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# Towards a universal microbial inoculum for dissolved organic carbon degradation experiments

Ada Pastor (1), Núria Catalán (1), Carmen Gutiérrez (1), Nupur Nagar (1), Joan P. Casas-Ruiz (1), Biel Obrador (2), Daniel von Schiller (3), Sergi Sabater (1,4), Mira Petrovic (1,5), Carles M. Borrego (1,6), and Rafael Marcé (1)

(1) Catalan Institute for Water Research, Girona, Spain (apastor@icra.cat), (2) Departament BEECA, Secció Ecologia, Universitat de Barcelona, Barcelona Spain, (3) University of the Basque Country, Bilbao, Spain, (4) Icrea, Catalan Institution for Research and Advanced Studies, Barcelona, Spain, (5) GRECO, Institute of Aquatic Ecology, University of Girona, Girona, Spain, (6) Group of Molecular Microbial Ecology, Institute of Aquatic Ecology, University of Girona, Spain

Dissolved organic carbon (DOC) is the largest biologically available pool of organic carbon in aquatic ecosystems and its degradation along the land-to-ocean continuum has implications for carbon cycling from local to global scales. DOC biodegradability is usually assessed by incubating filtered water inoculated with native microbial assemblages in the laboratory. However, the use of a native inoculum from several freshwaters, without having a microbial-tailored design, hampers our ability to tease apart the relative contribution of the factors driving DOC degradation from the effects of local microbial communities. The use of a standard microbial inoculum would allow researchers to disentangle the drivers of DOC degradation from the metabolic capabilities of microbial communities operating in situ. With this purpose, we designed a bacterial inoculum to be used in experiments of DOC degradation in freshwater habitats. The inoculum is composed of six bacterial strains that easily grow under laboratory conditions, possess a versatile metabolism and are able to grow under both aerobic and anaerobic conditions. The mixed inoculum showed higher DOC degradation rates than those from their isolated bacterial components and the consumption of organic substrates was consistently replicated. Moreover, DOC degradation rates obtained using the designed inoculum were responsive across a wide range of natural water types differing in DOC concentration and composition. Overall, our results show the potential of the designed inoculum as a tool to discriminate between the effects of environmental drivers and intrinsic properties of DOC on degradation dynamics.