

Buffer capacity of the coelomic fluid in echinoderms

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The increase in atmospheric CO₂ due to anthropic activities results in an acidification of the surface waters of the oceans. The impact of these chemical changes differs according to the considered organisms. The intertidal rocky shores may harbor organisms pre-adapted to the upcoming changes as they already face tidal pH and temperature fluctuations. In order to cope with the changes in seawater pH, these organisms possess different mechanisms involved in acid-base regulation. Some organisms present a higher buffer capacity than seawater, among which echinoderms. The properties of this buffer capacity and the factors influencing it were investigated in the sea urchin *Paracentrotus lividus* and in the starfish *Asterias rubens*, both species occurring in the intertidal zone of the North Atlantic and the North Sea, respectively. Buffer capacity is partly due to the coelomocytes present in the coelomic fluid and, in *P. lividus*, it is also due to a compound which contributes to a higher buffer capacity of the coelomic fluid of this species compared to that of the starfish. The effect of a decreased seawater pH (in the scope of predicted future ocean acidification) on this buffer capacity in *P. lividus* was investigated. A gradual increase of the buffer capacity was recorded when the seawater pH was decreased. Moreover, the comparison of different echinoderm species showed that Euechinoidea present a very high buffer capacity while Cidarioidea (other sea urchins), starfish and holothurians have a lower one. This can be explained either by the presence of the compound only in Euechinoidea, linked to differences in the respiratory machinery, or by metabolic differences between the various classes of echinoderms.

Keywords: ocean acidification; echinoderms; acid-base regulation.