

Interactive comment on “Solar Distillation of Impure Water from Four Different Water Sources under South-Western Nigeria Climate” by Saheed A. Adio et al.

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Reviewers Comment: The removal of TDS and EC was studied using a locally made solar distillation installation. Various water sources were used and compared to other experiments described in literature. The paper is reasonably well written, but lacks a clear objective and a good discussion of the results with literature.

Author s Response: These general observations have been carefully rectified based on reviewer's comment as follows.

General comments by Reviewer: A clear objective at the end of the introduction is

C1

missing. How does this relate to previous research in the area? What is novel? Only location is not sufficient.. Is the design novel? - It should be explained why solar stills are used to treat the water mentioned water sources. Probably there are more cost effective ways to treat groundwater, rain water and surface water. - EC and TDS is not sufficient to judge the treatment performance since these are not indicators for microbial contamination e.g. - Comparing EC and TDS to WHO guidelines is not sufficient to judge performance. - The discussion with literature should be included in the sections describing the results (now they are separated). - Cost analyses should be made in comparison with the production, so xxx Cm3 - Language, including tenses, should be checked - Redundant information should be deleted. - Avoid too general introduction

Author s Response: A clear objective has been written close to the end of the introduction as highlighted in lines 84-88. The relationship between the present study and earlier works are established by comparing design, performance, efficiency and cost as highlighted in lines 111-114, 295-301, 352-355, 362-363 and 402-405. The reviewer raises issues on TDS and EC measurement since we did not check the microbial level or activities. Many papers discussed TDS and EC without specific emphasis on microbial level. The scope of the study does not consider the level of microbial contamination in the water sample before and after the desalination. TDS and EC tested before and after desalination are just in addition to the effect of solar insolation and temperature variations on the yield of the distillate from the constructed solar still. These were carried out to judge the performance of the constructed solar still. Other yardstick/parameter exist but not within the scope of this study. The main objective is to evaluate the performance of the Solar still based on the obtained yield, WHO standard on the TDS and EC of the output, Cost reduction (based on the locally sourced materials used in construction), etc. TDS and EC measurement are one of the ways by which Solar still performance is checked in the literature. Future work may include checking the level of microbial contamination before and after desalination.

Reviewer's Comment Line 21-22 and 23-26 Author's Response: Correction made

C2

based on reviewer's comment

Reviewer's Comment Line 28-38 Author's Response: Correction made based on reviewer's comment

Reviewer's Comment Line 39 Author's Response: Effect based on reviewer's comment

Reviewer's Comment Line 46 Author's Response: Location specified as observed by the reviewer

Reviewer's Comment Line 48-51 Author's Response: Corrected as suggested by the reviewer

Reviewer's Comment Line 54-57 Author's Response: Corrected as suggested by the reviewer

Reviewer's Comment Line 81, 84 & 89 Author's Response: Word has been replaced and explanation on how this work solves the water purification problem was given to reflect the authors' opinion.

Reviewer's Comment Line 95-96 Author's Response: The statement has been rephrased as suggested and new statement is not bold or too assertive

Reviewer's Comment Line 138-145 Author's Response: Correction implemented as suggested by the reviewer, relevant references are included.

Reviewer's Comment Line 162-167 Author's Response: The statement has been rephrased as suggested and new statement is not bold or too assertive.

Reviewer's Comment Line 174 Author's Response: The overview of all the experimental settings is given in lines 162 – 187 and 190-222. Figures 1 and 2 have shown the experimental set-up, the detail overview is not considered necessary in the author's opinion. Other issues raised regarding duplicates in experiments and water sampling have been captured under experimental design

C3

Reviewer's Comment Line 175 Author's Response: Performance evaluation is now put under material and methods as suggested by the reviewer

Reviewer's Comment Line 183-186 Explain what design variables were varied and evaluated for optimized performance

Author's Response: None of the design variables mentioned in the session were varied or evaluated for optimization. All we do was that we compared the performance of passive flat plate collector against the active type.

Reviewer's Comment Line 196-209: should be rephrased (or deleted) based on the general comments above Author's Response: We have checked this; there is no reason to rephrase or delete. It is important to the article in our own opinion

Reviewer's Comment Line 210: dissolved solids are not "particles"; What is a "digital TDS meter", (type/measurement method, etc.)? Author's Response: Corrected as Highlighted in lines 224-227

Reviewer's Comment Line 219-226:should be more extensive and part of Materials and Methods section Author's Response: This has been elaborated in the material and methods section

Reviewer's Comment Line 228-230: consider deleting Author's Response: No need for deletion but modified

Reviewer's Comment Line 232: why randomly selected days? Is there another way to present all days? Author's Response: Experiments were carried out on several days. But we cannot present all the results because of space. And the results equally behave the same in as much as the solar radiation for the days under consideration look similar and it is the same experimental condition and water sample. In some case some experiments were even repeated. So, the 9 days selected are 4 days for active solar still and 5 days for the passive type.

Reviewer's Comment Line 236-237: is this relationship known from literature, then

C4

discuss this with literature. Author's Response: These have been discussed as highlighted in lines 273-284

Reviewer's Comment Line 238 - 243 Author's Response: Corrected based on reviewer's suggestions

Reviewer's Comment Line 256 and onwards: how does it compare with other studies? Author's Response: References given as highlighted in lines 295-301

Reviewer's Comment Line 267-269, 274, 284. Author's Response: Editorial errors and have been rectified as suggested by the reviewer

Reviewer's Comment Line 275: Do not use "significantly" when statistical analyses are not performed Author's Response: This has been rectified based on reviewer's suggestion

Reviewer's Comment Line 294-307: can be deleted, because the graphs represent the same data of previous graphs and do not give extra information. Author's Response: These graphs cannot be deleted because the parameters considered are different even though they look similar. The authors considered the graphs necessary and thereby retained them (Figures 3, 4 & 5)

Please also note the supplement to this comment:

<https://dwes.copernicus.org/preprints/dwes-2020-5/dwes-2020-5-AC4-supplement.pdf>

Interactive comment on Drink. Water Eng. Sci. Discuss., <https://doi.org/10.5194/dwes-2020-5>, 2020.