

RESEARCH TOOLS FOR TEACHING: A SCIENTIFIC PATH FOR 14 YEAR-OLDS TO UNDERSTAND MARINE ACIDIFICATION OCEAN ACIDIFICATION: BRING RESEARCH INTO CLASSROOMS

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Abstract

The fact that marine water is becoming more acidic because of the rising of atmospheric CO₂ partial pressure seems to be almost unknown to the public. A partnership with a middle school was established to fulfil the gap between research and the educational system. An experimental course on global climate change and ocean acidification was offered to 14 years-old pupils. The course, experimentally based on thallus of calcareous red algae grown under different acidic conditions, represents not only a way to spread knowledge on global climatic change among teenagers, but also a tool to measure how much new methods of teaching can improve scientific knowledge and skills at school.

Keywords: Algae, Global Change, Ph

Ocean acidification seems to be one of the most likely consequences of the increase of atmospheric CO₂ partial pressure, causing a remarkable change in the marine environment. [1]. Although ocean acidification might have great impacts, the phenomenon is still not well known and is almost unknown to the public. Our research team is focusing on the biological response of calcareous red algae (*Corallinaceae*) to ocean acidification [2]. The *Corallinaceae* play a fundamental ecological role in different marine ecosystems, from tropical reefs to high latitude cold waters. Different evidence, supported by vast and recent literature, suggest that, depositing mainly high-Mg calcite into their cell-walls, the *Corallinaceae* may be more susceptible to ocean acidification than other calcifiers [3]. Since we believe that education can play a key role in changing habits of new generation, regarding anthropic CO₂ emission and ocean acidification prevention, we decided to build a link between researchers and school. Thanks to specific skills in teaching that some members of our group developed for previous working experiences, and thanks to the support of C.I.R.D. (Interdepartmental Centre on Didactical Research – University of Trieste) we established a partnership with a middle school in town. We offered an experimental course on global climate change and ocean acidification to 14 years-old pupils. The experiment, based on thallus of *Lithophyllum incrustans* Philippi (1837) demonstrates that a lower pH than actual (7.8 versus 8.2) influences the growing rate and even the morphogenetic development of microscopical thalli. We randomly chose 21 students from all the 3rd classes of the schools and offered them to join the project, attending a course of 25 hours. Another 21 students, not taking part in lessons, represented the control group. The course was based on experimental observation of the growing of microscopical thallus, from spores released in the 1st day of culture until 14th day. The pupils learned to treat two 20-liter marine aquariums in which they grew the algae. In the first tank the pH value was the natural one (8.2), while in the second the pH value was maintained lower (7.8) through CO₂ insufflation. Pupils also learned to use instruments, to collect qualitative and numerical data, to represent the data, to elaborate them, and to take conclusion from the outcome. The personal engagement of the students, achieved through self-motivation, plays a fundamental role into the learning process: it is supposed that the girls and boys, attending to this course should develop their scientific knowledge and skills, including scientific language, more than control group [4]. All the students have been tested at the beginning of the school year, and will be at the end, to estimate previous skills and knowledge and homogeneity between the two tested groups. The scientific abilities and knowledge taken as terms of reference are those fixed by OCSE – PISA (*Organizzazione per la Cooperazione e Sviluppo Economico* - Programme International Student Assessment) for 14 years old students. The OCSE standard [5] is compared to the Italian ministerial standard [6], recently revised and updated.

References

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