
SUBMISSION MANUSCRIPT AMBC-MJM (Nimatuzahroh et al.)

3 messages

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Wed, Jul 18, 2018 at 9:28 PM

Dear Stella,

We send our manuscript article that is in accordance with the MJM template, cover letter, and manuscript check list. Please give us information, whether the completeness is in accordance with the required? Thank you for your help and attention.

Best regards,

Dr. Ni'matuzahroh and team

 **AMBC_MJM_NIMATUZHROH.rar**
252K

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: Fatimah Yusuf <fatimahyusuf25@yahoo.com>, Mus likhah <muslikhah1708@gmail.com>, sri sumarsih <sri-sumarsih@fst.unair.ac.id>, nuri oktavitri <nur_i_d_o@yahoo.com>

Wed, Jul 18, 2018 at 9:34 PM

Assalamualaikum,
Mohon masukkannya bila ada yang diperbaiki.
[Quoted text hidden]

 **AMBC_MJM_NIMATUZHROH.rar**
252K

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Thu, Jul 19, 2018 at 7:42 AM

Dear Dr. Ni'matuzahroh,

Greetings to you.

I have received your manuscript and other documents.

Many thanks! Have a nice day!

Regards,
Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]
Sent: Wednesday, 18 July, 2018 10:28:05 PM
To: Stella A/p Matthews @ Machap
Subject: SUBMISSION MANUSCRIPT AMBC-MJM (Nimatuzahroh et al.)

[Quoted text hidden]

To report this email as SPAM, please attach the original email as an

attachment to spam@1govuc.gov.my by holding Ctrl + Alt + F keys concurrently (for Outlook client) or right click on the email and forward as Attachment (for OWA).

Evaluation of your manuscript

3 messages

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: "nimatuzahroh@fst.unair.ac.id" <nimatuzahroh@fst.unair.ac.id>

Tue, Aug 7, 2018 at 9:42 AM

Dear Dr. Ni'matuzahroh,

Greetings to you.

Attached are the reviews of your manuscript entitled '**UTILIZATION OF BACTERIAL CONSORTIUM FOR OIL SLUDGE BIODEGRADATION USING BIOSLURRY METHOD**' by two experts for your perusal. Please look into the details of the comments and correct the manuscript as requested by the reviewers.

Kindly indicate the corrections made in the manuscript by :

1. Highlighting the corrections in the manuscript itself
2. Indicating the corrections made/ answer to every comment or question of the reviewer in a separate word document.

We would like to suggest to you to send the paper for proofreading (after correction) as the language and grammar need to be improved as well.

Since, one of the reviewer has requested for a re-submission, you will be given a month to correct your manuscript. Kindly let me know if you need additional time for proofreading. Our main aim is to publish articles of good quality. Therefore, we hope you will take these constructive comments to improve your manuscript. You will be notified of the paper acceptance or rejection by the guest editor of the journal by email after receiving your revised manuscript.

Kindly submit your revised manuscript by 10th September 2018. Please do not hesitate to contact me if you need clarification on this matter.

Thank you.

Best regards,
Stella

2 attachments

 **Review 1.docx**
17K

 **Review 2.docx**
21K

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Tue, Aug 7, 2018 at 12:28 PM

Dear Stella Matthews

Thanks for the information. We will immediately follow up on suggestions and comments from reviewers regarding our article.

Best regards

Ni'matuzahroh

[Quoted text hidden]

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Mon, Aug 13, 2018 at 7:44 PM

To: Nastiti Trikurniadewi <nastititrikurniadewi@yahoo.com>, hanif.yuliani@yahoo.com, Fatimah Yusuf <fatimahyusuf25@yahoo.com>, nuri oktavitri <nur_i_d_o@yahoo.com>

[Quoted text hidden]

2 attachments

 **Review 1.docx**

17K

 **Review 2.docx**

21K

**MALAYSIAN JOURNAL OF MICROBIOLOGY
(MJM)**

REFEREE'S REPORT

CONFIDENTIAL

MS NO: MJM

**TITLE: UTILIZATION OF BACTERIAL CONSORTIUM FOR OIL SLUDGE
BIODEGRADATION USING BIOSLURRY METHOD**

1. Assessment/ Overall Rating of the Paper

	Very Good	Good	Fair	Poor	Comments
Priority for publication			X		
Language proficiency			X		
Scientific significance		X			
Originality				X	
Appropriateness of title		X			
Conciseness of abstract		X			
Experimental design & methodology			X		
Results well presented and conclusive			X		
Discussion corresponds to result presented			X		
Clarity of presentation			X		
References given are appropriate and adequate		X			
Overall quality			X		

2. Recommendation

	Accept for publication as submitted
X	Accept for publication after minor revision / major revision
	The manuscript requires major revision and allow for a resubmission
	The manuscript cannot be accepted

DETAILED COMMENTS (Use additional pages if necessary).

The problem of oil sludge elimination is quite acute in the areas of oilfield enterprises' operation. The topic of the studies performed is relevant, timely, because in recent years the scale of environmental pollution by oil, oil products and oilfield wastewater exceeds significantly the existing amounts of remediation efforts taken.

This manuscript provides data confirming the effectiveness of the integrated application of methods of biostimulation (by using molasses, in this case), bio-augmentation in a bioslurry reactor.

The authors obtained results which are consistent with the well-known data of many other researchers, indicating the direct correlation between the abundance of hydrocarbon-oxidizing microorganisms and the rate of biodegradation of hydrocarbon compounds.

I consider it necessary to make some criticism:

(1) In the manuscript, the information is lacking on the species and laboratory strains of hydrocarbon-oxidizing bacteria obtained from the Microbiology Laboratory of the Airlangga University and used to produce an "exogenous" consortium.

(2) The authors did not indicate the ratio of the cultures used in the work to produce an artificial association. The section dealing with the preparation of a bacterial consortium for experiments is not fully described.

(3) The symbols given in Table 1 are unclear. 2 (abcde, tg, etc.).

(4) In Fig. 4, the confidence limits of the given temperature values for the experiment variants are not indicated.

(5) I do not consider it appropriate to locate Fig. 1 in the given undescriptive form.

(6) The text of the manuscript needs some language corrections before being published: missing articles (e.g. Line 10 – a completely randomized designed and throughout the text), word order (e.g. Line 81 – The bacterial consortium consists of ...), plurals of the nouns (e.g. Line 83 - ... are collection cultures etc.).

I believe that, after some improvements the manuscript can be published in the open press.

**MALAYSIAN JOURNAL OF MICROBIOLOGY
(MJM)**

REFEREE'S REPORT

CONFIDENTIAL

MS NO: MJM

TITLE: UTILIZATION OF BACTERIAL CONSORTIUM FOR OIL SLUDGE BIODEGRADATION USING BIOSLURRY METHOD

1. Assessment/ Overall Rating of the Paper

	Very Good	Good	Fair	Poor	Comments
Priority for publication		X			
Language proficiency			X		
Scientific significance		X			
Originality			x		
Appropriateness of title		x			
Conciseness of abstract			x		
Experimental design & methodology			x		
Results well presented and conclusive			x		
Discussion corresponds to result presented			x		
Clarity of presentation			x		
References given are appropriate and adequate		x			
Overall quality			x		

2. Recommendation

	Accept for publication as submitted
	Accept for publication after minor revision / major revision
X	The manuscript requires major revision and allow for a resubmission
	The manuscript cannot be accepted

DETAILED COMMENTS (Use additional pages if necessary).

This manuscript has been reviewed.

Although the authors have performed a substantial amount of work, there are still some areas of concern, which needs to be addressed.

In the Abstract, the aims should be clearly stated and should not have any other sentences introducing the work. Keywords should be placed in alphabetical order.

The grammar and phrasing could be improved, with better choice of word use that is more concise and scientific in nature.

On the scientific elements, I have the following queries:

- do you know what is the composition of the microbial communities used? % alone is not sufficient to provide an illustration on the success of the treatment. There should be an understanding about what is found in the consortium, what makes them work well, and the link to factors influencing the degradation (i.e. do you have more aliphatic degraders? More aerobes or anaerobes? Do you have dehalogenizing bacteria?) a metagenomics analysis will provide a good understanding on this
- the experimental design evaluates a range of % for treatment; how was this determined? Why maximum range is at 15%? What if it exceeds 15%, would you expect a better result? What is the discussion on this-it seems to be lacking at the moment
- why were molasses used to boost the growth of consortium? Provide justification and indicate the significance of adopting this approach. This is because, typically, growth of microbial consortium is enhanced via the use of simple N- and P-based fertilizers, which are economical and practical for use.
- There seems to be some elements of optimization, i.e. for pH. If this is the case, shouldn't the title reflect the optimization element as well?

