

HIFREQ PROJECT: EXPERIMENTAL TEST OF NITRATES AND PHOSPHATES RETENTION CAPACITY BY COCONUT FIBRE, XYLIT FIBRE AND TWIG BUNDLES

Within the framework of the European Project HiFreq, Naturalea is collaborating with the University of Birmingham to perform a research program related with the study of the potential capacity of three materials used in bioengineering techniques to reduce the water nitrate and phosphate loads that occurs in freshwater ecosystems.

In last weeks, the experimental set has been prepared, that is, 15 recirculating flumes that hold tap water, with circulation pumps and heaters set up in each one to provide the water velocity and temperature. Each flume content a gravel bed previously colonized by fluvial biofilm, except three of them that have no gravel bed and will be a control. The experiment consist of 5 treatments: (1) gravel bed and coconut fibre (placed in mesh packs), (2) gravel bed and xylit (placed in mesh packs), (3) gravel and twig bundles and two controls (4) one with gravel and (5) another one without gravel. First water analyses have also been performed.

These water samplings and analyses have been carried out before place the mesh packs and the hazel fagots into the flumes. That characterisation provides the information to know the initial physical and chemical conditions of the flume water before the nutrient injection that will be add in the experimental phase. If these initial features are similar enough, that will permit a comparative study within the treatments in the experimental stage.

Once the water characterisation has been performed, the mesh packs and the hazel twig bundles have been placed inside the selected flumes (Figures 1 and 2). When the fibres and the twigs are fully colonized by the biofilm the experimental phase can start; this colonisation of the substrates will take some weeks.



Figure 1: On the right, detail of one of the flumes with xylit mesh packs; on the left a control flume that just contents the gravel bed.



Figure 2: Flume with the four hazel twig bundles.

At the same time, the analyses of the organic matter content of each kind of substrate have started. To sample the substrates, several small mesh bags filled with xylit, coconut fibre and twigs have been placed in the flumes (Figure 3). One bag of each material will be retrieved from the flumes at different times over the experimental phase in order to analyse the organic matter content, the loss of mass and the biomass of biofilm attached to the substrate over the time.



Figure 3: Small mesh bags that content samples of the different substrates (left: xylit, right: coconut fibre) and that will be used for the organic matter content analyses.