C-1

**LEMBAR**
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW***
**KARYA ILMIAH : JURNAL ILMIAH**

| | | | |
|---|---|---|---|
| Judul Artikel Ilmiah | : | Submerged Membrane Photo Reactor (SMPR) with Simultaneous Photo Degradation and TiO2 Catalyst Recovery for Efficient Dyes Removal | |
| Penulis Artikel Ilmiah | : | **Dessy Ariyanti**, Filicia Wicaksana, Wei Gao | |
| Status Pengusul | : | Penulis utama | |
| Identitas Jurnal Ilmiah | : | a. Nama Jurnal | : ASEAN Journal of Chemical Engineering |
| | | b. ISSN | : print ISSN 1655-4418; online ISSN 2655-5409 |
| | | c. Nomor/Volume/Hal | : 2/21/225-240 |
| | | d. Edisi (bulan/tahun) | : 2021 |
| | | e. Penerbit | : Chemical Engineering, Universitas Gadjah Mada |
| | | f. Jumlah halaman | : 16 halaman |
| | | g. DOI artikel (Jika ada) | : https://doi.org/10.22146/ajche.65952 |
| | | h. Alamat web Jurnal | : https://journal.ugm.ac.id/AJChE/article/view/65952/32959 |
| | | i. Terindeks di | : Scopus (Q3) SJR 0,24 |
| | | j. Turnitin | : https://doc-pak.undip.ac.id/13904/4/Turnitin-C1.pdf |

Kategori Publikasi Jurnal Ilmiah : (beri ✓ pada kategori yang tepat)
- [✓] Jurnal Ilmiah Internasional
- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional tidak Terakreditasi

I. Hasil Penilaian *Peer Review* :

| Komponen Yang Dinilai | Nilai Reviewer | | |
|---|---|---|---|
| | Reviewer I | Reviewer II | Nilai Rata-Rata |
| a. Kelengkapan dan Kesesuaian unsur isi artikel (10%) | 4,00 | 4,00 | 4,00 |
| b. Ruang lingkup dan kedalaman pembahasan (30%) | 10,50 | 11,00 | 10,75 |
| c Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 10,00 | 11,00 | 10,50 |
| d. Kelengkapan unsur dan kualitas penerbit (30%) | 10,50 | 10,00 | 10,25 |
| Nilai Total = (100%) | **35,00** | **36,00** | **35,50** |
| Nilai pengusul = (0,6 x nilai total) | **21** | **21,60** | **21,30** |

Semarang,

Penilai 1

Prof. Dr. Andri Cahyo Kumoro S.T., M.T.
NIP 197405231998021001
Unit kerja : Teknik Kimia FT Undip

Penilai 2

Prof. Dr. Ir. Hadiyanto, S.T., M.Sc., IPU
NIP 197510281999031004
Unit kerja : Teknik Kimia FT Undip

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- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional tidak Terakreditasi

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|---|---|---|---|---|
| | Internasional | Nasional Terakreditasi | Nasional tidak Terakreditasi | |
| | **40** | | | |
| a. Kelengkapan dan Kesesuaian unsur isi artikel (10%) | 4 | | | 4,0 |
| b. Ruang lingkup dan kedalaman pembahasan (30%) | 12 | | | 11,0 |
| c Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 12 | | | 11,0 |
| d. Kelengkapan unsur dan kualitas penerbit (30%) | 12 | | | 10,0 |
| Nilai Total = (100%) | **40** | | | **36,0** |
| Nilai pengusul = | | | **60% x 36** | **21,6** |

**KOMENTAR/ULASAN PEER REVIEW**

| | | |
|---|---|---|
| Kelengkapan dan Kesesuaian Unsur | : | Kelengkapan unsur artikel sudah memenuhi, unsur sudah lengkap dari abstract hingga references. Tingkat plagiarisme sebesar 11%. |
| Ruang Lingkup dan Kedalaman Pembahasan | : | Ruang lingkup artikel sesuai dengan bidang teknik kimia yaitu mengkaji Submerged Membrane Photo Reactor (SMPR)Submerged Membrane Photo Reactor (SMPR). Kedalaman pembahasan dapat dilihat pada paparan hasil penelitian yang cukup tajam dengan menggunakan 30 referensi yang mendukung. Ruang lingkup karya ilmiah sesuai dengan bidang penulis. |
| Kecukupan & Kemutakhiran Data & Metodologi | : | Mayoritas data yang digunakan berasal dari rujukan 10 tahun terakhir yaitu berasal dari jurnal, namun terdapat 9 referensi yang lebih dari 10 tahun terakhir. Metodologi yang digunakan cukup baik. |
| Kelengkapan Unsur dan Kualitas Penerbit | : | Jurnal ini termasuk salah satu jurnal bidang Teknik Kimia yang merupakan Jurnal internasional bereputasi terindeks SCOPUS (Q3) dengan nilai SJR 0,24. Terbitan lengkap memuat volume, nomor, tahun dan daftar isi. Dewan redaksi jurnal ini terdiri dari berbagai negara. |

