Judul : Kinetics and morphological characteristics of struvite ($MgNH_4PO_4 \cdot 6H_2O$) under the influence of maleic acid

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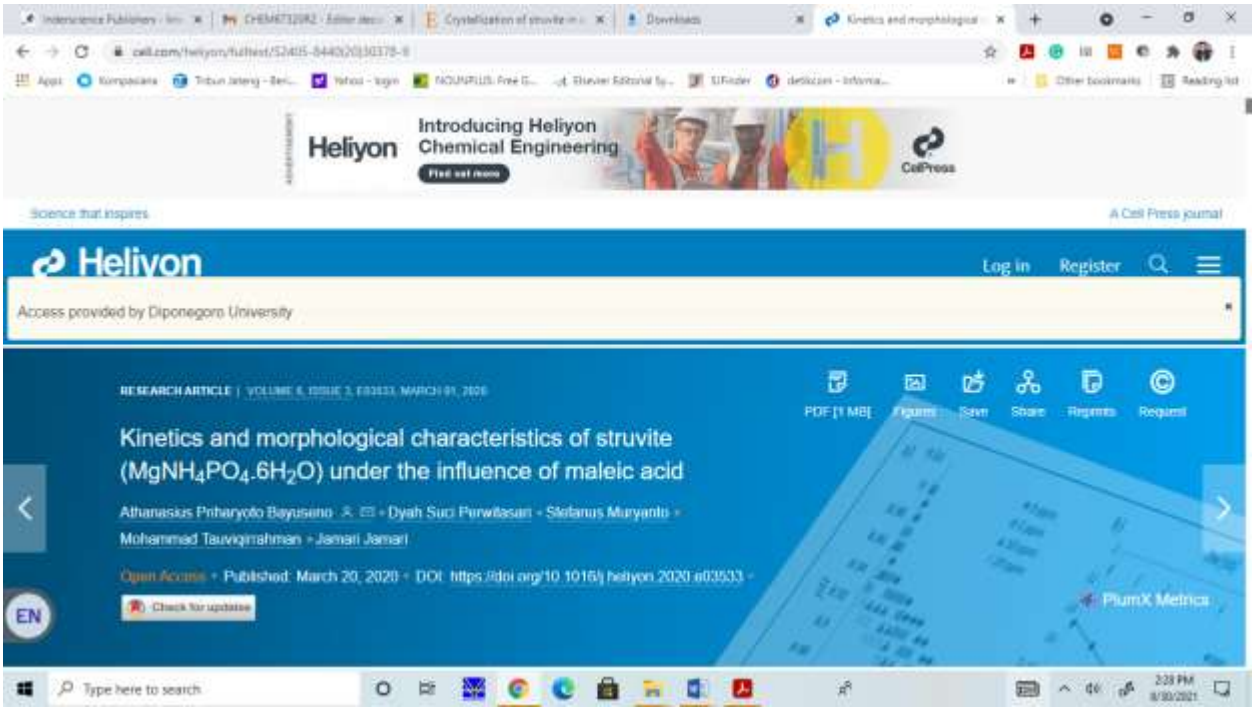

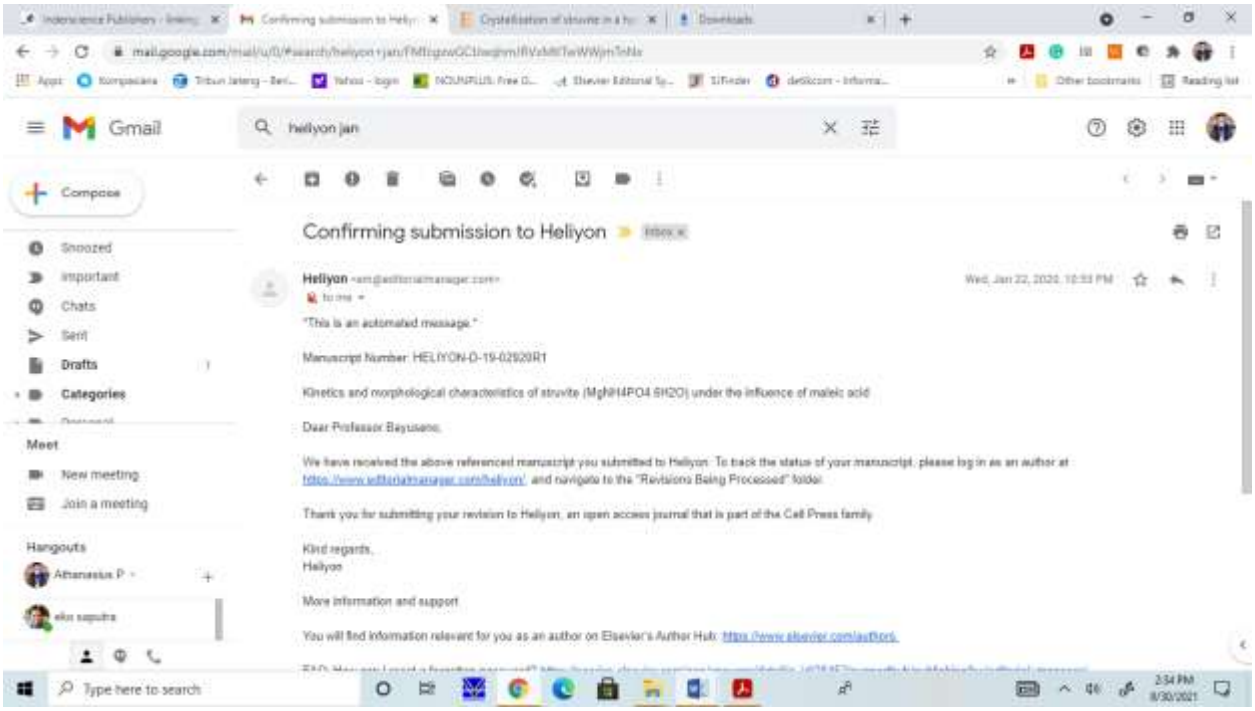

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Heliyon <em@editorialmanager.com>
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Wed, Jan 22, 2020, 10:33 PM

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Manuscript Number: HELIYON-D-19-02920R1

Kinetics and morphological characteristics of struvite (MgNH4PO4.6H2O) under the influence of maleic acid

Dear Professor Bayuseno,

We have received the above referenced manuscript you submitted to Heliyon. To track the status of your manuscript, please log in as an author at https://www.editorialmanager.com/heliyon/, and navigate to the "Revisions Being Processed" folder.

Thank you for submitting your revision to Heliyon, an open access journal that is part of the Cell Press family.

Kind regards,
Heliyon

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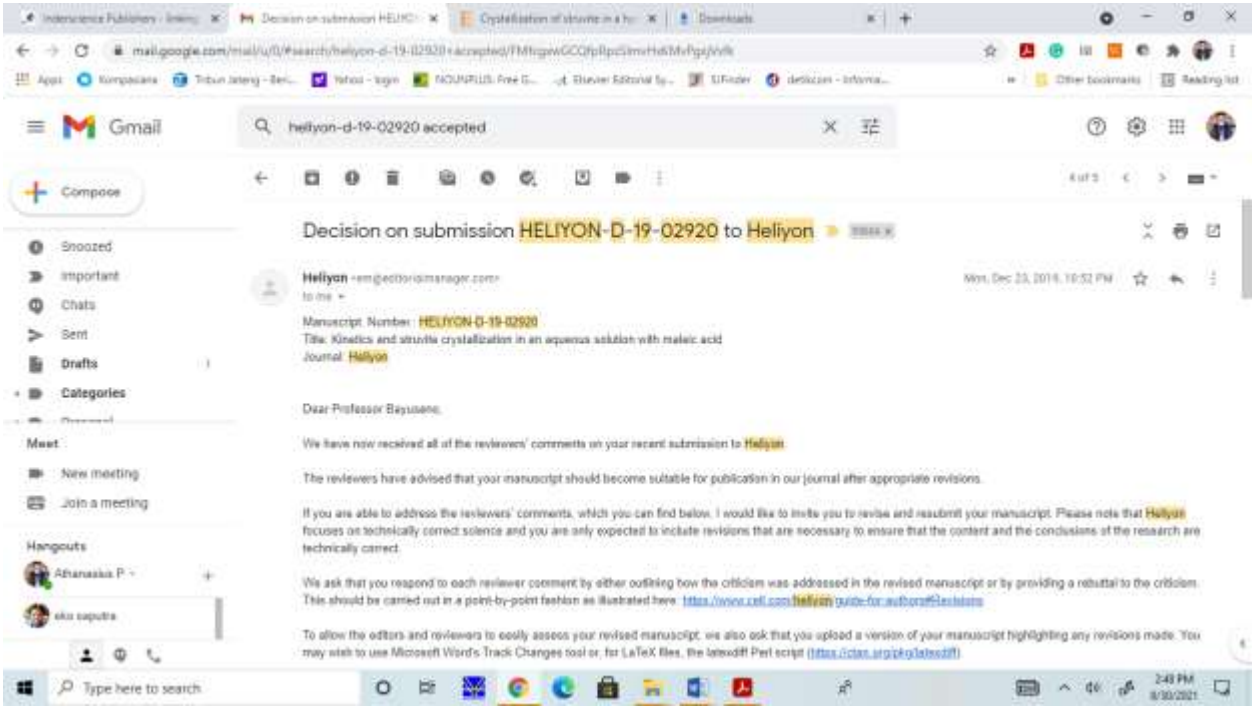

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Decision on submission HELIYON-D-19-02920 to Heliyon

Heliyon <em@editorialmanager.com>
to me

Mon, Dec 23, 2019, 10:52 PM

Manuscript Number: HELIYON-D-19-02920
Title: Kinetics and struvite crystallization in an aqueous solution with maleic acid
Journal: Heliyon

Dear Professor Bayuseno,

We have now received all of the reviewers' comments on your recent submission to Heliyon.

