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# *Interactive comment on* "De-chlorination of drinking water by forced aeration" *by* Ghanim Hassan and Robert G. J. Edyvean

**Anonymous Referee #2**

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In this paper forced aeration is experimented for de-chlorination purposes (after shock chlorination in reservoirs and wells). Major part of the paper is dedicated to the variation of air flows on the de-chlorination rate. In addition, three different chlorination methods are used. The paper is fairly written, but badly structured and some recommendations are made without evidence from the study. General comments: - Abstract is too long with too much detailing. Please concentrate on highlights (introduction and results, and avoid repetitions in abstract). - The introduction part should include some more references end with the clear knowledge gap. - The results chapters lacks explanation of the figures (given in discussion chapter) - The number of Figures are too many, and should be summarized so that better comparisons can be made. - It is recommended to merge the results and discussion chapter to avoid the above - It is



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Discussion paper

not clear how the shock chlorination experiments are performed and how they can be compared with the de-chlorination experiments. Is chlorine also “bubbled” or just dissolved and dosed? It is recommended to concentrate on de-chloriation experiments. - It is not clear from the paper how the “modelling” is performed. Is it assumed that the column is a plugflow (of air) reactor with changing “chlorine in air” concentration and thus a changing “chlorine saturation” concentration in water and thus a changing driving force? Since chlorine is not measured over the height of the reactor it is then difficult to define Kla values.. - A more extensive discussion on the results in the light of literature and competing technologies should be included - General recommendations/conclusions are made about pH effect, but this cannot be generalized since drinking water in practice is buffered and here demineralized water is used. - Avoid repetitions in the paper.

Specific comments: - Line 10, “biocide” is not used in drinking water treatment use “disinfectant” - Line 12, “charcoaling” should be “treatment with activated carbon” - Line 38-39, strange sentence since “new” is related to 1974 and it is not only a “study area” but “reality”. - Line 49-51, include references to Van der Kooij. - Line 53, “natural” should be “spontaneous” - Line 59, “it” = “is” - Line 62, “dechlorination” = “de-chlorination” - Line 63, see comment on Line 10 - Line 64-65, not clear what is meant - Line 71, delete “2. Hypotheses”, just part of introduction - Line 72-85, part of Materials and Methods section (including explanation asked for in general comments) - Line 86, “of” = “the” - Line 92-122, not relevant for explanation, common knowledge. - Line 123, should be “Lu et al. (1999) have done. . .” - Line 132-133, rephrase (not clear what is meant) - Line 133, “more” = “higher the” (2 times) - Line 135, avoid copying figures from other authors, so delete - Line 137, give reference - Line 140, “are designed” - Line 151, are these bubble sizes representative? - Line 152-153, rephrase - Line 158, rephrase - Line 160, rephrase - Line 176-177, not relevant here - Line 179, it is “recommended” but also “done”? - Line 193, use passive tenses “were prepared” etc. - Line 200, mention airflow, preferably not only in L/min, but also in m/h (for upscaling purposes) - Line 201, “8”? - Line 210, discuss that in “real water” the decay will be more rapid, since

chlorine reacts with other compounds in the water. - Line 261-262, should be part of introduction - Line 263-266, repetition so delete - Line 272-277, should be part of introduction - Line 278-293, give references for explanations - Line 296, what is meant by “stabilizing effect”? - Line 300, what is meant by “chlorine lock”? “h” = “H” - Line 301, - Line 303-305, explain what is the reason (with references) - Line 306-329, this discussion is not relevant (since not based on the results) or does not give extra information - Line 336-342, This is only relevant for the unbuffered, demineralized water used in the study. - Line 343-345, repetition so delete - Line 346-349, how do the values of Kla relate to other studies/systems with bubble aeration? - Line 350-355, unclear what is meant - Line 358-364, repetition so delete - Line 366, Kl is also dependent on turbulence - Line 367-369, Kla is independent of dC! - Line 371-373, not concentration difference, in relation to saturation concentration? - Line 374-379, not new so delete - Line 380-381, is chlorination done by air bubbling? See general comments. - Line 382-395, not part of the study (cannot be concluded) so delete.

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