Response of alkaline phosphatase and nitrate reductase activity under different partial pressures of CO_2 and Nitrate:Phosphate ratios in the coccolithophore *Emiliania huxleyi*

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Emiliania huxleyi is known to be one of the major calcite producing phytoplanktonic species in the ocean. Due to its worldwide distribution and its capability to form extensive blooms in both coastal and open oceanic waters, it is responsible for most of the global oceanic calcification and contributes greatly to the biochemical carbon cycle. Thus, the response of this species to different environmental conditions must be considered. There is clear evidence that ocean acidification, as a consequence of increasing CO_2 in the atmosphere, leads to many changes in geochemical and physiological processes including phytoplanktonic calcification mechanisms. However, few studies deal with the combined effects of different CO_2 and nutrient levels on coccolithophores' biology. Since nitrate and phosphate are the main limiting macronutrients in ocean ecosystems, the study of the change in the activity of the enzymes that participate in their assimilation under such environmental variation is crucial. Diluted batch cultures of *Emiliania huxleyi* were exposed to three different CO_2 levels (255, 527 and 1205 ppm), and combined with three different nutrient conditions (nutrient replete, phosphate limited and nitrate limited). Both variables were found to have a significant effect on alkaline phosphatase and nitrate reductase activity, although nutrient limitation was the dominant driving factor. These results contribute to the better understanding of bloom dynamics in projected future scenarios.