1. Introduction

- Blue Mussels (*Mytilus edulis*) production in hatcheries (figure 1) is limited by the occurrence of mass mortality events which are generally related to the presence of bacterial pathogens in the rearing system.
- Culture conditions in the rearing system can lead to the development of opportunistic pathogens, such as *Vibrio splendidus*, at a high density.
- Despite its effectiveness, the use of antibiotics poses many problems in aquaculture (e.g., occurrence and transmission of antibiotic resistance in the food web, long-term inefficiency, etc.) and is highly regulated internationally.
- The use of probiotics such as marennine, a blue pigment produced by *Haslea ostrearia* (figure 2), could be a promising alternative to antibiotics in bivalve hatcheries.  

2. Main objective of the study

Highlighting the protective effect of a new natural probiotic, marennine, on *Mytilus edulis* larvae during bacterial challenges in relation to a potential modification of the microbiota of the marennine-treated larvae.

3. Experimental design

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4.1 Larval survival rate

- The presence of the pathogen *V. splendidus* decreased the larval survival rate after 96 h of exposition for the unchallenged D-larvae but not for the post-larvae.
- Marennine demonstrated a protective effect on the challenged D-larvae.
- A preliminary experiment has demonstrated that marennine have no direct antibacterial effect on *V. splendidus* (data not shown).

Marennine-treated D-larvae were protected against *V. splendidus* during the experiments even though marennine did not previously show a direct antibacterial effect.

4.2 Bacterial abundance

- The presence of marennine did not affect the abundance of bacterial cells.
- The addition of *V. splendidus* cells is traceable with the cytograms after 1 h but not after 96 h.

Marennine did not demonstrate a direct antibacterial effect when used during the bacterial challenges of both larval stages against *V. splendidus* suggesting its effect is "in the larvae".

4.3 Bacterial richness

- The presence of marennine generally lead to a diminution of the number of OTUs detected.

5. Conclusion

The results demonstrated that the presence of marennine in the rearing medium of the challenged D-larvae had a protective effect which is associated with a modification in the larval microbiota's genetic fingerprint. Metabarcoding analyses will enable us to investigate the latter larval microbiota modification.