

Interactive comment on “Conversion of organic micropollutants with limited bromate formation during the Peroxone process in drinking water treatment” by A. H. Knol et al.

Anonymous Referee #2

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The paper deals with the oxidation of selected micropollutants with the combination of ozone and peroxide during pilot testing of natural pre-treated water. In addition, the formation of bromate is tried to be limited. The paper has some interesting practical information and is suitable for publication in DWES. The paper is well structured, but has several minor and textual elements that have to be addressed before publication

General comments The abstract is written in the present tense, where the past tense is more appropriate. In the abstract, the results and discussion and the conclusions chapters it is stated that “the peroxone process can be controlled on basis of temperature, bicarbonate and TOC”. However, from the text it is not clear how this can be

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done. On page 24 (line 9) it is mentioned that NOM influences ozone consumption, then on page 25 (line 5) it is said that DOC is not relevant for bromate formation and in the conclusions it is concluded that peroxone can be controlled by measuring DOC. Please explain better. In the abstract and the introduction to the “strict Dutch guideline”, while the limit of 0.5 $\mu\text{g/L}$ of bromate is more a target. Do not refer to company standards. Duplications and superfluous information have to be avoided in the text. Start conclusions chapter with a small introduction of the purpose of the paper.

Specific comments: Pg 22, Line 8-9: sentence needs rephrasing Pg 22, Line 11-12: sentence needs rephrasing Pg22, line 18-10: delete “below . . . formed” (not needed) Pg 23, line 2: insert “all” before OMP Pg 23, line 4, delete “more” Pg 23, line 8, 9 and 10: delete “at the moment”, “fully to” and “Mainly the” respectively. Pg23, line 12-13 needs rephrasing Pg 23, line 13-16: delete “OMPS with. . . for customer perception” Pg 23, line 16-17: swap “detected” and “structurally” Pg 23, line 18: delete “at present” Pg 23, line 22: insert “the” before “most” Pg 23, line 23: “these” = “this” Pg 23, line 24: “this” = “these” Pg 23, line 27: delete “very” Pg 23, line 28-Pg 24, line 25: text suggestion” Although the reaction rate of direct oxidation, depending on the type of compounds, is relatively. . . .(Gottschalk et al., 2010), and the reaction rate.1010 M-1s-1, direct oxidation cannot be neglected when applying peroxone. Pg 24 line 1: explain to which equation the kinetics parameter k belongs. Pg 24 line 16: delete the sentence “There is also. . . 2 $\mu\text{g/L}$.”

Pg 24, line 20: delete “in the Netherlands” Pg 24, line 23-24: delete “depending on the method of interpretation” Pg 24, line 24: delete “This negligible. . . company standard”. Pg 25, line 3: insert “thus” before “affected” Pg 25, line 5: explain that DOC is a measure for NOM Pg 25, line 5-6: replace “water matrix .. Meuse” by “the formation of bromate”. Pg 25, line 6-8: rephrase sentence, not clear what is meant. Pg 25, line 15: why you need to know the “minimum ozone/hydrogen peroxide ratio”? Pg 25, line 18: insert “accompanied by” before “with batch” Pg 25, line 22: Rephase as follows: “The pilot plant consisted of an ozone loop reactor (Xylem Wedeco) with sequential injection

