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Polyethylene microplastics effects on embryo-larval stage of the Pacific oyster, Magallana gigas.

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PURPOSE OF THE ABSTRACT
Polyethylene microplastics effects on embryo-larval stage of the Pacific oyster, Magallana gigas

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This study evaluates the effects of two contaminants (copper and microplastics) on the early stages of development of Pacific oyster Magallana gigas. Three different microplastics (MP) sizes were used (4-6?m ; 11-13?m and 20-25?m). The microplastics used are polyethylene (PE).The mature genitors are obtained in commercial hatcheries (France Naissain, Vendée, FR) and the fertilization is carried out in laboratory (University of La Rochelle, UMR LIENS and University of Bordeaux, UMR EPOC). Embryotoxicity was measured by considering the percentage of abnormal D larvae (malformations and developmental arrest) and developing larvae as well as swimming behavior (maximum speed recorded) after 24h of exposure. The effect of copper and MP on larval malformations is substantially the same with higher percentages of malformed larvae for the conditions exposed compared to Control (without pollutants). For developmental arrest, there are larger values for copper exposure than for microplastics. D-larvae exposed to copper and microplastics (4-6?m and 11-13?m) show a dose-response effect on the quantification of developmental arrest.
However, when the swimming behavior is analyzed, we find a dose-response effect for the two smallest MP sizes (4-6?m and 20-25?m). Effectively the maximum speed decreases with increasing concentrations of microplastics. There is no significant difference with the largest MP size tested (20-25 ?m).
For copper, there is a sharp decrease in swimming speed for the highest concentration
(1 ?g.L-1).
In conclusion, the embryo-larval stage appears to be impacted by both families of pollutants. Quantification of developmental arrest shows a dose-response effect. This dose- response effect is observed on the maximum speed recorded for the two small sizes of microplastics. The Charente-Maritime basin is the leading French producer with 22% of national production. Its strong economic and professional potential tends to obtain a quality of the environment necessary to continue to develop this sector of activity in Pertuis Charentais.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS
microplastics | oyster | behavior | polyethylene

BIBLIOGRAPHY