

## Environmental parameters modulate lead chloride toxicity on *Artemia salina*

Mohammad SN<sup>1</sup>; Pinto AAG<sup>1</sup>; Nagai MYO<sup>1</sup>; Coimbra EM<sup>1</sup>; Suffredini IB<sup>1</sup>; Peres GB<sup>1</sup>; Bernardi MM<sup>1</sup>; Bonamin LV<sup>1</sup>.

[1] Graduation Program in Environmental and Experimental Pathology, *Universidade Paulista* - UNIP, São Paulo, Brazil.

### ABSTRACT

**Introduction:** Different environmental conditions can influence the effects of toxic agents on living beings. Recently, a series of experiments performed in *Artemia salina* submitted to different kinds of intoxication have shown that both, isotherapeutic and succussed water can change *Artemia salina*'s bio resilience at different levels. Moreover, it seems to vary according to the circalunar cycle. **Objective:** To verify if circalunar phases and water agitation can modify the toxicity of lead chloride on *Artemia salina in vitro*. **Methodology:** *Artemia salina* cysts were exposed to seawater containing 0.04% of lead chloride (equal to EC10 or 10% effective concentration, previously determined in a pilot study) in 96-well culture plates. Thirty-six experimental repetitions were performed in four series to observe the possible effects of adding stirred water, the so-called succussed water, and the moon phases. The hatched cysts were recorded after 48 hours using a digital microscope (1000x magnification) to identify the hatching percentage and the viability and mobility of the born nauplii. **Results:** The exposition of cysts to PbCl<sub>2</sub> led to an increase in the hatching rate, and it was more evident during the full moon ( $p = 0.00014$ ) The addition of succussed water into the seawater medium reduced this effect to the baseline levels. An increase in mobility was seen in nauplii born from exposed cysts during the full moon ( $p = 0.00077$ ), but this effect was not affected by the treatment with succussed water. **Discussion:** Although the effects of lead chloride EC10 on the increase of nauplii hatching were expected, two environmental variables changed the sensitivity of cysts to this harmful stimulus. The circalunar cycle varied the hatching rate according to the moon phase, even in laboratory conditions, and the addition of succussed water into the medium reduced the hatching rate, even with different intensities according to the moon phase. The organi-

zation of nano and microbubbles generated after the succussion of water could be related to this protective effect and can explain, at least partially the effects of high diluted preparations on this biological context. **Conclusion:** Environmental factors, such as the circalunar cycle and products of water agitation, can modulate the adaptative control of hatching in *Artemia salina* exposed to lead chloride at EC10.

**Keywords:** ecotoxicology, microcrustacean, circalunar cycle, water agitation.