



## MASTER THESIS PROJECT

# Effects of the UV filter Benzophenone-3 on the blue mussel (*Mytilus edulis*) haemocytes

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## ABSTRACT

**Background/purpose:** Mussels are ecologically important species that provide numerous ecosystem services. Recent concerns about Benzophenone-3 and its cancerogenic and mutagenic effects have led to changes in allowed concentration in personal care products in the European Union. Studies have shown that it impacts different organisms, from algae to humans. Nevertheless, its impacts on crucial organisms such as *Mytilus edulis* and on their immune system are less studied and largely unknown.

**Methods:** In order to test the detection range of BP-3 with a spectrophotometer, standard solutions with concentrations from 3500 to 0,35 µg/L have been prepared. Further, to study BP-3's stability in seawater, BP-3 has been prepared in solutions at 175 mg/L and 3,5 g/L concentrations and observed during specific amount of time. The data has been analysed at 295 nm.

To study the impact of BP-3 on the immune cells of the mussels, 3 concentrations have been utilized: 350, 35, and 3,5 µg/L. *In vitro* tests have been conducted using a nuclei-tracking technique. The velocity of haemocytes (in µm/min) has been analysed and compared between samples treated with BP-3 and control samples.

**Results:** The equipment could detect BP-3 but was not suitable to study its stability at low concentrations. Nevertheless, preliminary results indicated that BP-3 may not be stable for a duration of 24 hours in tested conditions.

BP-3 influenced the motility of haemocytes twofold. Higher concentrations (350 and 35 µg/L) have suppressed the motility in comparison to the control, while the low concentration (3,5 µg/L) has stimulated mussels' haemocytes and induced an inflammatory response.

**Conclusion:** For the analysis of BP-3 stability more precise techniques are needed. Its stability should be tested at environmentally relevant concentrations.

BP-3 altered the motility of haemocytes *in vitro*. The results of this study could indicate that the immune system of *M.edulis* might be impacted by the presence of BP-3 in the environment. This result raises a question if *M.edulis* could fight against parasites and invaders in the presence of BP-3.