
Plastic exsudates induces negatives effects on fertilization of *Lytechinus variegatus* (Echinoidea: Echinodermata)

Agatha Miralha^{*†1}, Raquel Neves¹, Luciano Santos¹, and Mariana Contins²

¹UNIRIO – RJ, Brazil

²UFRJ – RJ, Brazil

Abstract

Plastics in the aquatic environment can release additive chemicals that induce toxicity to organisms affecting environmental quality that may be harmful to human health. The present study aims to evaluate the impacts of exposure to plastic exudates on the fertilization success of the sea urchin *Lytechinus variegatus*. Macroplastics were collected on the Vermelha Beach (Rio de Janeiro-Brazil), screened, and subsequently kept in a glass aquarium with artificial seawater (17.5 g plastics L⁻¹) for 40 days at 40°C to stimulate exudates release in the water. Sea urchins (n= 10) were manually sampled by free diving and, after acclimation in the laboratory (48 h), gametes release was induced (0.5 M KCl). Gametes of females (30 oocytes mL⁻¹) and males (105 spermatozoa mL⁻¹) were added to glass Erlenmeyers (200 mL) with filtered seawater and 0% (control), 25%, 50%, 75%, and 100% of exudates solution (Neves et al., 2018). After 24h of incubations in controlled conditions, aliquots (5 mL) of each replicate (n= 3 by concentration) were collected for examination under an inverted microscope. A significant effect of exposure to plastic exudates was evidenced in the fertilization success of the sea urchin (one-way ANOVA, p< 0.0001). Experimental assays revealed inhibitory effects from 50% concentration of plastic exudates on in vitro fertilization of the sea urchin *L. variegatus* (Tukey, p< 0.0001). The present study evidenced the negative effects of distinct concentrations of plastic exudates on fertilization of the sea urchin *L. variegatus* and highlights the potential impacts of marine litter, especially plastic pollution, on sea urchin distribution and maybe reducing the species' area of occurrence.

Keywords: plastics, sea urchin, ecology

^{*}Speaker

[†]Corresponding author: htamiralha@edu.unirio.br