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TOXICOLOGICAL AND BIOCHEMICAL MIXTURE EFFECTS OF AN HERBICIDE AND A METAL ON MARINE PRIMARY PRODUCERS AND PRIMARY CONSUMERS

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Mixture effects of chemicals and their potential synergistic interactions are of great concern to both the public and regulatory authorities worldwide. Intensive agriculture activities are leading to discharges of chemicals mixtures (pesticides and metals) to the located nearby aquatic areas with severe repercussions to aquatic communities and thus, to the trophic food web. Further information about the impacts of these stressors in aquatic organisms is needed. By this, our study address toxic and biochemical effects of single and equitoxic mixtures of the herbicide Primextra® Gold TZ and the metal copper in the marine diatom Thalassiosira weissflogii and in the estuarine calanoid Acartia tonsa by determining growth rate and immobilisation effects, respectively, and changes on fatty acids (FA) profiles, being the latter a good biomarker of stress. Single effects revealed that the herbicide is considerably more toxic to diatoms than to copepods, whereas the metal showed an opposite trend. Mixture effects revealed that copper and Primextra® acted antagonistically relative to concentration addition model on diatoms and synergistically relative to independent action model on copepods. FA profiles of diatom responded significantly to the single copper exposure. Significant decline in the content of copepod FAs was observed after mixture exposure, including considerable decrease of essential FAs that cannot be synthesized de novo. Our results revealed that the mixture effects are more hazardous for primary consumer than for primary producer species in terms of abundance and biomass quality, suggesting the harmful effects for higher trophic levels, biodiversity losses and decrease in ecosystem health status.

Biography

Valentina Filimonova is currently a 29 years old PhD researcher at the final year of the Doctoral Programme on Marine Ecosystem Health and Conservation (MARES, mares-eu.org) from University of Aveiro, Portugal, and Ghent University, Belgium. She published 2 papers in indexed SCI journals.

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