Our manuscript with highlighted corrections

2 messages

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Wed, Sep 26, 2018 at 7:57 AM

Dear Stella

I submit our manuscript that we have fixed and highlighted correction. The sentence colored in yellow is the sentence that we have added new and which we have revised according to the suggestion of the reviewer. We apologize for sending late from the time you gave due to our busy schedule at the University. Thank you very much for your help and attention.

Best regards

Ni'matuzahroh and team



Highlighted_correction_Manuscript_MJM_Ni'matuzahroh et al..docx
79K

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Wed, Sep 26, 2018 at 9:38 AM

Dear Dr. Nimatuzahroh,

Received. Thank you very much!

Regards,
Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]
Sent: Wednesday, 26 September, 2018 8:57:27 AM
To: Stella A/p Matthews @ Machap
Subject: Our manuscript with highlighted corrections

[Quoted text hidden]

Sekiranya e-mel ini adalah SPAM, sila lampirkan e-mel asal kepada spam@1govuc.gov.my dengan menekan 3 kekunci (Ctrl + Alt + F) secara serentak (MS Outlook client) atau klik tetikus kanan pada e-mel dan majukannya sebagai lampiran (OWA).

1 UTILIZATION OF BACTERIAL CONSORTIUM FOR OIL SLUDGE
2 BIODEGRADATION USING BIOSLURRY METHOD

3 **Keywords:** bacterial consortium; biodegradation; bioslurry; molasses; oil sludge

4 Ni'matuzahroh¹, Muslikhah¹, Nur Indradewi Oktavitri¹, Nastiti Trikurniadewi¹, Fatimah¹, Sri
5 Sumarsih², Hanif Yuliani³

6 ¹*Department of Biology, Faculty of Science and Technology, Universitas Airlangga 60115*
7 *Surabaya, Indonesia*

8 ²*Department of Chemistry, Faculty of Science and Technology, Universitas Airlangga 60115*
9 *Surabaya, Indonesia*

10 ³*Agency for The Assessment and Application of Technology, BPPT, 15314 South*
11 *Tangerang, Indonesia*

12 Corresponding Author : Ni'matuzahroh*

13 Mailing address : Department of Biology, Faculty of Science and Technology, Universitas
14 Airlangga, Kampus C Mulyorejo, Surabaya 60115, Indonesia

15 Telephone : +628121773272

16 Email address : nimatuzahroh@fst.unair.ac.id

17

18 **ABSTRACT**

19 **Aims:** Oil sludge is one of pollutant source in the environment. Bacteria are a group of microbes
20 which have the potency to solve the problems. Bacterial abundance, interaction, and
21 compatibility of environmental factors ensure the success of biodegradation. The purpose of
22 this study was to determine the effectiveness of bacterial consortium in degrading oil sludge
23 using bioslurry method.

24 **Methodology and Results:** The research design used was completely randomized design 4×5
25 with variation of bacterial consortium concentration and incubation time. Comparison between

26 contaminant and liquid phase in bioslurry method was 1:9 ratios with aeration, at room
27 temperature. The liquid phase comprises distilled water with the addition of 2% (v/v) of
28 molasses as a nutrient of bacterial growth. Bacterial growth was evaluated using the Total Plate
29 Count (TPC) method. TPH measurements were evaluated using the gravimetric method, as well
30 as the oil sludge hydrocarbon component evaluated by Gas Chromatography Mass
31 Spectrophotometry (GCMS). The pH and temperature data were analyzed descriptively while
32 TPC and TPH data were analyzed using Two Way ANOVA ($\alpha=0.05$). The bacterial consortium
33 could grow on oil sludge hydrocarbon substrate, the temperature ranges from 29°C-32°C during
34 treatment, and the optimum pH for biodegradation was 7. Biodegradation of TPH was 70.48%
35 at consortium concentration 15% for 14 days incubation.

36 **Conclusion, Significance and Impact of Study:** Biodegradation of oil sludge using a bacterial
37 consortium by bioslurry method is one of the effective methods to reduce pollutants in the
38 management of oil sludge.

39

40 INTRODUCTION

41 The oil refinery activity of the oil and gas refinery industry is still running today. The
42 amount of waste in the oil industry increases with the increase of oil industry activity. One such
43 industrial waste is the oil sludge that settles the bottom of the crude oil storage tanks.
44 Periodically, the oil tank must be cleaned to accommodate the new oils. Furthermore, the oil
45 sludge at the base of the oil tanks becomes a potentially polluting material on the environment.
46 The oil sludge contains the main compounds of aliphatic and aromatic hydrocarbons such as
47 benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs),
48 and containing heavy metal elements. Oil sludge is toxic, carcinogenic and mutagenic
49 (Kriipsalu et al., 2008, Liu et al., 2012). Environmental contamination by the ingredients of the
50 oil sludge can have an effect on the living organisms around it (Sari, et al., 2018). In addition,

51 the exploited sludge in the environment can reach the groundwater, lakes or water sources that
52 provide both domestic and industrial needs that the main source of clean water for sustainability
53 (Atlas & Bartha, 1998).

54 Handling cases of oil sludge hydrocarbon pollution has been widely done both
55 physically, chemically, and biologically. Biological handling with biodegradation is one of the
56 most cost effective and cheaper ways than physical and chemical methods (Mansur et al., 2015).
57 Biodegradation of hydrocarbons utilizes the role of potential microbes in decomposing
58 hydrocarbons. Previous study has revealed the ability of *Acinetobacter* sp. P2, *Bacillus subtilis*
59 3KP, (1), *Micrococcus* sp. LII 61, and *Pseudomonas putida* TI (8) in oil removal and
60 degradation of hydrocarbons in molasses substrates. The oil removal was supported by
61 biosurfactant products which produced in molasses substrate (Ni'matuzahroh et al., 2016a).
62 Microbes can break down harmful compounds into harmless compounds by releasing their
63 enzymes (Karigar and Rao, 2011). Oxygenase enzymes were produced by these aerobe
64 hydrocarbonoclastic isolates on medium with aliphatic and polyaromatic hydrocarbon
65 inductions (Sumarsih et al., 2017).

66 Efforts are being made to accelerate the biodegradation of hydrocarbons by maintaining
67 microbial survival, increasing microbial populations, and facilitating contact between
68 contaminants and microbes through it's biosurfactant product. Mix bacterial culture can
69 increase biodegradation rate compared to pure culture (Cerqueira et al., 2011). According to
70 Leahy and Colwell (1990), single microbial species can only degrade certain compounds in the
71 oil component, while using a microbial consortium can degrade hydrocarbon compounds that
72 can not be degraded by a single species because of the resulting enzyme capacity. Limitations
73 of oxygen are one of the important factors that inhibit the biodegradation of hydrocarbons by
74 aerobe hydrocarbonoclastic bacteria.

75 Bioslurry technology in biodegradation is effectively used to degrade hazardous
76 contaminants present in sediments, solids or sludges in a reactor equipped with an agitator and
77 aerator to supply oxygen during biodegradation (USEPA, 1990). According to Gonzales et al.
78 (2008), the advantages possessed by bioslurry reactors in the biodegradation of contaminants
79 include increasing mass transfer rate and contact between microorganisms, nutrients and
80 pollutants. USEPA (2009), stated that the addition of microbes and aeration in the bioslurry
81 reactor can be done to improve the performance of the reactor to the degradation of industrial
82 waste. Sufficiency of macro and micro elements is needed to support microbial growth that has
83 the potential to degrade hydrocarbons.

84 The incorporation of the biostimulation and bioaugmentation methods in the bioslurry
85 reactor will optimize the biodegradation process of hydrocarbons in the oil sludge
86 (Ni'matuzahroh et al., 2016b). Utilization of molasses as biostimulation agents in the
87 biodegradation of oil hydrocarbons began to receive attention (Ni'matuzahroh et al, 2017). This
88 study reported the influence of concentration variation of bacterial consortium on molasses
89 medium and variation of incubation time on effectiveness of biodegradation of oil sludge using
90 bioslurry method.

91

92 **MATERIALS AND METHODS**

93 **Research sites**

94 The research was conducted in an Ecology Laboratory, Environmental Laboratory and
95 Microbiology Laboratory of Faculty of Science and Technology, Universitas Airlangga,
96 Indonesia.

97 **Material**

98 Oil sludge came from PT. Pertamina Balongan, Indonesia, in the form of liquid sludge
99 simulated with the addition of sterile sand from Mojokerto, Indonesia, that has been sieved with

100 mesh 200 with a composition of 30% (v/w). The bacterial consortium consists of four
101 hydrocarbonoclastic bacteria, such us *Acinetobacter* sp. P2 (1), *Bacillus subtilis* 3KP,
102 *Microccocus* sp. LII 61, and *Pseudomonas putida* TI (8), which are collection cultures of
103 *Microbiology Laboratory of Universitas Airlangga*. The solvent used to extract hydrocarbons
104 from the oil sludge was n-hexane. Media for culturing bacterial isolates include Nutrient Agar
105 (NA) and Nutrient Broth (NB). Molasses was used as nutrients for bacterial growth.

106 **Preparation for Bioslurry Reactor**

107 Bioslurry reactors were used with glass and equipped with an aerator. The reactor has a
108 capacity of 1.5 L, cylindrical, with a diameter of 0.1 m, and a height of 0.15 m (freeboard 0.02
109 m). The design of the reactor is ilustrated in Figure 1.

110 **Preparation of Bacterial Isolate Consortium**

111 Each bacterial isolate was streaked on a slant NA medium, then incubated for 24 h at
112 25°C. The growing isolates were inoculated on NB medium and incubated for 24 hours on the
113 rotary shaker at 25°C. Each culture was ajusted to optical density (λ 600 nm) up to 0.5.
114 Consortium was composed with the same proportion of each bacterial culture and was ready
115 applied in each bioslurry reactor.

116 **Research design**

117 This was a laboratory experimental study using a completely randomized design of 5×4
118 factorial pattern with three replications. This research consists of two factors, namely variation
119 of concentration of microbial consortium and length of incubation time. The consortium
120 concentration of microbes added consisted of 0% (control), 5%, 10% and 15% (v/v), while the
121 incubation time was 0, 3, 7, 10 and 14 days. The study design is presented in Table 1.

122 **Biodegradation Test**

123 The biodegradation test was performed by comparison between the contaminant and the
124 liquid phase in the bioslurry treatment of 1:9. The bioslurry reactor was filled with 100 g of oil

125 sludge, with consortium concentration at each reactor was 0%, 5%, 10% and 15% (v/v), and
126 poured into it the distilled water with 2% molasses (v/v) up to the total volume of 1L
127 aseptically.

128 **Determination of Total Petroleum Hydrocarbon (TPH) and Percentage of Biodegradation**

129 The remaining TPH concentration during the treatment was measured by the modified
130 gravimetric method of EPA (1994) and Panda et al. (2013). The extraction was performed by
131 sampling, 30 mL culture of each reactor at a predetermined observation point using n-hexane
132 at a ratio of 1:1. The soluble hydrocarbons in n-hexane were evaporated to separate the
133 hydrocarbon phase with the solvent, the extraction takes place at a temperature of 60°C. The
134 hydrocarbons residues were weighed to obtain the weight of the remaining total petroleum
135 hydrocarbons (TPH). Further, TPH was analyzed using GC-MS to know content of the
136 remaining hydrocarbon compounds. The value of TPH was used to determine the percentage
137 of biodegradation using formula as below.

$$138 \quad \text{Hydrocarbon biodegradation (\%)} = \frac{\text{Initial TPH} - \text{final TPH}}{\text{initial TPH}} \times 100\%$$

139 **Viability Analysis of Bacterial Consortium**

140 Counting the number of bacterial cells was performed at each observation of incubation
141 time using pour plate method with a certain dilution series. Nutrien Agar (NA) medium was
142 used to grow bacterial isolates that play a role in hydrocarbon biodegradation. Incubation was
143 carried out for 24 hours at 25°C. TPC results were displayed with CFU/mL log values. At each
144 point, measurements of temperature and pH were also made.

145 **Data analysis**

146 Bacterial growth was evaluated using the Total Plate Count (TPC) method . TPH
147 measurements were conducted by the gravimetric method, evaluated by Gas Chromatography
148 Mass Spectrophotometry (GCMS). The pH and temperature data were analyzed descriptively,

149 while TPC and TPH data were analyzed using Two Ways ANOVA ($\alpha=0,05$) and continued
150 with Duncan test.

151

152 **RESULTS AND DISCUSSION**

153 The success parameters of oil sludge hydrocarbon biodegradation are indicated by
154 increasing of microbial number (CFU/mL), reduction of total residual weight of Petroleum
155 Hydrocarbon (g/g) on slurry substrate, intermediate metabolite compound formation, pH
156 change and temperature during treatment. The result of combinations of consortium
157 concentration variations and incubation time on total microbial count (CFU/mL) and weight
158 loss of oil sludge residue (g/g) are presented in Table 2, while the percentage of biodegradation,
159 pH, temperature measurement and analysis the content of the hydrocarbon compounds resulting
160 from biodegradation are shown in Figure 2, Figure 3, Figure 4, and Figure 5.

161 Based on Table 2 (Duncan test results), the highest mean log of total microbial number
162 (CFU/mL) in H4V3 treatment (15% bacterial consortium concentration at 14 days incubation
163 time) was 21.7 ± 1.22 CFU/mL. It can be seen that the residual oil sludge (g/g) decreases during
164 incubation time. The average weight loss of the highest sludge (g/g) residue lies in the H4V3
165 treatment of 0.142 ± 0.0045 (g/g). The highest percentage of degradation was 70.48% with oil
166 sludge concentration 30% (0.48 g/g) for 14 days (Figure 2). Weight loss of oil sludge residue
167 that occurred significantly on H4V3 treatment (15% increase in concentration and 14 days
168 incubation time). Increasing the number of bacteria and decreasing TPH are the result of
169 metabolic activity of the microbial consortium present in the culture. Indigenous and exogenous
170 bacteria used hydrocarbons in the oil sludge as a carbon sources proven by decreasing of TPH
171 in oil sludge. The consortium of exogenous bacteria also has a positive interaction with
172 indigenous bacteria. The increasing number of microbial populations will increase the rate of
173 degradation of hydrocarbon compounds (Pratiwi, 2014). With this bioslurry method, the

174 percentage of TPH biodegradation up to 100% is predicted to be achieved at 48, 26, 22 and 18
175 days of incubation in control treatment and variation of bacterial consortium addition with
176 concentration of 5%, 10%, and 15% respectively. The calculation analysis using the regression
177 equation is not reported in this paper.

178 Molasses used as biostimulation agents in the oil sludge biodegradation contain of
179 simple sugars and minerals required for the growth of consortium-forming bacteria. The
180 previous study also proved that molasses can be used as biosurfactant production media by
181 exogenous bacterial consortium and indigenous bacteria from oil sludge (Ni'matuzahroh, et al.,
182 2015, Ni'matuzahroh, et al., 2016a, Ni'matuzahroh, et al., 2017). Biosurfactant can increase the
183 solubilization of hydrocarbon to enhance the bioavailability of hydrocarbon for
184 hydrocarbonoclastic bacteria. Treatment with biostimulation using molasses was proven to
185 achieve TPH biodegradation up to 33.01% for 14 days incubation. The addition of a bacterial
186 consortium 5, 10, and 15% significantly gave a difference in the percentage of TPH
187 biodegradation compared to controls, which was 55.53%, 61.25% and 70.48% respectively.
188 The effectiveness of bioaugmentation is influenced by the concentration of bacterial consortium
189 and the interaction between bacteria. Utilization of bacterial consortium more than 15% is
190 assumed increase the percentage of hydrocarbon degradation, if environmental conditions still
191 support bacterial growth.

192 The main constraint of the biodegradation process in closed systems is the limitations
193 of oxygen used by aerobic bacteria degrading hydrocarbons. Increased incubation times
194 generally have a growth inhibitory effect indicated by a slowing growth phase (Ni'matuzahroh,
195 et al., 2016b). This study has successfully demonstrated that aerated supplying through
196 bioslurry method can ensure the oxygen demand for aerobic microbes to break down
197 hydrocarbons. This is evidenced by the ongoing exponential phase of bacteria at increasing
198 incubation time in all treatments.

199 The complexity of the compounds contained in the oil sludge and the high residual
200 weight **are** thought to be the **causes** of the difficulty of the microbes used in the study to degrade
201 the recalcitrant compounds. This can be seen in the increase in the average value of log results
202 in the total number of microbes (CFU/mL) that are not so high. The substrate attached to the
203 bottom of the bioslurry reactor and adhering to the sand soil during the study was also suspected
204 to be the cause of the lack of availability of hydrocarbon sources for the microbial consortium
205 used. The statement is supported by Goswami & Singh, (1990) in Pratiwi (2014) **which states**
206 **that the physical and chemical properties of hydrocarbon such as form, structure,** solubility and
207 hydrocarbon toxicity become one of the determinants of accessibility of hydrocarbon
208 compounds by microbes and may affect the use of substrate for bacterial growth.

209 **Based on Figure 3,** the pH value at various treatment variations increased and decreased
210 within the time range of day 0 to day-14. According to Zhu, **et al.,** (2001) the biodegradation
211 process will take place optimally if it occurs in sufficient conditions of nutrients, oxygen and
212 pH ranges from 6-9. Charlena, **et al.,** (2009) states that the increasing activity of microbes in
213 the biodegradation of hydrocarbons, it will also increase the organic acids produced.
214 Temperature is an environmental factor that affects the biodegradation of hydrocarbons
215 especially on metabolic processes and growth of microorganisms (Silvia, 2010). Based on
216 Figure 4, it can be seen that the temperature on days 0 and 3 on various concentrations of
217 microbial consortium tends to remain unchanged, but on the 7th, 10th and 14th days it tends to
218 be an increase. The increase in temperature is likely due to an increase in ambient temperature.
219 Biodegradation of petroleum takes place over a wide temperature range but is not always a
220 major factor limiting biodegradation if other environmental factors exist under optimal
221 conditions (Atlas, 1981).

222 Overall concentration of microbial consortium, incubation time and other factors such
223 as pH and ambient temperature will affect the total microbial count and percentage of oil sludge

224 degradation. In the combination treatment, it was found that the best treatment was found in
225 H4V3 (15% inoculum with 14 days incubation). The result of GCMS analysis showed that
226 variation of bacterial inoculum concentration also gave difference in percentage of hydrocarbon
227 component composition at the end of incubation time (Figure 5). Aliphatic components are
228 degraded faster than aromatic and polyaromatic components. The accumulation of aromatic
229 compounds in culture with the addition of 10% and 15% is a bit of bacterial growth inhibitor.

230 The use of bioslurry reactors is considered effective when used in biodegradation of
231 organic compounds such as hydrocarbons. This is evidenced by a short time of 14 days can
232 degrade oil sludge by 55.06% (initial TPH 30%). Cassidy (2001), states that the weakness
233 possessed by the bioslurry reactor in the process of biodegradation of hydrocarbon compounds
234 is the formation of unpredictable foams. The production of this foam can occur rapidly during
235 the stirring process especially when the speed of stirring and aeration are quite high.

236 Two percent of molasses can be used as biostimulants in the biodegradation of oil sludge
237 hydrocarbons. Determination of minimum levels of nutrients in molasses that was needed for
238 metabolism of hydrocarbon degrading bacteria becomes research targets that prospective to be
239 developed for efficient waste treatment. The use of molasses in the handling or treatment of
240 hydrocarbon waste can also support the utilization of organic waste in the environment.

241

242 CONCLUSION

243 Variations in the concentration of microbial consortium and length of incubation time
244 using bioslurry reactor have an effect on total microbial number (CFU/mL) and weight loss of
245 oil sludge residue (g/g). The best combination was found in the H4V3 treatment (15%
246 consortium, 14 days incubation) with a mean log value of total microbial cells of 21.77 ± 1.22
247 CFU/mL and the mean percentage of oil sludge biodegradation of 78.04%. The combination of

248 biostimulation, bioaugmentation and bioventing methods using bioslurry reactor is highly
249 prospective to be used in the processing of oil sludge.

250

251 ANKNOWLEDGMENT

252 The researchers would like to thank the Ministry of Research, Technology and Higher
253 Education, Republic of Indonesia (Kemenristek Dikti) for funding the research through the
254 National Strategic Research grant scheme in 2017.

255

256 REFERENCES

257 Atlas, R. M. (1981). Microbial Degradation of Petroleum Hydrocarbon: An Environmental
258 Perspective. *Microbial Review*. **120-308**.

259 Atlas, R.,M. & Bartha, R.. (1998). Microbial Ecology : Fundamentals and Aplication.
260 Company Inc Publishing, California. pp. 300-338.

261 Charlena. (2010). Bioremediasi Tanah Tercemar Limbah Minyak Berat menggunakan
262 Konsorsium Bakteri. Thesis. Sekolah Pasca Sarjana Institute Pertanian Bogor. Bogor.

263 Cassidy, D.,P. (2001). Biological Surfactan Production in a Biological Slurry reactor treating
264 diesel fuel contaminated soil. *Water Sci Technol*. **73**.

265 Cerqueira V. S., Hollenbach E. B., Maboni Franciele, Vainstein M. H., Camargo Flávio
266 A.O., Peralba Maria do Carmo R., Bento Fátima M. (2011). Biodegradation potential of
267 oily sludge by pure and mixed bacterial cultures. *Bioresource Technology* **102, 11003–11010**.

268 Gonzalez, I., V., R., Fava, F., & Varaldo, H., M., P. (2008). A review on slurry bioreactors
269 for bioremediation of soils and sediments. *Journal of Microbial Cell Factories*. Universitas
270 Bologna, Italia. **7 (5)**.

271 Karigar C., Rao S., (2011). Role of Microbial Enzymes in the Bioremediation of Pollutants:
272 A Review. *Enzyme Research*. **1-11**

273 **Kriipsalu, M., Marques, M., Maastik, A., (2008).** Characterization of oily sludge from a
274 wastewater treatment plant flocculation–flotation unit in a petroleum refinery and its treatment
275 implications. *J. Mater. Cycles Waste Manag.* **10**, 79–86.

276 **Leahy, J.,G & Collwell, R.,R. (1990).** Microbial Degradation of Hydrocarbons in the
277 Environments. *Microbial rev.* **305-315**.

278 **Liu J., Liu G., Zhang J., Yin H., Wang R., (2012).** Occurrence and Risk Assessment of
279 Polycyclic Aromatic Hydrocarbon in Soil from the Tiefa Coal Mine District, Liaoning, China.
280 *J. Environ. Monit.* **14(10)**, 2634-2642.

281 **Mansur, A.A., Adetutu, E.M., Makadia, T., Morrison, P.D., Ball, A.S. (2015).** Assessment
282 of the Hydrocarbon Degrading Abilities of Three Bioaugmentation Agents for the
283 Bioremediation of Crude Oil Tank Bottom Sludge Contaminated Libyan Soil'. *International*
284 *Journal of Environmental Bioremediation & Biodegradation.* **3(1)**, 1–9.

285 **Ni'matuzahroh, Puspitasari A. O., Pratiwi I. A., Fatimah, Sumarsih S., Surtiningsih T.,**
286 **Salamun. (2016a).** Oil Removal from Petroleum Sludge using Bacterial Culture with Molasses
287 Substrate at Temperature Variation. *AIP Conference Proceedings* **1718**, 030002.

288 **Ni'matuzahroh, Fatimah, Sumarsih, S. Yuliani, H. (2016b).** Utilization of Bacterial Formula
289 “Biocleanoil” for Oil Tank Cleaning and Oil Sludge Treatment (In Indonesia). Research Report.
290 Universitas Airlangga.

291 **Ni'matuzahroh., Nurmalasari, R., Silvia, R.A., Nurhariyati, T., Surtiningsih, T. (2015).**
292 Effectiveness in Enhancing Oil Recovery through Combination of Biosurfactant and Lipase
293 Bacteria. *J. Appl. Environ. Biol. Sci.*, **5(6)** : 83-87.

294 **Ni'matuzahroh., Pratiwi, I.A., Surtiningsih, T., Fatimah., Sumarsih, S. (2017).** The
295 Potency of *Micrococcus* sp., LII 61 Bacteria as Oil Sludge Cleaning Agent. *Journal of*
296 *Biological Researches.* **Vol 22(2)**

297 **Panda, S. , Kar, N.,& Panda, R. (2013).** Isolation and identification of petroleum hydrocarbon
298 degrading microorganism from oil contaminated environment. *International Journal of*
299 *Environmental Sciences.* **3(5): 1314-1321.**

300 **Pratiwi, I., A. (2014).** Biodegradation of Oily Sludge Hydrocarbon Compunds by *Micrococcus*
301 sp. L II 61. (In Indonesia). Master Thesis. Universitas Airlangga, Indonesia.

302 **Sari, G.L., Trihadiningrum, T., Ni'matuzahroh. (2018).** Petroleum Hydrocarbon Pollution
303 in Soil and Surface Water by Public Oil Fields in Wonocolo Sub-district, Indonesia. *Journal of*
304 *Ecological Engineering.* **1, Issues 2, March 2018.**

305 **Silvia, S. (2010).** Biodegradation of Petroleum Hydrocarbon using Bacterial Isolate from Crude
306 Oil Waste. PT. Cevron Pasific Indonesia (In Indonesia). Universitas Andalas, Sumatera Barat.
307 *Journal.* **1(1).**

308 **Sumarsih, S., Ni'matuzahroh., Fatimah., Puspitasari, M., Rusdiana, M., (2017).** Effect of
309 Aliphatic and Aromatic Hydrocarbons on The Oxygenase Production from
310 Hydrocarbonoclastic bacteria. *Journal of Chemical Technology and Methallurgy.* **52(6):1062-**
311 **1069.**

312 **U.S. Environmental Protection Agency (US-EPA). (2009).** Soil Hazard Categorization and
313 Management. Industrial Waste Resource Guidelines (IWRG). EPA. Victoria.

314 **USEPA. (1990).** Slurry Biodegradation. Engineering Bulletin. EPA/5402/290/016.

315 **Zhu, X., Venosa.,A.,D., Suidan, M.,T., & Lee, K. (2001).** Guidelines for the Bioremediation
316 of marine shorelines and freshwater wetlands. *Cincinnati.* **OH 45288, 156.**

Table 1. Treatment variation of bacterial consortium concentration and incubation time

Incubation time (Days)	Concentration of bacterial consortium (% v/v)			
	V0	V1	V2	V3
H0	H0V0	H0V1	H0V2	H0V3
H1	H1V0	H1V1	H1V2	H1V3
H2	H2V0	H2V1	H2V2	H2V3
H3	H3V0	H3V1	H3V2	H3V3
H4	H4V0	H4V1	H4V2	H4V3

Notes:

V0: Concentration of bacterial consortium 0% (v/v) as a control of treatments

V1: Concentration of bacterial consortium 5% (v/v)

V2: Concentration of bacterial consortium 10% (v/v)

V3: Concentration of bacterial consortium 15% (v/v)

H0: Day 0

H1: Day 3

H2: Day 7

H3: Day 10

H4: Day 14

Table 2. Combination of consortium concentration and length of incubation time to **total bacterial number** (CFU / mL) and weight loss of oil sludge residue (g/g)

Treatments	Average of number of bacteria (log CFU/mL)	Average of oil sludge residue (g/g)
H0V0	16.549 ± 0.52 ^{abcde}	0.460 ± 0.009 ^k
H1V0	15.437 ± 0.43 ^a	0.456 ± 0.019 ^k
H2V0	17.000 ± 0.00 ^{bcdef}	0.458 ± 0.001 ^k
H3V0	17.765 ± 0.18 ^{fg}	0.462 ± 0.018 ^k
H4V0	17.537 ± 1.07 ^{efg}	0.431 ± 0.001 ⁱ
H0V1	15.945 ± 0.61 ^{ab}	0.388 ± 0.004 ⁱ
H1V1	16.049 ± 0.22 ^{ab}	0.373 ± 0.004 ^h
H2V1	17.347 ± 0.306 ^{defg}	0.359 ± 0.012 ^{hi}
H3V1	18.191 ± 0.19 ^g	0.385 ± 0.040 ⁱ
H4V1	19.759 ± 0.6 ^h	0.323 ± 0.004 ^g
H0V2	15.874 ± 0.98 ^{ab}	0.246 ± 0.007 ^e
H1V2	16.199 ± 0.23 ^{abc}	0.198 ± 0.007 ^{bc}
H2V2	17.347 ± 0.32 ^{defg}	0.375 ± 0.010 ⁱ
H3V2	19.7518 ± 0.63 ^h	0.269 ± 0.006 ^f
H4V2	19.422 ± 0.037 ^h	0.235 ± 0.008 ^f
H0V3	16.339 ± 0.66 ^{abcd}	0.179 ± 0.009 ^b
H1V3	17.212 ± 0.46 ^{cdefg}	0.322 ± 0.016 ^g

H2V3	18.293±1.21 ^g	0.213 ± 0.009 ^{cd}
H3V3	19.531±0.14 ^h	0.186 ± 0.010 ^b
H4V3	21.773±1.22ⁱ	0.142 ± 0.005^a

Noted: Data labelled with different letters are statistically different ($\alpha = 0.05$; Duncan's test)

Information of Fig.1:

- 1. Freeboard
- 2. Cylindrical glass
- 3. Pipe
- 4. Aerator
- 5. Diameter of reactor
- 6. Height of reactor

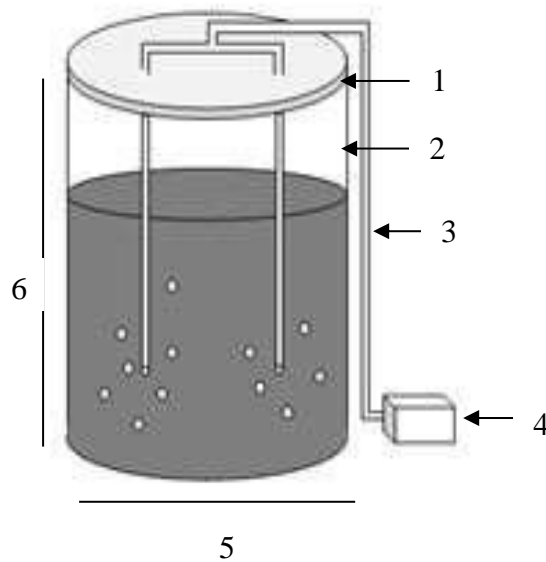


Figure 1. Bioslurry reactor design

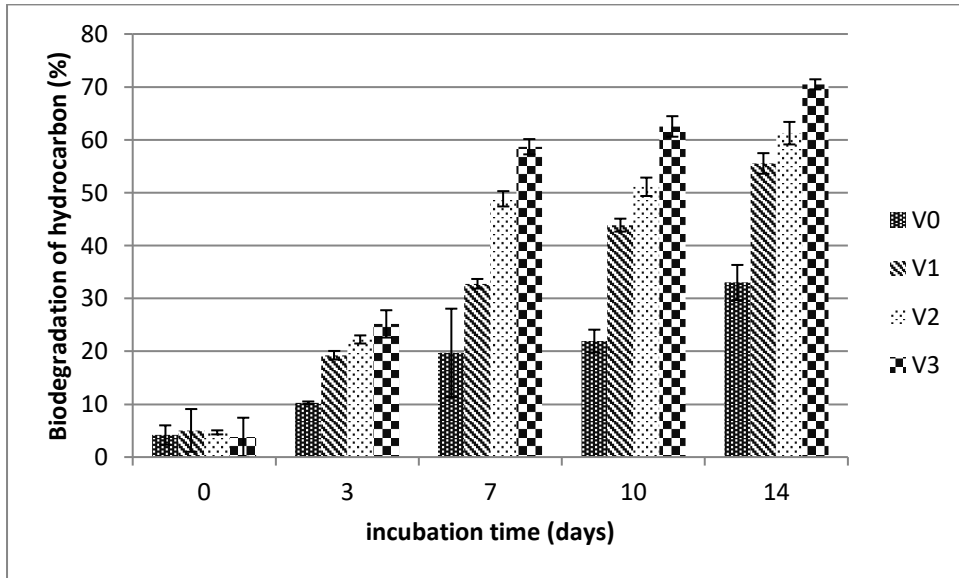


Figure 2. The percentage of hydrocarbon biodegradation at various concentrations of bacterial consortium and time of incubation

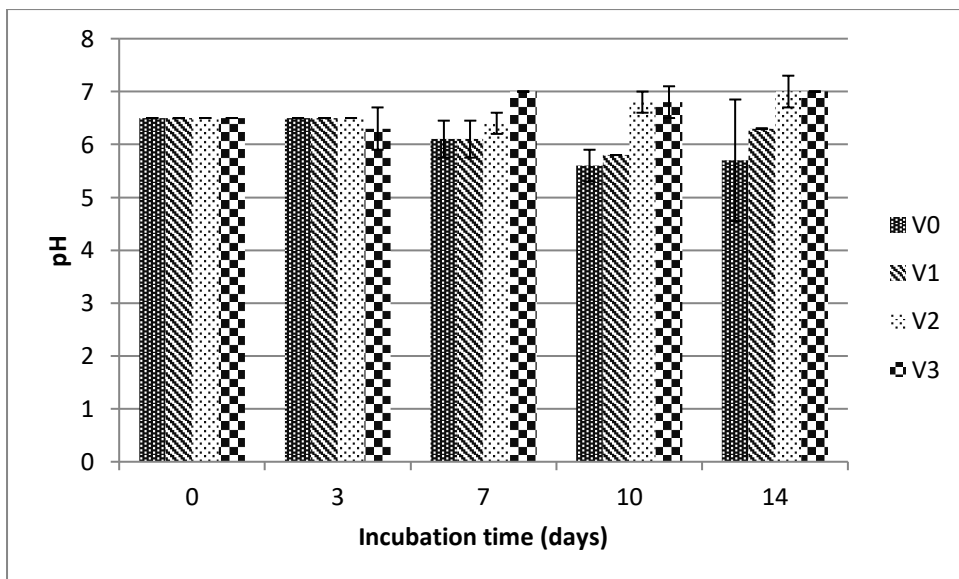


Figure 3. pH in all treatments in bioslurry reactor

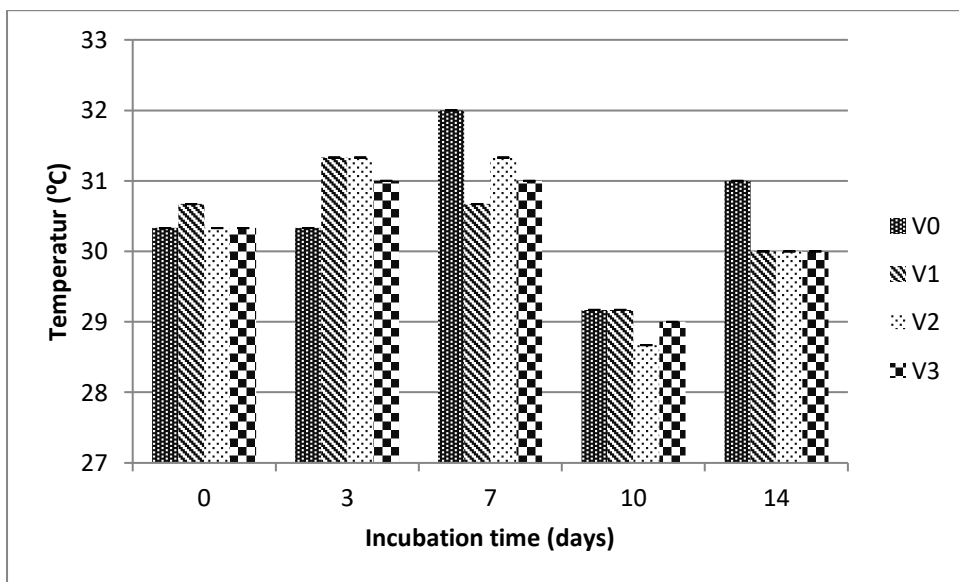


Figure 4. Temperature in all treatments in bioslurry reactor

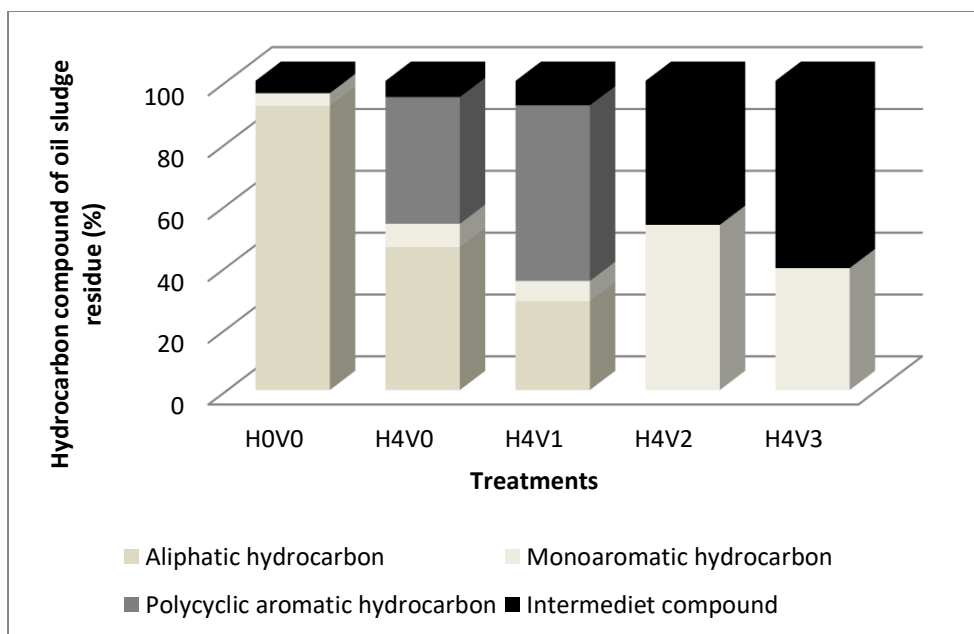


Figure 5. The remaining hydrocarbon components in all treatments at 14 days of incubation

Final revision (MJM-AMBC 2019)

3 messages

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
Cc: Tosiah Bt Sadi -Dr <tosiah@mardi.gov.my>

Mon, Jan 28, 2019 at 3:17 PM

Dear Dr. Ni'matuzahroh,

The editor has checked your revised manuscript and has recommended some minor corrections. Please do the corrections in the manuscript provided in this email.

1. Please check all your references format. It has to follow the format set by Malaysian Journal of Microbiology. All the references need revision.
2. The captions of Figure 2, 3, and 4 must be self-explanatory. Please indicate the meaning of the legend in the caption.

Kindly return your final version of revised manuscript by 18 February 2019.

Thanks and Regards,
Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]
Sent: Wednesday, 26 September, 2018 8:57:27 AM
To: Stella A/p Matthews @ Machap
Subject: Our manuscript with highlighted corrections

Dear Stella


I submit our manuscript that we have fixed and highlighted correction. The sentence colored in yellow is the sentence that we have added new and which we have revised according to the suggestion of the reviewer. We apologize for sending late from the time you gave due to our busy schedule at the University. Thank you very much for your help and attention.

Best regards

Ni'matuzahroh and team

Sekiranya e-mel ini adalah SPAM, sila lampirkan e-mel asal kepada spam@1govuc.gov.my dengan menekan 3 kekunci (Ctrl + Alt + F) secara serentak (MS Outlook client) atau klik tetikus kanan pada

e-mel dan majukannya sebagai lampiran (OWA).

 **Final revision- Dr. Ni'matuzahroh.docx**
95K

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Mon, Jan 28, 2019 at 5:27 PM

Dear Stella

Thank you very much for your information.

Best regards

Ni'matuzahroh and team

[Quoted text hidden]

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: Nastiti Trikurniadewi <nastititrikurniadewi@yahoo.com>

Mon, Jan 28, 2019 at 5:45 PM


Assalamu'alaikum Nastiti

Alhamdulillah, ada kabar terkait artikel kita.

Wassalam

Ni'mah

[Quoted text hidden]

 **Final revision- Dr. Ni'matuzahroh.docx**
95K

Final revision (MJM-AMBC 2019)_Ni'matuzahroh

5 messages

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Mon, Feb 11, 2019 at 4:00 PM

Dear Stella,

Please kindly check the final revision of our manuscript in the attached file. The highlight of the gray sentence is the sentence that we have revised. We have also revised the reference format according to the format specified by the Malaysian Journal of Microbiology. Thank you very much for your help and attention.

Best regards,

Ni'matuzahroh and team



Final revision- Dr. Ni'matuzahroh - 110219.docx
104K

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Mon, Feb 11, 2019 at 9:45 PM

Dear Dr. Ni'matuzahroh,

Received with thanks.

Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]
Sent: Monday, 11 February, 2019 5:00:49 PM
To: Stella A/p Matthews @ Machap
Subject: Final revision (MJM-AMBC 2019)_Ni'matuzahroh

[Quoted text hidden]

To report this email as SPAM, please attach the original email as an attachment to spam@1govuc.gov.my by holding Ctrl + Alt + F keys concurrently (for Outlook client) or right click on the email and forward as Attachment (for OWA).

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
Cc: Tosiah Bt Sadi -Dr <tosiah@mardi.gov.my>

Wed, Feb 13, 2019 at 7:36 AM

Dear Dr. Ni'matuzahroh,

Good morning.

Please use MJM template for your manuscript as in the attachment.

Thanks and Regards,
Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]

Sent: Monday, 11 February, 2019 5:00:49 PM

To: Stella A/p Matthews @ Machap

Subject: Final revision (MJM-AMBC 2019)_Ni'matuzahroh

[Quoted text hidden]

[Quoted text hidden]

 **MJM Formatting template.doc**
163K

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: "nimatuzahroh@fst.unair.ac.id" <nimatuzahroh@fst.unair.ac.id>

Tue, Feb 19, 2019 at 9:37 AM

Dear Dr. Ni'matuzahroh

Good morning

Could you please send me your revised manuscript in MJM template by 22/2/2019, Friday?

Your cooperation is highly appreciated !

Thanks and Regards,

Stella

From: Stella A/p Matthews @ Machap

Sent: Wednesday, 13 February, 2019 8:36:44 AM

To: nimatuzahroh nimatuzahroh

Cc: Tosiah Bt Sadi

Subject: RE: Final revision (MJM-AMBC 2019)_Ni'matuzahroh

[Quoted text hidden]

 **MJM Formatting template.doc**
163K

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Tue, Feb 19, 2019 at 6:52 PM

Dear Stella

Thanks for the information. We will immediately change according to the MJM template. We are trying to send you before February 22, 2019. Thank you for your attention and assistance.

Best regards

Ni'matuzahroh and team

[Quoted text hidden]

Manuscript in MJM template_Ni'matuzahroh et al.

5 messages

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Fri, Feb 22, 2019 at 11:50 AM

Dear Stella M.,

We would like to submit our revised manuscript in MJM template. The file in the attachment of this email.
Thank you for your help.

Best regards,
Dr. Ni'matuzahroh and team

 **MJM Formatting template_Ni'matuzahroh.doc**
343K

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Fri, Feb 22, 2019 at 1:54 PM

Dear Dr. Ni'matuzahroh,

Received with thanks.

Regards,
Stella

From: nimatuzahroh nimatuzahroh [nimatuzahroh@fst.unair.ac.id]
Sent: Friday, 22 February, 2019 12:50:10 PM
To: Stella A/p Matthews @ Machap
Subject: Manuscript in MJM template_Ni'matuzahroh et al.

[Quoted text hidden]

Sekiranya e-mel ini adalah SPAM, sila lampirkan e-mel asal kepada spam@1govuc.gov.my dengan menekan 3 kekunci (Ctrl + Alt + F) secara serentak (MS Outlook client) atau klik tetikus kanan pada e-mel dan majukannya sebagai lampiran (OWA).

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Sun, May 5, 2019 at 8:04 PM

Dear Stella,

We have sent our final manuscript entitled "**Utilization of Bacterial Consortium for Oil Sludge Biodegradation Using Bioslurry Method**" on February 22, 2019, for Malaysian Journal of Microbiology. Until now, we have not received any information. May we know, how is the progress of our manuscript?
Thank you for your attention.

Best regards,

Dr. Ni'matuzahroh

[Quoted text hidden]

Stella A/p Matthews @ Machap <stella@mardi.gov.my>
To: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Mon, May 6, 2019 at 6:59 AM

Dear Dr. Ni'matuzahroh,

We are checking the formatting of all the manuscript. Once it is done, the papers will be sent to the publisher. Tentatively, the paper will be published 3 months after the submission, most likely in September 2019.

Thanks and Regards,

Stella

From: nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>

Sent: Sunday, 5 May, 2019 9:04:12 PM

To: Stella A/p Matthews @ Machap

Subject: Re: Manuscript in MJM template_Ni'matuzahroh et al.

[Quoted text hidden]

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Mon, May 6, 2019 at 9:24 AM

Dear Stella,

Thank you for your fast response and information.

Best regards,
Dr. Ni'matuzahroh

[Quoted text hidden]

Accepted for publication in AMBC-MJM special issue 2019

2 messages

Stella A/p Matthews @ Machap <stella@mardi.gov.my>

Fri, Jun 21, 2019 at 9:38 PM

To: Noor Azlina Binti Masdor <azlina@mardi.gov.my>, Dang Lelamurni Binti Abd Razak <danglela@mardi.gov.my>, Nor Ayshah Alia Binti Ali Hassan <ayshalia@mardi.gov.my>, Nurul Ammar Illani Binti Jaafar <ammarj@mardi.gov.my>, "holed@sbc.org.my" <holed@sbc.org.my>, "ni-nyoman-t-p@fst.unair.ac.id" <ni-nyoman-t-p@fst.unair.ac.id>, "nyomantri@yahoo.com" <nyomantri@yahoo.com>, "sinpakonesinghalath@gmail.com" <sinpakonesinghalath@gmail.com>, "Nur Sulastri Bt. Jaffar" <sulastri@mardi.gov.my>, Koh Soo Peng <karenkoh@mardi.gov.my>, "nimatuzahroh@fst.unair.ac.id" <nimatuzahroh@fst.unair.ac.id>, Mohd Nazri Bin Baharon <mnazri@mardi.gov.my>, Azlan Azizi Bin Muhamad Nor <azlanmn@mardi.gov.my>
Cc: Tosiah Bt Sadi -Dr <tosiah@mardi.gov.my>

Dear authors,

Greetings to you.

We are delighted to inform you that your paper has been accepted for publication in AMBC-MJM special issue 2019.

We have submitted your paper as listed below to the Malaysian Journal of Microbiology and it is expected to be published by end of September 2019.

1. Brewer's rice – a potential substrate for cosmeceutical bio-ingredient production by solid state fermentation using *Aspergillus oryzae* (Dang Lelamurni Abdul Razak)
2. Enhanced detection of antimicrobial activities and secondary metabolites production from *Plantactinospora* sp. KBS50 cultivated using the OSMAC fermentation approach (Holed Juboi)
3. The response of microbial community in aerobic rice rhizosphere that affected by various plant growth stages and soil types (Nor Ayshah Alia Ali Hassan)
4. Heating cell immobilization of *Streptomyces griseus* and its variant for economical fructose production (One Asmarani)
5. The development of indirect and sandwich ELISA-based detection methods for the detection of *Campylobacter jejuni* using monoclonal and polyclonal antibody preparations (Noor Azlina Masdor)
6. Anti-fungal substances of *Bacillus subtilis* against *Ganoderma boninense* (Sinpakone Singhalath)
7. New Bacterial Fruit Rot Disease of Jackfruit caused by *Dickeya fangzhongdai* in Malaysia (Nur Sulastri)
8. Antimicrobial efficacy of fermented mango leaves beverage towards selected foodborne pathogens (Koh Soo Peng)
9. Utilization of bacterial consortium for oil sludge biodegradation using bioslurry method (Ni'matuzahroh)
10. Antimicrobial activity and antibiotic resistance of lactic acid bacteria isolated from Malaysian stingless bee's gut (Nurul Ammar Illani Jaafar)
11. Antifungal activity of selected plant extracts against *Curvularia* sp. infecting local purple sweet potato (*Ipomoea batatas*)(Mohd Nazri)
12. Dissemination Pattern of Bacterial Heart Rot (BHR) disease and screening of the disease resistance among commercial pineapple varieties in Malaysia (Azlan Azizi Muhamad Nor)

Please contact the guest editor of the issue Dr. Tosiah Sadi (tosiah@mardi.gov.my) for further communication.

I would like to thank you for all your support, commitment and patience!

Best regards,
Stella

nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>
To: "Stella A/p Matthews @ Machap" <stella@mardi.gov.my>

Fri, Jun 21, 2019 at 10:17 PM

Dear Stella

Thank you for your information

Best regards

Ni'matuzahroh

[Quoted text hidden]

Fw: MJM Volume 15, No. 4 (AMBC 2018) Special Issue and MJM Volume 15, No. 5 (August 2019) Issue are now online!