Semarang, 10 Okt 2022
Penilai 2

Prof. Dr. Ir. Hadiyanto, S.T., M.Sc., IPU
NIP 197510281999031004
Unit kerja : Fakultas Teknik
Bidang Ilmu : Ilmu Teknik Kimia
Jabatan/Pangkat : Guru Besar

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|---|---|---|---|---|
| | Internasional | Nasional Terakreditasi | Nasional tidak Terakreditasi | |
| | **40** | | | |
| a. Kelengkapan dan Kesesuaian unsur isi artikel (10%) | 4 | | | 4,00 |
| b. Ruang lingkup dan kedalaman pembahasan (30%) | 12 | | | 10,50 |
| c Kecukupan dan kemutahiran data/informasi dan metodologi (30%) | 12 | | | 10,00 |
| d. Kelengkapan unsur dan kualitas penerbit (30%) | 12 | | | 10,50 |
| Nilai Total = (100%) | **40** | | | **35** |
| Nilai pengusul = | | | **60% x 35** | **21,00** |

**KOMENTAR/ULASAN PEER REVIEW**

| | | |
|---|---|---|
| Kelengkapan dan Kesesuaian Unsur | : | Artikel ini mencakup judul, abstrak, metode percobaan, hasil dan pembahasan, kesimpulan, ucapan terima kasih dan daftar putaka. |
| Ruang Lingkup dan Kedalaman Pembahasan | : | Isi artikel masih dalam ruang lingkup jurnal Asean J. Chem. Eng. yang meliputi penggabungan katalis TiO2 dalam membran berongga yang berwarna dan uji kemampuan katalis tsb untuk mendegradasi zat warna organic Rhodamin B dalam submerged membrane photoreactor. Hasil percobaan dibahas dengan cukup jelas dan didukung dengan pustaka yang sangat memadai atau sekitar 67% dari pustaka yang digunakan. |
| Kecukupan & Kemutakhiran Data & Metodologi | : | Jumlah dan kualitas data memadai untuk publikasi di jurnal internasional bereputasi. Hampir semua pustaka yang digunakan bersifat mutakhir (70%) dan lebih dari 67% digunakan dalam pembahasan. Sayangnya langkah percobaan tidak disertai dengan rujukan yang seharusnya |
| Kelengkapan Unsur dan Kualitas Penerbit | : | Journal ini tergolong dalam jurnal internasional bereputasi Q3 dengan SJR 0.235 dan H index 7 pada pemeringkatan jurnal Scimago tahun 2021. Editorial board berasal dari berbagai negara, terdapat pedoman penulisan yang jelas dan format penulisan konsisten. Pada umumnya, artikel yang disajikan merupakan hasil karya penulis dari berbagai negara Asia Tenggara. Penerbit jurnal ini adalah Departemen Teknik Kimia - Universitas Gadjah Mada - Yogyakarta. Gaya selingkung yang diterapkan jurnal ini cukup baik. Akan tetapi, dari 11 artikel yg terbit pada volume tsb, sebanyak 6 artikel ditulis oleh penulis dari Indonesia. |

Semarang, 29 Oktober 2022
Penilai 1

Prof. Dr. Andri Cahyo Kumoro S.T., M.T.
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Bidang Ilmu : Teknik Kimia
Jabatan/Pangkat : Guru Besar

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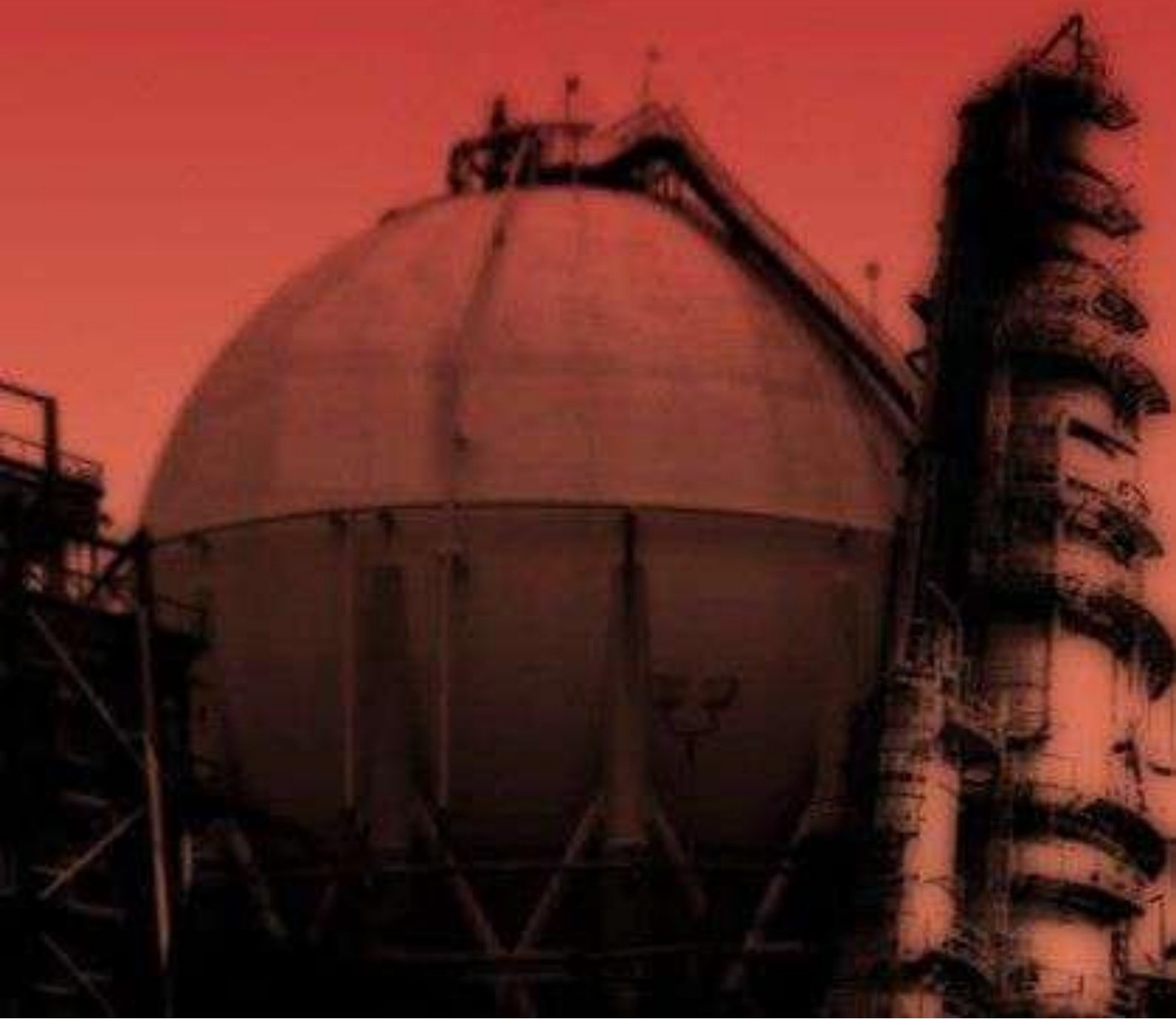

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ASEAN Journal of Chemical Engineering



# Vol 21, No 2 (2021)

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ASEAN Journal of Chemical Engineering 2021, Vol. 21, No. 2, 225 – 240

# Submerged Membrane Photo Reactor (SMPR) with Simultaneous Photo Degradation and $TiO_2$ Catalyst Recovery for Efficient Dyes Removal

***Dessy Ariyanti*[1]**
***Filicia Wicaksana*[2]**
***Wei Gao*[2]**
[1] *Department of Chemical Engineering, Universitas Diponegoro, Semarang 50275, Indonesia*
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*Submitted* 18 May 2021 *Revised* 03 October 2021 *Accepted* 08 October2021

**Abstract.** In this study, a polyvinylidene difluoride (PVDF) hollow fiber membrane module incorporated with $TiO_2$ was submerged into a photocatalytic reactor to create a hybrid photocatalysis with membrane separation process (a submerged membrane photoreactor, SMPR), for advanced dyes wastewater treatment. The SMPR performance was assessed by the degradation of single component Rhodamine B (RhB) and degradation of mixed dyes (RhB and Methyl orange (MO)) in a binary solution. Several operational parameters such as the amount of catalyst loading, permeate flux, and the effect of aeration were studied. Fouling tendency on the membrane was also investigated to determine the optimum operating conditions. The results show that the synergetic effect of the low catalyst loading and permeate flux creates the environment for optimum light penetration for high photocatalytic activity as the hybrid system with low catalyst loading (0.5 g/L) and 66 L/m$^2$h of flux with aeration at 1.3 L/min has proven to increase the photocatalysis performance by 20% with additional catalyst recovery. In addition, applying the low catalyst loading and flux permeate with aeration brings minimal fouling problems.

**Keywords:** Dye degradation, Submerged membrane, Photocatalytic reactor, $TiO_2$ recovery

## INTRODUCTION

Industrial dyes and textile dyes wastewater has been a long-term environmental threat. During the manufacturing process, about 10–20% of total dye products are become waste and discharged as effluents into the water body. The common pollutants found in textile wastewater and other industrial processes are organic dyes (Ajmal, Majeed, Malik, Idriss, & Nadeem, 2014; Saravanan, Gracia, & Stephen, 2017; Zangeneh, Zinatizadeh, Habibi, Akia, & Hasnain Isa, 2015).

To date, the most reliable method in terms of zero waste technology for organic wastewater treatment is photocatalysis using catalyst semiconductor metal oxide $TiO_2$. Under UV light exposure, $TiO_2$ excited electrons for hydroxyl radicals (•OH) generation, which further assists organic compounds' decomposition and

DOI: 10.22146/ajche.65952

ASEAN Journal of Chemical Engineering 2021, Vol. 21, No. 2, 133–142

# Enhancement of Delignification and Glucan Content of Sugarcane Bagasse by Alkali Pretreatment for BioethanolProduction

***Kyaw Wunna***
***[*1,3] Kiohiko Nakasaki [2]***
***Joseph Auresenia [1]***
***Leonila Abella [1]***
***Pag-asa Gaspillo [1]***
[1] *Chemical Engineering Department, De La Salle University-Manila, Manila, Philippines*
[2] *Department of International Development Engineering, Tokyo Institute of Technology, Tokyo, Japan*
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*Submitted* 26 August 2020 *Revised* 10 September 2021 *Accepted* 14 September 2021

**Abstract.** The current work aimed to enhance the delignification of sugarcane bagasse (SCB) for bioethanol production. The optimization of alkali (sodium hydroxide) pretreatment parameters such as concentration and residence time was carried out by the Taguchi method using $L_{16}$ orthogonal array with two factors and four levels. Sugarcane bagasse powder was mixed with sodium hydroxide (NaOH) solution (0.5-2 wt.%) and heated in an autoclave at 121°C and at varied times (30-120 min). From the statistical analysis of data, it was observed that delignification and glucan increased with the increased concentration and short time. The optimum parameters of NaOH pretreatment were 2 wt.% of NaOH concentration and 30 minutes of residence time. At the optimum conditions, 86.8% delignification and 46.6% glucan content of SCB were obtained. Thus, alkali pretreatment optimized by Taguchi design is the effective method to remove lignin and to increase cellulose or glucan content in sugarcane bagasse for facilitating the further catalytic hydrolysis in bioethanol production.

**Keywords:** Delignification, Glucan, Lignin, Sugarcane bagasse, Alkali pretreatment

## INTRODUCTION

Sugarcane bagasse (SCB) is one of the largest cheap lignocellulosic materials among various agricultural residues and it is a waste of the sugar juice extraction process (Ju et al. 2011). Current uses of SCB are energy sources in sugar mills and distillery plants, generation of electricity to be sold to the national grid (Rocha et al. 2011), pulp and paper production, phenolic compounds, polymer films, fertilizer and pesticides, ethanol, butanol, furfural, natural adhesive resin, xylitol, nanocomposites, animal feeds and other products (Ju et al. 2011). However, a major part of the bagasse in the sugar mill remained underutilized (Rocha et al. 2011).

Sugarcane bagasse is a kind of herbaceous lignocelluloses (Wang et al. 2020). SCB is mainly composed of cellulose,

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ASEAN Journal of Chemical Engineering 2021, Vol. 21, No. 2, 158 – 169

# Comparison of Microwave-Assisted Extraction to SoxhletExtraction of Mango Seed Kernel Oil using Ethanol and n-Hexane as Solvents

***June Neil G. Balacuit*** [1]
***Jollana Dianne A.***
***Guillermo*** [1]***Reuben James***
***Q. Buenafe*** [1] ***Allan N.***
***Soriano*** *,[2]

[1] *School of Chemical, Biological, and Materials Engineering and Sciences, Mapúa University, Intramuros, Manila, Philippines*

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*Submitted* 23 January 2021 *Revised* 05 October 2021 *Accepted* 08 October 2021

**Abstract.** