



## ***Interactive comment on “Factorial design of experiment (DOE) for modeling solar still parameters” by Malik Al-Abed Allah et al.***

**Malik Al-Abed Allah et al.**

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Received and published: 15 December 2020

Dear Editor and Reviewer, The authors will like to appreciate the reviewers for taking the time to constructively critique the manuscript in order to enhance its quality suitable for the research community.

Comment 1: In the title: authors should avoid using abbreviations in the title. Action: It has been reviewed and modified.

Comment 2: In the Abstract: # Line 50: optimization of the solar still system is complex and not the system itself. This sentence should be rephrased. # Line 53: basin area, saline water depth, and solar radiation are many factors, not one factor. Authors point

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out them as singular. This sentence should be corrected and rephrased. Action: It has been reviewed and modified

Comment 3: In the introduction: # Numbering of reference was missed after reference number 3. Authors must check that before submitting the manuscript in the whole manuscript!. # Line 153, There is a description for many covers of still and at the end, the result is that the maximum productivity with the still of one glass cover. This part must be summarized. # Line 165, the name of materials is missed. Abbreviations only are not acceptable. Action: It has been reviewed and modified

Comment 4: # Authors must describe the novelty of this research work. Is some research articles used DOE to optimize these parameters before or not?. This is missed in the Introduction section. Action: It has been reviewed and modified

Comment 5: In Methodology: # In Table 1, the authors should describe how the design space was chosen. How to prove the condition corresponds to the maximum productivity determined in the current design space is the optimum condition in the entire parameter space? It could not be left to the experience as it is written in Line 228. # Line 256, Tg, Tw, and Tb are not defined. # Line 257, the differential equations do not exist in the manuscript or even in a supporting information file. Action: It has been reviewed and added

Comment 6: Results: # The title of this section should be “Results and Discussion”. # Line 267, where are these mathematical formulas? Action: It has been reviewed and added

Comment 7: Sections 3.1. ,3.2., and 3.4., there is no discussion for the obtained results. Also, there is no explanation and comparison from the literature with what the authors find. # Fig. 5b, “d” letter is missed in distilled water. # English of the manuscript must be revised. # Generally, No discussion in this article for the obtained results. Also, by the DOE method, you decrease the number of experiments to optimize the process. I could not see any description for experiments done to have the responses.

Also, there is no confirmation for the obtained results numerically by doing at least one experiment with the solar still referred by the authors Action: It has been reviewed and added " engineers usually rely on simulation software (such as Matlab, GT series, EES, and etc.) to imitate the operation of any process, and then optimize the design. However, because most of the variables that influence the performance of the system are numerical data, there will be infinite variable portfolios. Though the application of simulation software can significantly reduce the experiment cost and enhance the experiment efficiency when each variable has a specific value, it can hardly deal with the situation of infinite potential variable combinations. So, we must consider carefully how to design the experiment plan properly, by which we can identify the key variables and their optimum value intervals with a few experiments as possible. To solve this problem, in this paper, we introduce the DOE (Design of Experiment) methodology to arrange and conduct the experiments rationally in the future with optimal conditions. With the statistical analysis of simulation experiment data, we set up the functional relationship model, discuss the influences of different variables on the performance of the system, then search out and test the combination of the optimum variable in the future."

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Interactive comment on Drink. Water Eng. Sci. Discuss., <https://doi.org/10.5194/dwes-2020-28>, 2020.

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