Drink. Water Eng. Sci. Discuss., 5, C212–C214, 2012
www.drink-water-eng-sci-discuss.net/5/C212/2012/

Drinking Water Engineering and Science Discussions

Interactive comment on "Low-cost multi-stage filtration enhanced by coagulation-flocculation in upflow gravel filtration" *by* L. D. Sánchez et al.

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Received and published: 1 November 2012

Response to the comments of Referee #2:

We really appreciate your comments and your dedication to the revision of the work. Responses to comments are presented below:

Comment 1

This paper "Low-cost multi-stage filtration enhanced by coagulation-flocculation in up-flow gravel filtration"assesses the operational and design aspects of coagulation and flocculation in upflow gravel filters (CF-UGF) in a multi-stage filtration (MSF) plant. Paper was aloud written and visibly is the flexibility of the system to operate with and without coagulant according to the influent turbidity.

Answer 1:

We appreciate your comment. The technological option that is presented has indeed good flexibility which is very important for sustainable water quality improvement in rural and small community water supply systems.

Comment 2

Suggestion: - performed other hydrodynamic model. In the hydrodynamic model was performed only CMRS model (in Reactor Engineering literature named Tank in series model) but not performed other models (e.g. Dispersion model). Considering that only 51% of tank reactor was perfect mixed for determination influence of dispersion should be determined Peclet number. To check balance of tracer and confirmed that not involved in any of the physical and chemical processes.

Answer 2

For the hydraulic analysis of reactor, in fact we employ three models as described in the methodology section 2.2. Results were analysed with the mathematical model Wolf-Resnick, the Morril Index (relationship between the time between the 90% and the 10% passage of the tracer), and the model of completely mixed reactors in series (CMRS). Wolf-Resnick model quantifies fractions of plug flow, the mixed flow and dead zones; while the CRMS model indicates the number of reactors in series showing the trend toward plug flow or mixed flow. The Morril index also indicates the trend toward plug flow (IM=1), mixed flow or no ideal flow. As the results showed the same trend with the three models, we feel that is sufficient support for our case and we do not consider it necessary to apply another models, as the Peclet number mass diffusion PeMD, because in essence it will give the same information that Morrill Index. PeMD less than one, gives an idea of a perfect mixing flow and if it is greater than 100, gives an idea of a plug flow. Intermediate PeMD indicate a non-ideal behavior of the reactor.

Comment 3

Syntax mistake in paper: - Fig. 4. X-axis not correctly described In Chem. Eng. Literature ratio t/t0 need to write as lower case letter and it is dimensionless time. Uppercase letter T is symbol for Temperature.

Answer 3

Figure 4. will be revised to correct the syntax error

Interactive comment on Drink. Water Eng. Sci. Discuss., 5, 291, 2012.