

{rokbox title=|Overview of the components of ISMI :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-microbial-activity-hydrostatic-pressure-microbial-incubator-amano-et-al-2022-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-microbial-activity-hydrostatic-pressure-microbial-incubator-amano-et-al-2022.jpg{/rokbox}

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[**A device for assessing microbial activity under ambient hydrostatic pressure: The in situ microbial incubator \(ISMI\).**](#)

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Abstract: Microbes in the dark ocean are exposed to hydrostatic pressure increasing with depth. Activity rate measurements and biomass production of dark ocean microbes are, however, almost exclusively performed under atmospheric pressure conditions due to technical constraints of sampling equipment maintaining in situ pressure conditions. To evaluate the microbial activity under in situ hydrostatic pressure, we designed and thoroughly tested an in situ microbial incubator (ISMI). The ISMI allows autonomously collecting and incubating seawater at depth, injection of substrate and fixation of the samples after a preprogrammed incubation time. The performance of the ISMI was tested in a high-pressure tank and in several field campaigns under ambient hydrostatic pressure by measuring prokaryotic bulk ³H-leucine incorporation rates. Overall, prokaryotic leucine incorporation rates were lower at in situ pressure conditions than under depressurized conditions reaching only about 50% of the heterotrophic microbial activity measured under depressurized conditions in bathypelagic waters in the North Atlantic Ocean off the northwestern Iberian Peninsula. Our results show that the ISMI is a valuable tool to reliably determine the metabolic activity of deep-sea microbes at in situ hydrostatic pressure conditions. Hence, we advocate that deep-sea biogeochemical and microbial rate measurements should be performed under in situ pressure conditions to obtain a more realistic view on deep-sea biotic processes.

Keywords: