Review of: "Use of the experimental designs as an approach to optimize the inhibition efficiency of a Pyridazine derivative against corrosion of steel in an acidic medium"

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Potential competing interests: No potential competing interests to declare.

My comments

Thank you very much for giving me the chance to cooperate with your respected journal in reviewing this interesting work.

The work is dealing with the '**Use of the experimental designs as an approach to optimize the inhibition efficiency of a Pyridazine derivative against corrosion of steel in an acidic medium**". This work is very important for readers to improve their awareness regarding how to protect or preserve metallic structures from corrosion in severe media by using a successful experimental design. This work is very interesting and important for protecting metallic structures by selecting the proper design of practical work according to their suitability and reproducibility in corrosion resistance approaches. The paper is carefully prepared but some points must be fixed before the publication of this manuscript.

1. The title is long but precise for the core message of this research.
2. As you know this work is considered one of the important applied research projects and the word (application) is mentioned in the last paragraph before the conclusion and in the conclusion. Please I hope to see it in the abstract and the introduction part for a comparison of the previous work and your work.
3. The introduction is well-written and covered the period from 2001 to 2020 and this literature is satisfactory. Some related references in corrosion protection in acidic media could be added.

- Zohdy KM, El-Sherif RM, Ramkumar S, El-Shamy AM, Quantum and electrochemical studies of the hydrogen evolution findings in corrosion reactions of mild steel in acidic medium, Upstream Oil and Gas Technology, 2021, 6, 100025. https://doi.org/10.1016/j.upstre.2020.100025
- Zohdy KM, El-Shamy AM, Gad EAM, Kalmouch A, The corrosion inhibition of (2Z,2′Z)-4,4′-(1,2-phenylene bis (azanediyl)) bis (4-oxo but-2-enoic acid) for carbon steel in acidic media using DFT, Egyptian journal of petroleum, 2019, 28(4), 355-359. https://doi.org/10.1016/j.ejpe.2019.07.001
- Sherif EM, Abbas AT, Gopi D, El-Shamy AM, Corrosion and corrosion inhibition of high strength low alloy steel in 2.0 M sulfuric acid solutions by 3-amino-1,2,3-triazole as a corrosion inhibitor, Journal of Chemistry, 2014: Article ID 538794,

8 pages. http://dx.doi.org/10.1155/2014/538794

- Sherif EM, Abbas AT, Halfa H, El-Shamy AM, Corrosion of High Strength Steel in Concentrated Sulfuric Acid Pickling Solutions and Its Inhibition by 3-Amino-5-mercapto-1, 2, 3-triazole, Int. J. Electrochem. Sci., 2015, 10, 1777-1791.

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1. Figures and tables are acceptable
2. The pH is not mentioned completely in the manuscript. As you know the pH is very important and not covered in this manuscript. For more benefits of this manuscript, I recommend adding a title specified to the effect of pH variation on the corrosion resistance of this alloy. As you know the corrosion rate is connected directly with the pH of the medium from acidic to alkaline media (variation of pH from 1.5 to 10). The variations of pH in different parts of the different steps of applications this issue is very important for readers so please give more illustrations of the benefits of Pyridazine derivative and their potential effect against corrosion in low pH. This part needs more illustration, especially how it works. This reference may help you in this part.

- Zohdy KM, El-Sherif RM, El-Shamy AM, Effect of pH Fluctuations on the Biodegradability of Nanocomposite Mg-Alloy in Simulated Bodily Fluids, Chemical Paper, 2022, 2022: 1-21. https://doi.org/10.1007/s11696-022-02544-y

1. The word mechanism is not mentioned completely in the manuscript and I think it is very important for readers to know the mode of action of this compound in the behavior of corrosion resistance in acidic media just want to know what happened. Please specify
2. I hope to see a specific part under this title (structure effect relationship) I think it will help readers to get the highest benefits from this manuscript. Just illustrate short notes about the new mechanism of the Pyridazine derivative and its effect on corrosion control.
3. This work is very important for industrial applications especially in acid cleaning so please in the conclusion add one or more sentences to highlight the benefits of the application of this design in industries.
4. The references are listed according to the requirements of the journal.
5. The manuscript contains some minor editing and grammatical mistakes. Please check it before the publication.

My decision is: **acceptance after a minor revision**