The reviewers have advised that your manuscript should become suitable for publication in our journal after appropriate revisions.

If you are able to address the reviewers' comments, which you can find below, I would like to invite you to revise and resubmit your manuscript. Please note that Heliyon focuses on technically correct science and you are only expected to include revisions that are necessary to ensure that the content and the conclusions of the research are technically correct.

We ask that you respond to each reviewer comment by either outlining how the criticism was addressed in the revised manuscript or by providing a rebuttal to the criticism. This should be carried out in a point-by-point fashion as illustrated here: https://www.cell.com/heliyon/guide-for-authors#Revisions

To allow the editors and reviewers to easily assess your revised manuscript, we also ask that you upload a version of your manuscript highlighting any revisions made. You may wish to use Microsoft Word's Track Changes tool or, for LaTeX files, the latexdiff Perl script (https://ctan.org/pkg/latexdiff)

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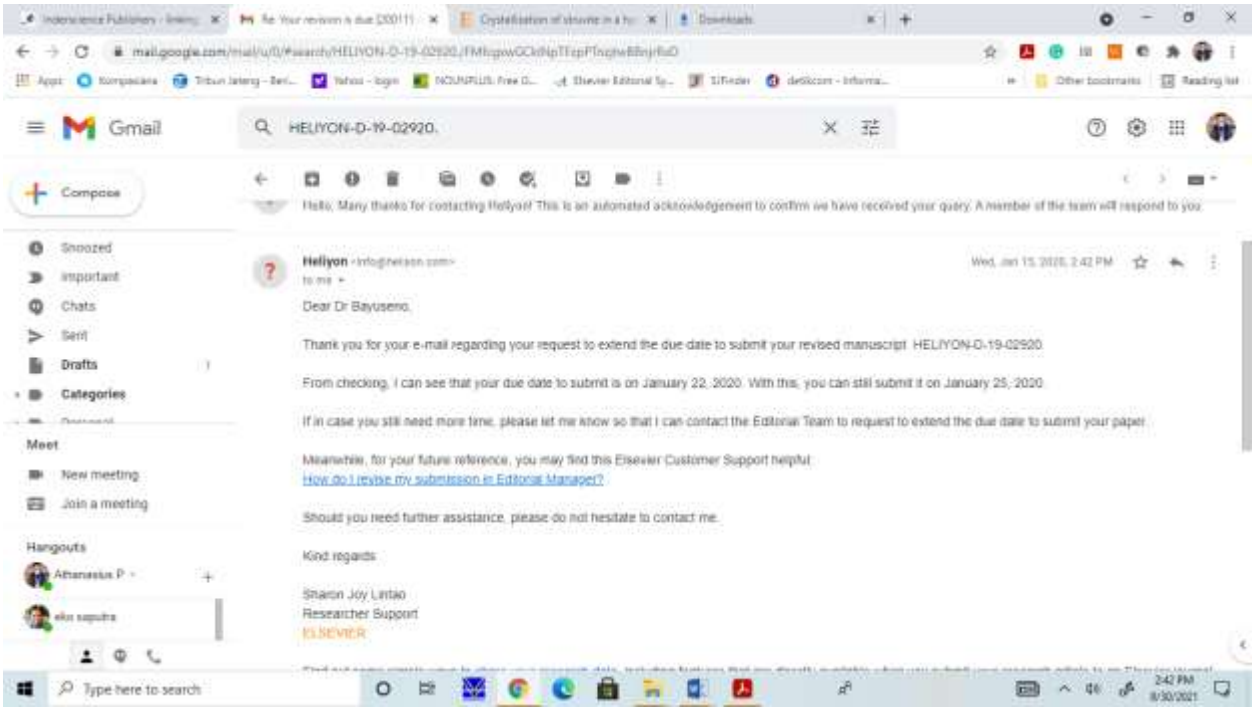

Dear Editor,

Thank you for your letter on our manuscript. We would like to thank the editor and reviewers for their constructive remarks. The manuscript has been improved accordingly. In the text we used track changes for the addition/revision of the manuscript. Following, we wrote in the font style of yellow for the answer of the reviewer.

