' release into food. It must be given attention to these evidences when manufacturers wish to declare paper products "Plastic Free".

The Laboratory Management

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