1 message

Stella A/p Matthews @ Machap <stella@mardi.gov.my>

Thu, Aug 1, 2019 at 2:43 PM

To: Dang Lelamurni Binti Abd Razak <danglela@mardi.gov.my>, Noor Azlina Binti Masdor <azlina@mardi.gov.my>, Nor Ayshah Alia Binti Ali Hassan <ayshalia@mardi.gov.my>, "holed@sbc.org.my" <holed@sbc.org.my>, Azlan Azizi Bin Muhamad Nor <azlanmn@mardi.gov.my>, Nurul Ammar Illani Binti Jaafar <ammarj@mardi.gov.my>, "Nur Sulastrri Bt. Jaffar" <sulastrri@mardi.gov.my>, nimatuzahroh nimatuzahroh <nimatuzahroh@fst.unair.ac.id>, "nyomantri@yahoo.com" <nyomantri@yahoo.com>, "sinpakonesinghalath@gmail.com" <sinpakonesinghalath@gmail.com>, Mohd Nazri Bin Baharon <mnazri@mardi.gov.my>, Koh Soo Peng <karenkoh@mardi.gov.my>
Cc: Tosiah Bt Sadi -Dr <tosiah@mardi.gov.my>

Dear authors,

Greetings to you.

We are glad to inform you that your articles are published online. **MJM Volume 15, No. 4 (AMBC 2018) Special Issue. Congratulations!**

We would like to thank you all for sending your article to AMBC special issue and for your great co-operation throughout the publication process.

Thanks and Regards,

On behalf of AMBC publication team.

From: Malaysian Journal of Microbiology <mjm@usm.my>

Sent: Thursday, 1 August, 2019 1:52 PM

To: Stella A/p Matthews @ Machap

Cc: Prof. Dr. K. Sudesh Kumar; Tosiah Bt Sadi -Dr

Subject: MJM Volume 15, No. 4 (AMBC 2018) Special Issue and MJM Volume 15, No. 5 (August 2019) Issue are now online!

Dear Dr. Stella,

We are pleased to inform you that the **MJM Volume 15, No. 4 (AMBC 2018) Special Issue** and **MJM Volume 15, No. 5 (August 2019) Issue** are now online!

We hope that the articles published will contribute positively towards the constant development of the scientific community around the world. Starting from this year, we are increasing our number of publication from 4 to 6

issues per year with issues published in February, April, June, August, October and December. We look forward to your continued support and contributions to MJM.

Please find the direct links to the articles in the latest issues below:

Volume 15, Issue 4: AMBC 2018

Research Articles

Brewer's rice - A potential substrate for cosmeceutical bio-ingredient production by solid state fermentation using *Aspergillus oryzae*

Razak, D. L. A., Rashid, N. Y. A., Jamaluddin, A., Ghani, A. A., Mansor, A., Manan, M. A.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Enhanced detection of antimicrobial activities and secondary metabolites production from *Plantactinospora* sp. KBS50 cultivated using the OSMAC fermentation approach

Juboi, H., Hwang, S. S., Yeo, T. C., Nissom, P. M.

[\[Abstract\]](#) [\[Download Full Text\]](#)

The response of microbial community in aerobic rice rhizosphere that affected by various plant growth stages and soil types

Ali Hassan, N. A. A., Othman, R., Sadi, T.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Heating cell immobilization of *Streptomyces griseus* and its variant for economical fructose production

Asmarani, O., Rachmawati, J., Rahayu, S., Rahmah, S. A., Purkan., Puspaningsih, N. N. T.

[\[Abstract\]](#) [\[Download Full Text\]](#)

The development of indirect and sandwich ELISA-based detection methods for the detection of *Campylobacter jejuni* using monoclonal and polyclonal antibody preparations

Masdor, N. A., Altintas, A., Tothill, I.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Anti-fungal substances of *Bacillus subtilis* against *Ganoderma boninense*

Singhalath, S., Aryantha, I. N. P.

[\[Abstract\]](#) [\[Download Full Text\]](#)

New bacterial fruit rot disease of jackfruit caused by *Dickeya fangzhongdaii* in Malaysia

Jaffar, N. S., Osman, M. S., Koyube, M. N. K.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Antimicrobial efficacy of fermented mango leaves beverage towards selected foodborne pathogens

Koh, S. P., Sharifudin, S. A., Abdullah, R., Abdul Hamid, N. S., Mirad, R., Mustaffa, R.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Utilization of bacterial consortium for oil sludge biodegradation using bioslurry method

Ni'matuzahroh., Muslikhah., Oktavitri, N. I., Trikurniadewi, N., Fatimah., Sumarsih, S., Yuliani, H.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Antimicrobial activity and antibiotic resistance of lactic acid bacteria isolated from Malaysian stingless bee's gut

Jaafar, N. A. I., Syed Mohamad, S. A., Wan Abdul Razak, W. R.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Antifungal activity of selected plant extracts against *Curvularia* sp. infecting local purple sweet potato (*Ipomoea batatas*)

Baharon, M. N., Zulkifli, N. S. A., Baharom, N. A., Mat Yunus, S.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Dissemination pattern of bacterial heart rot (BHR) disease and screening of the disease resistance among commercial pineapple varieties in Malaysia

Muhamad Nor, A. A., Zainol, R., Abdullah, R., Jaffar, N. S., Abdul Rasid, M. Z., Laboh, R., Ahmad Shafawi, N., Abdul Aziz, N. B.

[\[Abstract\]](#) [\[Download Full Text\]](#)

MJM Vol. 15, No. 5 (August 2019)

Short Communications

Report on outbreak and *in vitro* management of leaf spots disease caused by *Pestalotiopsis* sp. on oil palm seedlings in nurseries in Ghana

Lekete, E., Osekre, E. A., Andoh-Mensah, E.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Research Articles

Effects of carbon source and additives on biomass, exopolysaccharide production and morphology of *Pleurotus ostreatus* in submerged cultivation

Othman, N. Z., Mohd. Din, A. R. J., Zakaria, K. H. N., Ramli, S., Yeng, L. H., Abd. Rashid, S. N., Mohd. Yunus, M. M., Sarmidi, M. R.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Study on the killing effect of cold atmospheric pressure plasma on MRSA *Staphylococcus aureus* in vitro and in vivo infection model

Namini, Y. N., Heidarzadeh, S., Khaledi, A., Abbasi, E., Abbasi, A., Esmaili, D.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Molecular identification, in vitro copper resistance and antibiotics susceptibility of the causal agent of the olive knot disease in Morocco

Abdelaaziz, B., Hanane, L., Mohamed, O., Imad, K., Khaoula, H., Abdellatif, B., Rachid, B., El hassan, A.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Antimicrobial wound dressing film utilizing nano-cellulose and gelatin as drug delivery system for *Garcinia mangostana* L extract

Ring, L. C., Yenn, T. W., Wahidin, S., Tan, W., Abdullah, S. Z., Jamil, N. A. M., Rahman, M. S. A.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Bioactivity of *Alcaligenes faecalis* and *Lecanicillium* sp. isolated from crocker range of Sabah against *Erwinia psidii* of papaya dieback disease

Chong, K. P., Lo, R. K. S., Gansau, J. A.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Microencapsulation of *Lactobacillus plantarum* 299v incorporated with oligofructose in chitosan coated-alginate beads and its storage stability in ambarella juice

Ng, S. L., Lai, K. W., Nyam, K. L., Pui, L. P.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Screening of lignocellulolytic fungi for hydrolyzation of lignocellulosic materials in paddy straw for bioethanol production

Mohamed Ghazali, M. F. S., Mohd Zainudin, N. A. I., Abd Aziz, N. A., Mustafa, M.

[\[Abstract\]](#) [\[Download Full Text\]](#)

ABC genotyping and putative virulence factors of *Candida albicans* clinical isolates

Moron, L. S., Cabrera, E. C.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Development and characterization of pumpkin crackers containing live culture of *Lactobacillus acidophilus*

Lim, H-X., Ong, C-Y., Kuan, C. S., Yeo, S-K.

[\[Abstract\]](#) [\[Download Full Text\]](#)

Enjoy reading MJM!

Thank you.

Best regards,

The Editorial Office



Malaysian Journal of Microbiology

ISSN (print): 1823 – 8262

ISSN (online): 2231 – 7538

<http://mjm.usm.my>
