Drink. Water Eng. Sci. Discuss.,
https://doi.org/10.5194/dwes-2018-28-RC2, 2019

Open Access
Drinking Water
Engineering and Science
Discussions

Interactive comment on "Bio-purification of drinking water by froth flotation" *by* Ghanim Hassan and Robert Edyvean

Anonymous Referee #2

Received and published: 30 January 2019

In this paper froth flotation, without the use of chemicals, is studied to remove bacteria from surface water, with the idea to diminish the doses of e.g. chlorine to disinfect the water. The study is creative, since froth flotation is not being used in drinking water production. However, unfortunately, the obtained results (50% removal) are not sufficient for implementation in practice, since in drinking water production frequently log 3 (99.9%) or more removal are required. The paper misses reflection on this issue. In addition, the paper builds on two other submitted papers. It is recommended to merge the three paper into this one, to avoid overlap and missing information (such as froth height in the columns), when reading the paper. General comments: - A clear explanation of the difference between froth flotation and DAF should be included in the introduction - The results chapters lacks explanation of the figures (given in discussion

chapter) - It is recommended to merge the results and discussion chapter to avoid the above - A more extensive discussion on the results in the light of literature and competing technologies should be included - It is not clear if there is a reference column (without froth flotation) installed. The long retention times in the columns can also give "spontaneous" decay of the bacteria. - It is not clear what the section on "dead bacteria" adds to the paper. So the suggestion is to delete this part. Specific comments: - Line 7, it is questionable if chlorine enhances biofilm formation (nowadays chlorine is also used to control biofilms in drinking water distribution) - Line 12 (and onwards), "length" = "height" - Line 14, content was measured - Line 16-17, questionable, see above. - Line 31, the word "biocide" is not used in drinking water treatment. Better use "disinfection" of "chlorination". - Line 33-34, rephrase or delete (unclear and not of importance) - Line 35-36, rephrase (unclear what is meant) - Line 40-42, see remark above - Line 47-48, see remark above - Line 52, a clear knowledge gap should be presented (may be also in combination with the other two papers) - Line 57, insert "respectively" after two meters height. "... sparger of 19 cm..." - Line 59, "... attached to the..." - Line 61-62, delete sentence. Not relevant here. - Line 64 and 75, delete Table 1. Not relevant information. - Line 77, explain why a nutrient broth is needed for the experiments - Line 79, explain that 24 hours incubation is sufficient in order to... - Line 82-84, avoid duplication of figures (almost similar) - Line 87-93, explain why this procedure was followed and if this is also done in other studies in this way. - Line 94-105, delete (see comment above) - Line 106 (and onwards), use passive tense: "was prepared", "was collected" etc. - Line 107 (and onwards), check section numbering. - Line 113 and 114, explain what is meant by "expected" and "desired"? - Line 121, "(2.3.1)" is not found in the paper. - Line 128 (and onwards), "downstream"= "effluent" - Line 129-131, explain why exactly this procedure is followed. - Line 130, mention the "next air flow rates". - Line 131, does it mean that with lower effluent flows there are higher froth flows? - Line 135, "3.2" cannot be found in the paper. - Line 137, "was restarted" - Line 138, "should be" = "were" - Line 140, "2.3.1"? - Line 145 and 148, "reaches" = "reached" - Line 157, "the difference of the concentrations between the

inlet and the effluent flows” - Line 166 and 170, what is meant by “stage 1” and “stage 2”? - Line 178-184, delete section - Line 187-190, this paragraph is more for the (end of) the introduction - Line 192, “downstream”= “effluent concentration” - Line 195, how the turbulence was measured/calculated? And how the “remixing of the bubbles in the froth” was observed? - Line 196, How the “waves” were observed? - Line 200-203, give reference on this explanation. - Line 207, “with less cfu/ml in the effluent” - Line 208-209, not clear how this was determined. - Line 210-212, it is not clear if the expected removal of bacteria was through the froth layer or in the entire column. It is also not clear what the froth layer thickness was (and if these were different for the two columns) - Line 213, “enhances” = “enhanced” - Line 221, “in the current chapter” (is this copied from the original thesis)? - Line 227 is floc formation and attachment of bacteria in natural water (with salt) also not a relevant mechanism of enhanced bacterial removal? - Line 228-249 not relevant here, so delete - Line 250, check numbering of sections - Line 251, “starts” is “started”, in the other papers higher air flows were reported.. - Line 252, “loses itself from” - Line 253, in continuous operation more water is wasted, but also more water is produced, so report the efficieny (in %). - Line 256, since the column wall is apparantly important for froth build up, then reflect on large-scale application. - Line 262-263, this recommendation could not be made based on the presented work - Line 264-265, delete section - Line 276-278, this conclusion could not be made based on the presented work

---

Interactive comment on Drink. Water Eng. Sci. Discuss., https://doi.org/10.5194/dwes-2018-28, 2019.