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INHIBITION OF MARINE BIOFOULING BY POTASSIUM SORBATE LAB-TESTS AND FIELD TRIALS APPROACHES

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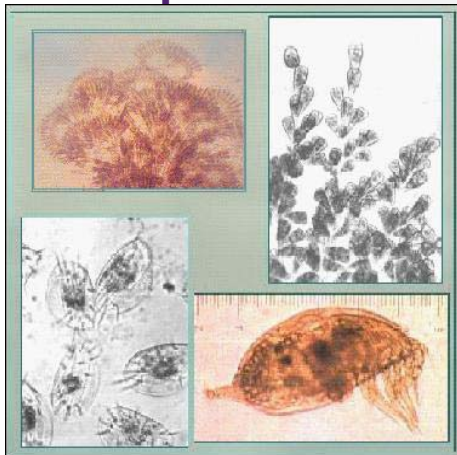
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INTRODUCTION

New trends in antifouling technology are focused to the use of environmental friendly-compounds. One of them is the application of common antimicrobial products, and it is hypothesised that they could affect the first step of the sequence and consequently interrupt biofouling development.



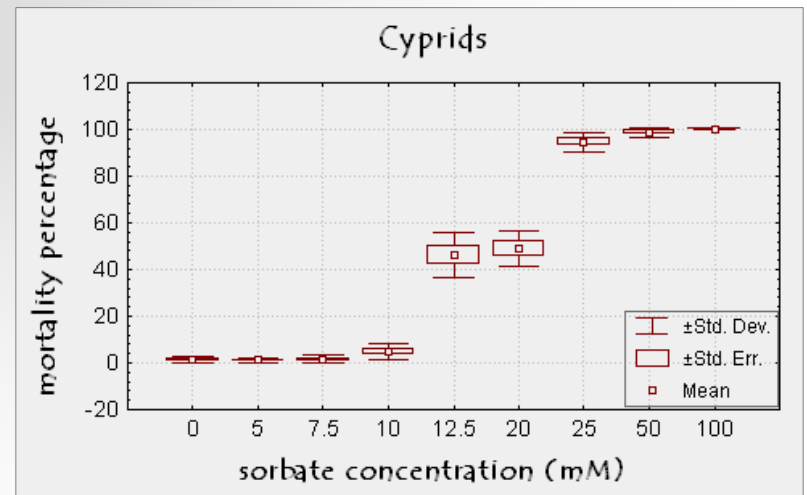
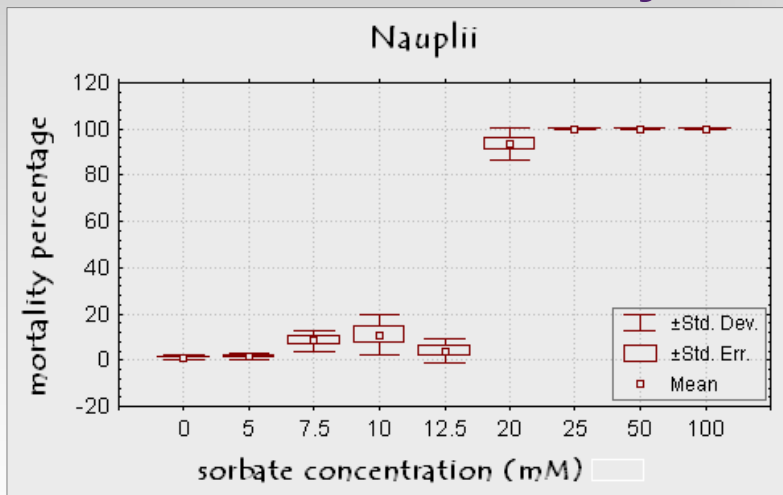
The aim of this study is to evaluate the activity of potassium sorbate, a synthetic compound widely used as food preservative, on larval survival of *Balanus amphitrite* through laboratory antifouling bioassays and field trials.

LAB -TESTS

In the lab , potassium sorbate solutions ranged between 0.1 and 0.001M were prepared.

