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I International Conference on Research for Sustainable Development in Mountain Regions

Book of Abstracts

INSTITUTO POLITÉCNICO DE BRAGANÇA

Centro de Investigação de Montanha

Embrapa

United Nations Educational, Scientific and Cultural Organization · UNESCO Chair in Sustainable Mountain Development

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S03O07

Biofilm as nutrient removal from eutrophic waters: potential applications in a mountain urban river (Fervença River, NE Portugal)

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Algal blooms are, generally, controlled by chemical and/or physical methods. However, these methods can be toxic and/or deleterious to biota, laborious, expensive and short-lived. The most effective control measure is reducing the amount of available nutrients in water. Biofilm is amongst the most efficient organisms in removing dissolved nutrients in aquatic ecosystems. Micro and mesocosm experiments carried out by the team tested the magnitude of nutrient uptake by biofilm using water from a lake and of a sewage plant treatment. Artificial substrates (plastic bands) were used in order to stimulate biofilm colonization. Results, for both river and sewage treatment water, revealed that similar proportion of total inorganic nitrogen and total phosphorous, 58 and 57%, respectively, was captured during the 45 days of experimentation, confirmed by the significant decrease of chlorophyll a concentration and by the increasing of water transparency in the treatments with biofilm. The Fervença River is a mountain river, flowing for about 25 km, and discharging into Sabor River (River Douro watershed). It is subjected to high levels of disturbance: the upper section receives diffuse nutrient inputs (namely nitrogen and phosphorous) mainly generate by agricultural activities; the middle section, which flows through Bragança city, has been regulated, several pools were created and riparian vegetation was fully removed from the left bank; the lower section receives the effluent from the sewage treatment plant, inputting an additional charge of nutrients. Therefore, due to eutrophication and reduced shade, blooms of filamentous algae occur frequently, both in the middle and in the lower sections, impacting water quality, recreational and aesthetic value of the fluvial landscape. In the present communication, the applicability and the potential use of this environmental-friendly methodology, directly "in-situ" and/or in sewage plant, as a means of preventing Fervença River eutrophication and the excessive algal growth, will be discussed.