Disposable face masks after their use: a potential significant source of microplastics to environment

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Since the Sars-Cov-2 pandemic broke out in 2020, the production and use of FFP2 masks has grown exponentially. While the use of masks has reduced the spread of the SARS-CoV-2 virus, on the other, it is becoming an emerging source of microplastic pollution due to their improper disposal. Since FFP2 masks have a structure made up of different layers of material, the base of which is made up of two plastic polymers, PP (polypropylene) and PE (polyethylene), it is necessary to evaluate the toxicology both for the environment and for human health.

In the present work a protocol for the degradation of FFP2 masks in synthetic seawater (SSW) was developed. The SSW thus treated was analyzed to verify the presence and type of nano and microplastics released by Raman analysis and to evaluate the effect on the embryonic development of the sea urchin *Paracentrotus lividus*, model organism widely used for ecotoxicity studies.

The results indicated that MPs are released into the SSW during degradation of FFP2, mainly as fibres, and that these MPs-released FFP2 alter the quality of gametes, the speed of development, induce malformations and death of embryos and pluteus larvae. Since MPs induce oxidative stress and compromise mitochondrial function, it is reasonable to assume that this stress is at the basis of the observed changes. Taken together, these results suggest that the degradation products of FFP2 masks, MPs, cause toxic effects on reproduction and embryonic development of *P.lividus*. Considering the conservation of many *P. lividus* genes in humans, these microplastics could also pose a danger to human health.