

Toxicity of sediments under the influence of the submarine emissary of Santos using the marine amphipod *Parhyale hawaiiensis*.

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Abstract

Acute toxicity tests were performed using sediments from the submarine emissary of Santos and *Parhyale hawaiiensis*, which is a marine amphipod. The toxicity was related to the organic matter present in the sediments.

Key words: acute toxicity, sediments, marine organism.

Introduction

In Brazil, the submarine emissary of Santos is considered one of the main emissaries of the country, reaching a volume of seven thousand liters per second. However, the practice of effluent disposal in the oceans may have negative impacts on aquatic biota. When treatment is not appropriate, several contaminants can reach the water and sediments of the disposal area. Knowing that the practice of disposal can affect the marine life, this work aimed to evaluate the acute toxicity of sediment samples under the influence of the submarine emissary of Santos using the marine amphipod *Parhyale hawaiiensis*.

Results and Discussion

Samples were collected at four different sites in four sampling campaigns and were evaluated as fresh sediment, dry sediment (45°C), aqueous fraction (elutriate with sediment and water, 1:4 (w/v), and organic extracts (2.5DCM:1MeOH). Liquid samples were tested using 96-wells microplates¹, and the sediment using 12 wells-microplates containing sediment and salt water in 1:4 (w/v)^{1,2}. Neonates (< 7 days old) *P. hawaiiensis* were used and placed individually in each well. From samples analyzed, fresh sediment presented a toxicity for 72% of samples, while dried sediment was toxic for 78% of samples. Besides, all aqueous fraction were negative and organic extracts were toxic for 71% samples.



Image 1. Sites where the samples were collected.

We also analyzed the Extracted Organic Material (EOM) to know how much organic matter is present in the samples. For that, we added 200 μ L of organic extract in one capsule for each point and measured the difference of its mass before and after the addition of the volume. That difference is considered organic matter.

With the knowledge that the mortality could be due to the organic matter present in the sediments, we made the correlation between EOM and mortality of dried sediment, reaching a positive relation (Image 2).

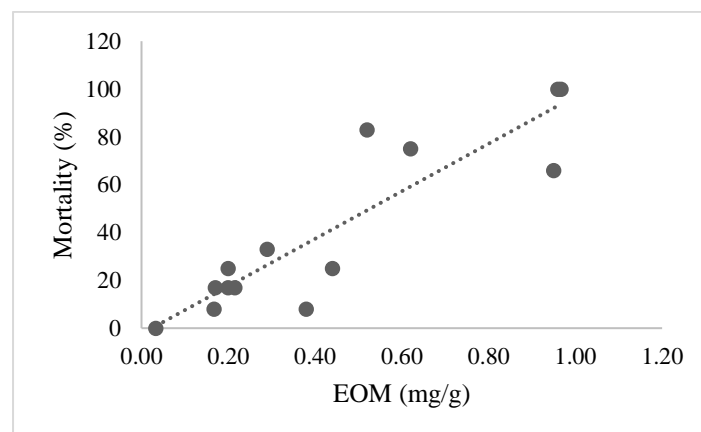


Image 2. Relation between EOM and mortality using *P. hawaiiensis*.

Conclusions

Results suggest that toxicity is mainly related to organic contaminants, which is possible to note that mortality and organic matter are directly proportional. Therefore, we conclude that the sediments are being adversely affected by the submarine outfall discharge.

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¹ ARTAL, M. et al. Development of the marine amphipod *Parhyale hawaiiensis* as a model organism for ecotoxicology. **Abstract Book of SETAC North America 37th Annual Meeting**, p. 103, 2016.

² ASTM. E 1367 – 03. Standard Test Method for Measuring the Toxicity of Sediment - Associated Contaminants with Estuarine and Marine Invertebrates. **American Society for Testing and Materials**, 2014.