

# [Water] Manuscript ID: water-994108 - Submission Received

1 pesan

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24 Oktober 2020 pukul 21.23

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Dear Dr. Sarto,

Thank you very much for uploading the following manuscript to the MDPI submission system. One of our editors will be in touch with you soon.

Journal name: Water

Manuscript ID: water-994108 Type of manuscript: Article

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the

Distillery Spent Wash Having Very High Pollutant Content

Authors: Iqbal Syaichurrozi, Sarto Sarto \*, Wahyudi Budi Sediawan, Muslikhin

Hidayat

Received: 24 October 2020

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If you have any questions, please do not hesitate to contact the Water editorial office at water@mdpi.com

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# [Water] Manuscript ID: water-994108 - Assistant Editor Assigned

1 pesan

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26 Oktober 2020 pukul 13.39

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Dear Dr. Sarto,

Your manuscript has been assigned to Pichayapong Srisawad for further processing who will act as a point of contact for any questions related to your paper.

Journal: Water

Manuscript ID: water-994108

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the

Distillery Spent Wash Having Very High Pollutant Content

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Received: 24 October 2020

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wbsediawan@ugm.ac.id, mhidayat@ugm.ac.id

#### You can find it here:

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Best regards,

Mr. Pichayapong Srisawad, M. Eng.

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# [Water] Manuscript ID: water-994108 - Major Revisions

1 pesan

Water Editorial Office <water@mdpi.com>

25 November 2020 pukul 09.25

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Received: 24 October 2020

E-mails: iqbal\_syaichurrozi@untirta.ac.id, sarto@ugm.ac.id,

wbsediawan@ugm.ac.id, mhidayat@ugm.ac.id

Submitted to section: Wastewater Treatment and Reuse,

https://www.mdpi.com/journal/water/sections/Wastewater\_Treatment\_Reuse

It has been reviewed by experts in the field and we request that you make major revisions before it is processed further. Please find your manuscript and the review reports at the following link:

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Please revise the manuscript according to the reviewers' comments and upload the revised file within 10 days. Use the version of your manuscript found at the above link for your revisions, as the editorial office may have made formatting changes to your original submission. Any revisions should be clearly highlighted, for example using the "Track Changes" function in Microsoft Word, so that changes are easily visible to the editors and reviewers. Please provide a cover letter to explain point-by-point the details of the revisions in the manuscript and your responses to the reviewers' comments. Please include in your rebuttal if you found it impossible to address certain comments. The revised version will be inspected by the editors and reviewers. Please detail the revisions that have been made, citing the line number and exact change, so that the editor can check the changes expeditiously. Simple statements like 'done' or 'revised as requested' will not be accepted unless the change is simply a typographical error.

Please carefully read the guidelines outlined in the 'Instructions for Authors' on the journal website

https://www.mdpi.com/journal/water/instructions and ensure that your manuscript resubmission adheres to these guidelines. In particular, please ensure that abbreviations have been defined in parentheses the first time they appear in the abstract, main text, and in figure or table captions; citations within the text are in the correct format; references at the end of the text are in the correct format; figures and/or tables are placed at appropriate positions within the text and are of suitable quality; tables are prepared in MS Word table format, not as images; and permission has been

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Do not hesitate to contact us if you have any questions regarding the revision of your manuscript or if you need more time. We look forward to hearing from you soon.

Kind regards, Mr. Pichayapong Srisawad, M. Eng. **Assistant Editor** Email: srisawad@mdpi.com

**MDPI** Water Editorial Office St. Alban-Anlage 66, 4052 Basel, Postfach, CH-4020 Basel, Switzerland E-Mail: water@mdpi.com http://www.mdpi.com/journal/water/

This manuscript is attempting to remove the COD from the distillery spent wash. This topic will attract a wide readership, and the results are reasonable. However, some minor concerns should be addressed before it is qualified for publication.

Reviewer comments	Author responses
A component analysis of the raw DSW	Thank you. We have added the chemical
should be given	characteristics of the raw DSW in Table 1.
_	Line 146, Page 4.
Equation (3) and (6) are not consistent.	Thank you. We have added the detail
	calculation showing the two equations are
	consistent.
	Eq (3b) (Line 176, Page 5) with Eq (12a) (Line
	198, Page 6)
The photos in Figure 5 and Figure 6 are not	Thank you. We have revised the figures.
in good quality, and they can be transferred	Please see figures 6 and 7. Line 371-373
to drawings with trend lines.	(Page 14-15)
What are the coefficients of determination	Thank you. We have added calculation for
for the models? Some fittings seem not	the coefficient of determination. Eqs.19a-d
ideal. Will the models still fit when changing	(Line 213, Page 6-7). We proposed two
the pH?	models with different route. Explanation for
	the two model on Page 5-6 (Line 178-214).
	The R <sup>2</sup> for the model 1 and model 2 is shown
	in Table 3 (Line 314, Page 11) and Table 5
	(Line 411, Page 17). For EC with variation of
	current, model 1 is suitable. However, model
	2 is appropriate for initial pH of 5 and 7.
	Please check our explanation on Page 16.

#### **General comment:**

This work employs electrocoagulation (EC) to remove pollutants from distillery spent wash (DSW). The effect of the initial DSW pH and the current used during the EC experiments were analyzed by monitoring the effect of voltage, pH, electrolyte temperature, and volume and COD concentration for a period of 8 hours. A kinetic model in DSW's EC is proposed considering the collected data.

The paper has interesting results but presents too many English mistakes, insufficient scientific discussion, and inconsistent and hard-to-read sentences. Considering that, the reviewer suggests the rejection of the paper and, to the editor's discretion, a possible resubmission in the case the authors are able to significantly rewrite it and correct it.

## **Specific comments**

#### Introduction

Reviewer comments	Author responses
Line 31: The word 'water' seems to be incorrectly used here. Please, correct to 'water'.	Thank you. We have revised it. Line 57
Which kind of pollutants exist in DSW composition? Please, mention some of the organic compounds.	Thank you. Please check Line 57-58. Then, chemical characteristics in our raw DSW are shown in Table 1 (Line 146)
The authors mention the low operating cost of the DSW's EC treatment but do not mention any other treatments available in the literature and their disadvantages compared to EC.	Thank you. Please check Line 59-72.
The authors discuss the use of Fe as an anode, but Al can also be employed in EC processes. Can Al also be used in DSW's EC? It should be discussed in the text.	Thank you. Please check Line 74-82.
The introduction does not have enough information about the topic and needs to be improved, namely by explaining other techniques used for DSW treatment and their issues or citing more works about DSW's EC.	Thank you. Please check Line 59-72 and 83-99.
There is a repetition of the tested different working conditions (Lines 51, 52, and 56, 57).	Thank you. For Line 56-57, we have deleted it. Please check Line 121.

Thank you. Please check Line 112-120.

# Materials and methods

Reviewer comments	Author responses
Line 62: The initial conductivity of the electrolyte should be given in the text. Conductivity is not one of the parameters recorded during the work. Conductivity values should be mentioned to give an idea on the electrolyte conductivity to check if it could be an issue.	Thank you. We have added information about chemical characteristics (including conductivity) in our raw DSW that are shown in Table 1 (Line 146, Page 4)
Line 67: The distance between the electrodes seems to be significant (5.5 cm). It is essential to know the solution conductivity to understand how the ohmic resistance will influence this electrolyte's electrochemical behavior at the beginning of the electrolysis when there are no metal ions in solution.	Thank you. We have added information about the conductivity of the raw DSW in Table 1 (Line 146, Page 4)

# Development of Kinetic Model

Reviewer comments	Author responses
There is a section for the kinetic model and equations employed in its application but part of that information should be moved to the introduction and some to results and discussion.	Thank you. We have added information about the models in Introduction (Line 112-120)

# Results and discussion

Reviewer comments	Author responses
The topic is interesting and the results could be useful, but they are not properly organized or presented in the most appealing form. The discussion is confusing and difficult to follow. The authors should present deeper discussion and a better comparison with the literature.	Thank you. We have added deep discussions. Furthermore, we have proposed two models with two different routes. Moreover, the comparison between this study and other studies has discussed in point 4.3 (Line 420-437).

Figure 7 needs to be changed because it is not readable at all – the curves overlap the legends.	Thank you. We have revised it. Please check Figure 3 (line 294, page 10).
The results and discussion of the modeling are difficult to follow, as previously mentioned.	Thank you. We have revised it. Please check line 300-312 and line 375-410.
Line 235: "thesolution" – please, correct it.	Thank you. We have revised it. Line 451.

Overall, a grammar check is required. In many sentences, definite (the) or indefinite (a or an) articles are omitted.

Reviewer comments	Author responses
17 : resulted higher ; resulted in higher	Thank you. We have revised it. Line 18.
152 : easy ; easily	Thank you. We have revised it. Line 283.
153 : Figure2(C) ; Figure 2(C)	Thank you. We have revised it. Line 290.
184 : brought ; brought	Thank you. We have revised it. Line 339.
194 : Surprisingly's expression is	Thank you. We have revised it. Line 349.
inappropriate in academic papers. It would	
be nice to change it to the word	
'remarkabily'.	
209 : more ; higher	Thank you. We have revised it. Line 364.
228 : was resulted ; produced or generated	Thank you. We have revised it. Line 312.
235 : thesolution ; the solution	Thank you. We have revised it. Line 451.
237 : until end of process ; until the end of	Thank you. We have revised it to become
the process	"throughout the process". Line 452
239 : and flotation processes. ; and flotation	Thank you. We have revised it. Line 454
reaction.	
240 : produced ; produced	Thank you. We have revised it. Line 454.
241 : As consequent ; As consequence	Thank you. We have revised it. Line 456-457.
In the Equation (7), the font size of the left	Thank you. We have check it (now Eq (11))
side is small to compare to the right side. It	(Page 5). The left and right sides use the
will be better to correct the font.	cambria math size 10.
Figure 5 and 6	Thank you. We have revised the figures to
Due to the background of the Figure 5 and 6,	become figures 6-7. Check the figures on
the results of the change are hard to see and	Page 14-15, Line 371-373 .
check. The backgrounds of all pictures in Figure 5 and 6 should be unified in white so	
that changes in the sample can be	
distinguished well.	
Rather than holding the sample with hand	
and taking a picture, you should fix it with a	
conical tube rack and replace it with a	
picture taken.  A picture should be taken so that the scale of	
the conical tube can be checked.	
Land some and care some se direction.	

# Figure 7

The font size of the legend is large, so it overlaps the graph. It is desirable to make the font size smaller so that the trend of the graph can be seen clearly.

# Response:

Thank you. We have revised the figure. Please check the Figure 3 (Line 294, page 10)

In the attached file you will find a miner notes to improve your paper peer-review-9461824.v1.pdf

Reviewer comments	Author comments
14. investigated	14. is to investigate
31. waster bodies	57. water bodies
43. mg/L	95. mgL <sup>-1</sup>
46-47. The dilution before EC treatment is	98-99. Dilution prior to the EC treatment is
not interesting because it will make the total	not attractive because it will make up the
volume of the DSW to be very much more.	total volume of DSW more.
138. Many authors believed that the working	263-264. Many authors believed that the
volume is constant.	working volume is constant [16-18].
In Figure 1 (D-F), omit "decrease in"	We have revised in. Please check Figure 1 (D-
	F) on Page 8

Manuscript ID: Water-994108

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the Distillery Spent Wash Having Very High Pollutant Content

This paper deals with the treatment of distillery spent wash (DSW) by means of electrocoagulation (EC). In this sense, the effect of initial pH (acid and neutral) and current (2.5, 3 and 3.5 A) were studied. Besides, a kinetic model was also developed based on the formation of sludge from COD and scum from sludge. However, this reviewer has serious concerns about the novelty of this study, because the authors recently published other work focused on the treatment of DSW by means of EC. Besides, this reviewer has also some concerns about the modeling. Therefore, I do not recommend its publication in *Water* in the present form. In this sense, the changes required are included in the attached pdf.

peer-review-9461996.v1.pdf

Reviewer comments	Author comments
14. investigated	14. is to investigate
17. resulted	18. resulted in
18. temperature increased from beginning	19. temperature increased throughout the
until end of process	process
22-23. The kinetic constant of ka and kb for	27-28. The higher the current was applied in
current of 3.5 A was higher than that for	the EC, the higher the kinetic constants of k <sub>a</sub>
current of 2.5 and 3 A	and k <sub>b</sub> would be.
In my opinion, introduction must be	Please check Line 59-82.
improved. Nothing is commented about	
other methodologies to remove high	
polluting streams as DSW. Besides, there is	
no information related to the use of Fe as	
anode.	
30. bioetanol	56. bioethanol
31. is forbidden to be thrown away	57. cannot be released
33-34. Furthermore, it results hydrogen gas	69-70. Furthermore, hydrogen gas, an
that can be stored and used as an energy	alternative energy, could also be obtained
source	during the EC process
35. the coagulants are resulted with help of	73. the coagulants resulted from the help of
electrical force	electrical force
39. resulted	78. resulted in
For Line 41-43, Could you please indicate	We have added the information about
which parameters were analysed in these	those. Please check Line 83-99.
studies? Are the same as those studied in	
the current work?	
What is the novelty of this study in	The novelty of this study is (1) without
comparison to the previous ones? Is the use	dilution (Line 101), (2) using the constant
of undiluted DSW? Please clearly state it.	current during 8 h which is different from
On the other hand, what is the novelty of	our previous study (Line 101-108), (3)

this study in comparison to your previous one (reference 6)?	development of the simple mechanistic models (line 112-120).
57. in	124. at
61. bioetanol	129. bioethanol
More details about the DSW should be provided because they can also influence the EC treatment. For example, the conductivity, alkalinity, concentration of salts (P, K, N)	Thank you. The chemical characteristics in our raw DSW are shown in Table 1 (Line 146). The explanation about that in Line 129-144.
67-68. same with that	152. the same used
69. of	154. at
72. aquadest	157. distilled water
79. was	164. were
87. adsorbtion	172. adsorption
124. "These results were in line with studies of [13-14] " Please give some details about the studies used for comparison purposes.	238-243. These results were in line with some studies [26-27] where the solution pH usually increases during the EC process. Kobya et al. [26] reported that the final pH is always higher than the initial pH (3, 5, 7, 9, 11) in EC using iron electrode in treating textile wastewaters. Meanwhile, Kim et al. [27] also found the same conclusion that the solution pH increased at the end of the process at the initial pH of 3, 5, 7, 9 in the EC in treating the groundwater.
157. Could you please include the operating conditions on the Figure caption.? I mean Initial COD, initial pH and initial temperature?	Thank you. Please check the title of the figure 1 (251-253)
220. "very low SSE value" Although low SSE value was obtained. The model when 3.5 A were used significantly differs from the experimental data, specially in the case of sludge and scum. Please revise it.	Thank you. We have revised it. Please check Line 301-312.
222. "/h" It is commonly expressed as h-1. Please change it.	306. h <sup>-1</sup>
233. resulted	447. resulted in
234-235. "Furthermore, initial pH of 7 could decrease more COD mass than initial pH 4.4 and 5."	448-450. Furthermore, the EC with the initial pH of 7 could decrease more COD mass than that with the initial pHs of 4.4 and 5.0.

237. until end of process	452. throughout the process
240-241 Variable of initial pH of 7.0 had no supernatant (sludge all) at the processing time above 5 h.	455-456. When initial pH of 7.0 was used, for times higher than 5 h, supernatant was not observed, just obtaining sludge
241. consequent	457. consequence
249. Could you please remove the legend from the figure and include it in the figure caption? It is difficult to see the data and models.	Thank you. Please check the title of Figure 3 in Line 294-298.  "Figure 3. Comparison between experimental data and predicted data obtained by the mechanistic models: (A) COD, (B) sludge, (C) scum. (◊, 2.5 A experimental data; □, 3 A experimental data; Δ, 3.5 A experimental data), (black linesquare dot, 2.5 A model 1; black line-long dash, 3.5 A model 1; cred linesquare dot, 2.5 A model 2; red linesolid, 3 A model 2; red linesolid, 3 A model 2; red linesolid, 3.5 A model 2).



# [Water] Manuscript ID: water-994108 - Manuscript Resubmitted

1 pesan

Submission System <submission@mdpi.com>

4 Desember 2020 pukul 21.26

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Dear Dr. Sarto,

Thank you very much for resubmitting the modified version of the following manuscript:

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Received: 24 October 2020

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Submitted to section: Wastewater Treatment and Reuse,

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A member of the editorial office will be in touch with you soon regarding progress of the manuscript.

Kind regards,

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# [Water] Manuscript ID: water-994108 - Revised Version Received

1 pesan

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5 Desember 2020 pukul 10.51

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Dear Dr. Sarto,

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Submitted to section: Wastewater Treatment and Reuse,

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We will continue processing your paper and will keep you informed about the submission status.

Kind regards,

Ms. Sissi Jia

E-Mail: sissi.jia@mdpi.com

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# [Water] Manuscript ID: water-994108 - Minor Revisions

1 pesan

Water Editorial Office <water@mdpi.com>

11 Desember 2020 pukul 16.40

Balas Ke: srisawad@mdpi.com

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wbsediawan@ugm.ac.id, mhidayat@ugm.ac.id

Submitted to section: Wastewater Treatment and Reuse,

https://www.mdpi.com/journal/water/sections/Wastewater Treatment Reuse

It has been reviewed by experts in the field and we request that you make minor revisions before it is processed further. Please find your manuscript and the review reports at the following link:

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Do not hesitate to contact us if you have any questions regarding the revision of your manuscript or if you need more time. We look forward to hearing from you soon.

Kind regards,

Mr. Pichayapong Srisawad, M. Eng.

**Assistant Editor** 

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http://www.mdpi.com/journal/water/

The authors took into consideration the reviewers' comments and managed to significantly improve the quality of the paper. The addition of literature data in the introduction and the extended discussion show the effort they have made. The newly added parts are generally good but need some language polishing. The reviewer recommends the manuscript acceptance after minor corrections detailed below.

### **Reviewer remarks:**

- Lines 132, 133: "If the DSW is released directly to the water bodies, the water biota cannot breath and finally death" - please, change the phrase to "If the DSW is released directly to the water bodies, the water biota can die due to the high COD values in the water."

## Response:

Thank you. We have revised the sentence. Please check Line 131-132.

- Line 138: The definition of alkalinity is really not needed. The phrase "The alkalinity is a function of pH. At low pH, the alkalinity is very low or not detected" should be removed.

## Response:

Thank you. We have removed the sentence. Please check Line 137-138.

- Line 142: "It cannot be used as a fertilizer because the soil structure will be poor (not fertility)" - This needs to be better explained. It is not obvious to the reader why the wastewater with high organic content cannot be used as fertilizer. Could you please add a short sentence explaining it?

## Response:

Thank you. We have revised and added a short sentence. Please check Line 140-142

- Except for the case of model 2 and pH = 4.4, all other R2 values are lower than 0.98. In a short sentence, the authors should mention that there is a considerable deviation in the other cases.

# Response:

Thank you. We have added sentences. Please check Line 408-410.

- Some English mistakes throughout the manuscript should be corrected before publication.

## Response:

Thak you. We have revised some words in the manuscript.

Lines 29, 30, 77, 87, 90, 108, 151, 158, 159, 167, 227, 241, 243, 258, 284, 309, 310, 333, 336, 352, 353, 382, 385, 419,

- The reviewer suggests putting the letters (A), (B), etc., inside the figures and not outside, as it facilitates the reader's understanding.

## Response:

Thank you. We have revised the figures. Please check Figure 1 (page 8), Figure 2 (page 9), Figure 3 (page 10), Figure 4 (page 12), Figure 5 (page 13), Figure 8 (page 17),

- Line 81, "89.941 and 95.045%", these percentages should not have more than one decimal place. Change it to "89.9 and 95.0%". This should also be corrected in the abstract and checked throughout the paper.

# Response:

Thank you. We have revised them. Please check Lines 17, 80, 84, 272, 273, 358, 448 and in Table 6 (page 19)

- In table 6, the first column is meaningless and should be removed.

## Response:

Thank you. We have removed the first column. Please check Table 6 (page 19)

## Reviewer 3

It is judged that the content has been improved more than the previous version of the paper, and the English expression including grammar has been improved. The relationship between the changes in sludge and scum and COD has been well established, and the contents of the modeling based on this paper are sufficiently interesting.

Response: Thank you.

### Reviewer 5

This paper deals with the treatment of distillery spent wash (DSW) by means of electrocoagulation (EC). In this sense, the effect of initial pH (acid and neutral) and current (2.5, 3 and 3.5 A) were studied. Besides, a kinetic model was also developed based on the formation of sludge from COD and scum from sludge. The authors has considered all my comments carefully. Therefore, I recommend its publication in *Water*.

Response: Thank you.



# [Water] Manuscript ID: water-994108 - Manuscript Resubmitted

1 pesan

Submission System <submission@mdpi.com>

13 Desember 2020 pukul 16.07

Balas Ke: Pichayapong Srisawad <srisawad@mdpi.com>, Water Editorial Office <water@mdpi.com>

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Dear Dr. Sarto,

Thank you very much for resubmitting the modified version of the following manuscript:

Manuscript ID: water-994108 Type of manuscript: Article

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the

Distillery Spent Wash Having Very High Pollutant Content

Authors: Iqbal Syaichurrozi, Sarto Sarto \*, Wahyudi Budi Sediawan, Muslikhin

Hidayat

Received: 24 October 2020

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Submitted to section: Wastewater Treatment and Reuse,

https://www.mdpi.com/journal/water/sections/Wastewater\_Treatment\_Reuse

https://susy.mdpi.com/user/manuscripts/review\_info/9220740a802356d3329ad9c2b4855dbe

A member of the editorial office will be in touch with you soon regarding progress of the manuscript.

Kind regards,

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# [Water] Manuscript ID: water-994108 - Revised Version Received

1 pesan

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13 Desember 2020 pukul 18.12

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Dear Dr. Sarto,

Thank you very much for providing the revised version of your paper:

Manuscript ID: water-994108 Type of manuscript: Article

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the

Distillery Spent Wash Having Very High Pollutant Content

Authors: Iqbal Syaichurrozi, Sarto Sarto \*, Wahyudi Budi Sediawan, Muslikhin

Hidayat

Received: 24 October 2020

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Submitted to section: Wastewater Treatment and Reuse,

https://www.mdpi.com/journal/water/sections/Wastewater Treatment Reuse

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We will continue processing your paper and will keep you informed about the submission status.

Kind regards,

Mr. Pichayapong Srisawad, M. Eng. **Assistant Editor** 

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# [Water] Manuscript ID: water-994108 - Accepted for Publication

1 pesan

Water Editorial Office <water@mdpi.com>

16 Desember 2020 pukul 19.11

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Dear Dr. Sarto,

We are pleased to inform you that the following paper has been officially accepted for publication:

Manuscript ID: water-994108 Type of manuscript: Article

Title: Effect of Current and Initial pH on Electrocoagulation in Treating the

Distillery Spent Wash Having Very High Pollutant Content

Authors: Iqbal Syaichurrozi, Sarto Sarto \*, Wahyudi Budi Sediawan, Muslikhin

Hidayat

Received: 24 October 2020

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wbsediawan@ugm.ac.id, mhidayat@ugm.ac.id

Submitted to section: Wastewater Treatment and Reuse,

https://www.mdpi.com/journal/water/sections/Wastewater Treatment Reuse

https://susy.mdpi.com/user/manuscripts/review\_info/9220740a802356d3329ad9c2b4855dbe

We will now make the final preparations for publication, then return the manuscript to you for your approval.

If, however, extensive English edits are required to your manuscript, we will need to return the paper requesting improvements throughout.

We encourage you to set up your profile at SciProfiles.com, MDPl's researcher network platform. Articles you publish with MDPl will be linked to your SciProfiles page, where colleagues and peers will be able to see all of your publications, citations, as well as your other academic contributions.

We also invite you to contribute to Encyclopedia (https://encyclopedia.pub), a scholarly platform providing accurate information about the latest research results. You can adapt parts of your paper to provide valuable reference information for others in the field.

Kind regards,
Ms. Fionna Fu
Skype: live:fionna.fu
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Assistant Editor

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