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Influence of bacteria on the response of microalgae to contaminant mixtures

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12 **Abstract**

13 When microalgae are exposed to contaminants, the role of associated bacteria within
14 the phycosphere, the microenvironment surrounding algal cells, remains largely unknown.

15 The present study investigated the importance of algae-associated bacteria on the responses of
16 microalgae growth to metallic and organic toxicant exposure. The effects of a polluted
17 sediment elutriate, and of metal or pesticide mixtures at environmentally relevant
18 concentrations ($<10 \mu\text{g L}^{-1}$) were assessed on the growth of two microalgae strains: *Isochrysis*
19 *galbana*, a prymnesiophyte, and *Thalassiosira delicatula*, a centric diatom. Both cultures
20 were maintained as axenic or bacterized under similar conditions in batch cultures. In axenic
21 conditions, the metal mixture addition at low concentrations alleviated limitation of growth by
22 metals for *T. delicatula* relative to control, but inhibited *I. galbana* growth at highest
23 concentration. In similar axenic conditions, both *T. delicatula* and *I. galbana* growth were
24 negatively inhibited by pesticide mixture at concentrations as low as 10 ng L^{-1} . The bacterial
25 diversities associated with the two microalgae strains were significantly different (Bray–

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