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point (IPs) and sample points (SPs) and a degassing contact chamber, and an ozone generator. Pg 26, line 6, 9, 18: only use IP and SP Pg 26, line 10: replace “flowed out” by “discharged to” Pg 26, line 17: is = was Pg 26, line 22, 24, 25: was = is Pg 26, line 24: passed = passes Pg 27, line 1: rephrase sentence to “Because of the varying water quality, research over a . . .” Pg 27, line 14: “representatively” = representativity Pg 27, line 17: replace “and” by “dosing” Pg 27, line 18: delete “RSF entered” Pg 27, line 20: rephrase into “about 0.1 mg CL-1, while the influent varied. . .” Pg 28, line 11: use “50” instead of “Fifty” Pg 28, line 27-29: DOC is apparently measured as TOC, explain. Pg 29, line 4: delete “range” (it is one wavelength) Pg 29, line 20: delete “(resulting. . . atrazine)” Pg 29, line 23: also include the energy consumption for the production of hydrogen peroxide Pg 29, line 26: if = when Pg 29, line 26 – pg 30: replace “the knowledge that bromate. . . ozone doses” by “findings of Von Gunten (2003b) Pg 30, line 6: why 10 mg/L? elsewhere was mentioned 5 mg/L Pg 30, line 7: is= was Pg 30, line 8: rephrase by “to comply a bromate concentration below 0.5 $\mu\text{g L}^{-1}$ at an ozone dose.” Pg 30, line 12: insert “dosing” before “was investigated” Pg 30, line 17: replace “year” by “period” (longer than year) Pg 30, line 18: differs = differed Pg 30, line 23: rephrase into “peroxide, exceeded the value of 0.5 $\mu\text{g L}^{-1}$ (with a maximum of 1.0 $\mu\text{g L}^{-1}$) Pg 31, line 4: appoint = indicate Pg 31, line 6: replace “from.. 2012” by “during the test period” Pg 31, line 11: Croué = Croué et al. Pg 31, line 13: “was found” = is Pg 31, line 15-16: There is or is not a correlation. You cannot say “correlation is not very obvious” Pg 31, line 17-18: delete “It is. . .bromide alone” Pg 31, line 22-23: delete “At higher pH. . . bromate formation” (it is clear from the small variation that you cannot draw conclusions) Pg 31, line 24-27: delete “and. . . . probably preferential”. (see above) Pg 32, line 1: replace “To which extent. . . .For sure” by “Probably” Pg 32, line 8: replace RSF by “the influent” Pg 32, line 9: is=was Pg 32, line 11: delete “Concerning the enclosed Meuse” Pg 32, line 15: delete “under which. . . negligible” Pg 32, line 18: delete second “the” Pg 32, line 20: delete “enormously” Pg 32, line 25: is = was Pg 32, line 26: mention all model compounds of relevance Pg 33, line 3: rephrase into “agent, also contains an aromatic ring, but. . .” Pg 33, line 6: mention all model compounds of

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relevance Pg 33, line 18: rephrase into “Bromacil was thus directly oxidized..” Pg 33, line 23: delete “ Besides. . . . 6 mgL-1” Pg 34, line 2: will be = is Pg 34, line 5: delete sentence Pg 34, line 7: easy = easily Pg 34, line 11: delete “therefore” Pg 34, line 12: substitute “Dunea guideline” by “value of 0.5 $\mu\text{g L}^{-1}$ Pg 34, line 15-18: delete paragraph Pg 34, line 19: rephrase into “It should therefore be noted. . .” Pg 34, line 21-22: delete “In the first. . . .Secondly” Pg 34, line 22-23: rephrase into “Also because oxidation by peroxide leads. . . products of OMPs. . . Sonntag et al. (2012), that may have unwanted toxic properties”. Pg 34, line 27 – Pg 35 line 2: delete paragraph Pg 35, line 5: RSF = influent Pg 35, line 10-14: delete sentences “All three. . . . Co-correlation.” Pg 35, line 15-16: delete “The fact. . . DOC concentration and rephrase into “, with the practical implication that in summer. . . dose needs to be bromate formation.” (so coming after “Fig 7”) Pg 35, line 24: degrades = degraded Pg 36, line 2-4: delete “ In drinking water. . . . Guideline for bromate” Pg 36, line 5: is = was Pg 36, line 6: is = was Pg 36, line 7: has = had Pg 36, line 8: limits = limited Pg 36, line 8: add “to levels below 0.5 $\mu\text{g L}^{-1}$

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