

On the horns of a dilemma: Evaluation of textile synthetic and natural microfibers' impact on the physiology of the Pacific oyster *Magallana gigas*

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Résumé (250 mots max.)

The recent growth of fast-fashion and our daily use and maintenance of fibrous materials over the years have led to the massive release of microfibers (MF, 2 million tons / year) into the oceans. Although MF pollution is commonly linked to plastic pollution, a vast majority of the collected MF are made of natural component (e.g. cellulose). In order to fill gaps on the impact of textile MF, we investigated the effects of a 96h-exposure to textile natural (wool, cotton, organic cotton) and synthetic (acrylic, nylon, polyester) MF and their associated chemical additives on the physiology of the Pacific oyster *M. gigas*. Specifically, we evaluated oyster's capacity of ingesting MF of a given size and explored the effects of both MF and their leachates on a set of biomarkers representing key physiological functions. For both MF and leachates, two scenarios were considered: an environmentally relevant (10 MF L⁻¹) and a worst-case scenario (10000 MF.L⁻¹). Regardless of the compound tested, there was no effect of exposure concentration on oyster's key physiological processes. A contrasting response was observed after exposure to MF: ingestion of natural MF led to a perturbation of oyster digestive and immune function while little effects of synthetic MF were observed on the selected endpoints. However, the exposure to the associated leachates led to minimal effects on digestive, stress and immune endpoints tested. Although counter-intuitive these results stress the need to consider both natural and synthetic particles and their associated leachates to thoroughly evaluate the impact of anthropogenic debris.

Mots clés : textile microfibers, contamination, oysters, biomarkers

Thème(s) :

- 1/ Sources, Niveaux de contamination, Modélisation
- 2/ Mécanismes de transformation des plastiques
- X 3/ Impacts des plastiques et risques sur les organismes et les écosystèmes
- 4/ Conception de polymères à plus faible impact environnemental, Solutions
- 5/ Approches sociologique, socio-économique, nouveaux modèles économiques