Reviewer #1:
The authors investigated an important problem about struvite precipitation. However the research focus was not properly set up.
Here are my main comments about the paper:
1) The abstract was not written in a scientific way, it only summarizes experiment and results, there is no information about novelty and literature gaps.

Answer:
Thank you for the reviewer's comment on the Abstract. As suggested the reviewer's concern has been thoroughly addressed. The revised version of the abstract is as follows.
Answer to Comment #1:
The Abstract has been revised and written in a scientific manner, which summarize and condense the whole manuscript: Introduction, Methods, Results and Discussion, and Conclusion and Recommendation.

Abstract:

This work reports a stirred-batch lab crystallization to examine the influence of maleic acid ($HO_2CCHCHCO_2H$), and temperatures (30 and 40 ºC) on crystallization kinetics and morphology of struvite. The crystallization was followed by measuring the pH change up

to 70 min. The pH decreased drastically for the first five minutes of the run, then started to tail off. It was found that the crystallization rate constants range from 1.608 to 6.534 per hour, which agrees with the most published value. Higher maleic acid concentrations resulted in greater growth retardation; the highest retardation was 74.21%, which was achieved for 30°C with 20.00 ppm maleic acid. SEM imaging of the obtained precipitates showed irregular prismatic morphology, and the associated EDX confirmed that the precipitates were struvite ($MgNH_4PO_4 \cdot 6H_2O$). As checked through XRD, the crystalline nature of the struvite was further confirmed, and that co-precipitation of struvite with struvite-K was observed. The co-precipitation was the result of K^+ adsorption onto the crystal surface. Temperatures had less influence on struvite crystallization. At 40ºC and 20.00 ppm the rate constant was 1.332 per hour; whereas at 30ºC and 0.00 ppm) the corresponding was 1.776 per hour, indicating the retardation of about 25%. Thus, the temperature effect is only 1/3 of the maleic acid effect. The current findings suggest that the presence of maleic acid can be used to elucidate the mechanism of crystallization as well as the crystalline phase transformation of struvite. In practical terms, maleic acid could be potential as a scale inhibitor.

Reviewer's comment #2:
2) Only investigated one simple synthetic solution, $MgCl_2$ and $NH_4H_2PO_4$. Dynamic behaviour study had very little meaning with respect to real wastewater.
Answer to Comment #2:
We agree with the reviewer's comment. We are indeed aiming to develop a practical and suitable method to deal with real wastewater problem pertaining to scaling. The current work, however, is fundamental in nature, and is considered important as a basis for our future real wastewater treatment exploration.

Reviewer's comment #3:
3) I would suggest doing static study first for more complex synthetic solution close to the real wastewater.
Answer to Comment #3:
We appreciate this insightful comment. As a matter of fact, we have published several papers on struvite experimentation, which are available in the open literature. It is aimed that our future project on struvite include both synthetic and real wastewater solutions.

(4) Author should focus more in explaining the trends observed with convincing explanation/ arguments. Compare the quality/pros and cons of various available methods available in the literature and make suggestions, with proper justifications, for the best methodologies, comment on key requirements which will be an exceptional credit to this work.

Answer to Comment #4:

Title, Introduction and discussion had been modified accordingly.

(5) Discussion and Conclusions should be elaborated further and efforts to be made towards evidencing major gaps in both existing experimental work/ theoretical & computational models/technologies, and cost economics, identifying unbeaten tracks and promising paths for further developments/ modifications for the kinetics and struvite crystallization.

Answer to Comment #5:

Discussion and conclusion had amended accordingly.

(6) Elaborate the general guidelines for navies / emerging researchers working on struvite crystallization.

Answer to Comment #6:

Thank you again for the suggestion. Introduction and results had been added some relevant references.

Dear Editor,

Thank you for your letter on our manuscript. We would like to thank the editor and reviewers for their constructive remarks. The manuscript has been revised accordingly.

Editor and Reviewer comments:

Reviewer #2: Manuscript Number: HELIYON-D-19-02920R2
Title: Kinetics and morphological characteristics of struvite (MgNH4PO4.6H2O) under the influence of maleic acid

Authors adequately responded to all queries and followed reviewers' suggestions for the improvement of manuscript and revised manuscript seems suitable for publication in Heliyon.

Editorial office comments:

Please ensure that all files that are uploaded are the most recent versions. Please remove all older files when resubmitting.

Please remove “One of the authors (DSP) wishes to thank to the University of Pembangunan National, Surabaya Indonesia and Diponegoro University, Semarang, which has provided the research grant of 2018-2019 for the completion of this work. ” from your Acknowledgements, as this information is handled separately.

Please ensure that all figure panels are labelled and the figure captions describe each panel. Currently,

Figure 1, 2, 6 contains unlabelled panels.