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Biogeosciences Discussions

Interactive comment on "Characterization of broom fibers for PRB in the remediation of aquifers contaminated by heavy metals" *by* C. Fallico et al.

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1. Referring to question 1, we believe that what was founded by analyzing the evolution of permeability to vary the density it is a general trend that we expected to found also by intuition, because increasing the density of the fibers one obtains a reduction of the amount of porous available to the flux through the medium (broom), so a decrease of the k. In Fig. 8, effectively the k value for DH=50 cm at density of 79 kg/m^3 is bigger than the k value at density of 64 kg/m^3, however we retain of interest the general trend and not the single episodic value. In fact the experimental values can be influenced by some factors, as a wrong compaction of the fibers, the initial formation of macropores that afterwards, increasing the

density, close again, etc... Therefore we consider meaningful the results shown in Fig. 8 that confirm altogether the expected trend.

2. Considering second issue, how it was said in the paragraph 1.1 Natural fibers from the experiments of Mohanty et al. (2000) before and Beom-Goo Lee et al. (2004) then yielded that the principle mechanism through which a natural fiber and then also the broom fiber determine a reduction of the heavy metal concentration is by absorption because the fiber has a height specific surface that is able to well absorb the pollutant. This is the main mechanism certainly recognized by literature, but we also think that some other processes could play an ulterior role in concentration reduction and this is something to investigate in the future.

3. Taking into account the third topic we choose a linear relation for kinetic of degradation because this is the most common approach to follow in design a PRB with zero-valent iron (ZVI) as a reactive medium. Some references that use this kinetic are:

Bonomo L. "*57° Corso di aggiornamento in Ingegneria Sanitaria – Ambientale. Siti Contaminati: Tecnologie di risanamento* ". Dipartimento di Ingegneria Idraulica, Ambientale e del Rilevamento – Sezione Ambientale – Politecnico di Milano. (2003).

Di Molfetta A., Sethi R. "*Criteri di progettazione di barriere permeabili reattive a ferro zero valente*".Dipartimento di Georisorse e Territorio, Politecnico di Torino. (2001).

U.S.EPA. September 1998. *Permeable reactive barrier. technologies for contaminant remediation*. R. M. Powell, R. W. Puls, Subsurface Protection and Remediation Division National Risk Management Research Laboratory Ada, Oklahoma 74820

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