Toxicity tests were conducted using nauplii II and cyprids of *Balanus amphitrite*; results were recorded after 24 hours incubation.

Toxicity Tests – 24 hours



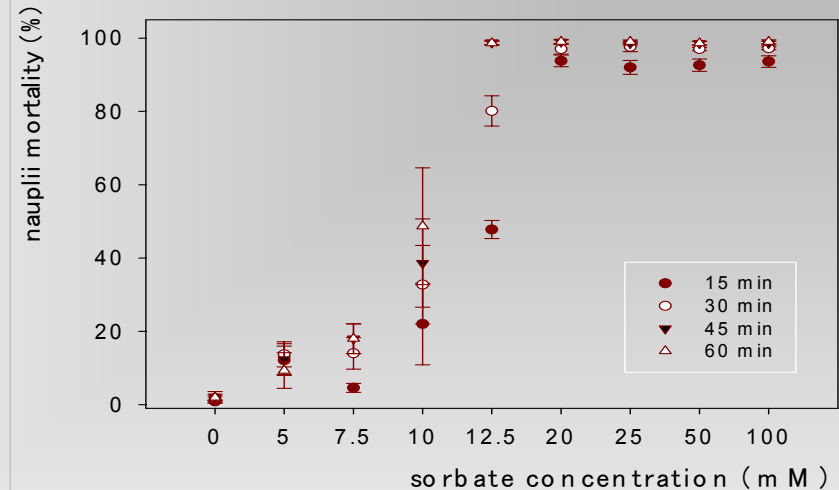
Data were analysed non-parametrically (Kruskal-Wallis), $p < 0.05$. Bars indicate mean \pm SE.

LAB -TESTS

Also, effect of potassium sorbate solutions on nauplii during the first 60 minutes of exposure was checked.

Data were analysed using ANOVA test, $p < 0.05$. Bars indicate mean \pm SE.

Toxicity Tests - 1 hour

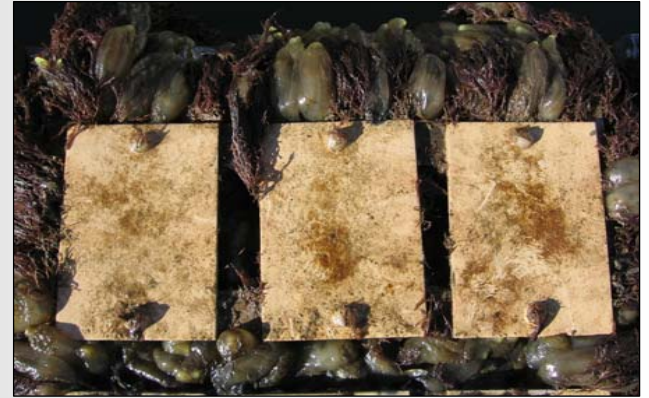


Significant differences between treatment and controls were observed in solutions higher than 12.5 mM. Above this concentration, solutions were effective in inhibiting both nauplii swimming movements and cyprids attachment. These results were detected since the first 60 minutes of exposure to potassium sorbate solutions.

FIELD TRIALS

Potassium sorbate was entrapped into a non-toxic varnish. Acrylic panels coated with the varnish were exposed in Mar del Plata harbour, Argentina.

Biofouling percentage cover was estimated. Significant differences were registered in settlement of diatoms (*Achnanthes*, *Nitzschia*, *Synedra*, *Lycmophora*) and some macrofoulers (*Enteromorpha*, *Ectocarpus*, *Bugula*, *Ciona*, *Botryllus*) between painted and control panels ($p < 0.05$)



Painted panels, 30 days immersion



Control panels, 30 days immersion

CONCLUSIONS

- Laboratory tests shown that potassium sorbate solutions were effective in inhibiting *Balanus amphitrite* larvae
- In field trials, the potassium sorbate incorporated into varnish coating show a great decrease in micro and macro-fouling density and diversity in relation to controls
- Since potassium sorbate is a good, non-lethal, bioactive compound and demonstrated a satisfactory behavior in the sea, it is an excellent alternative for fouling control

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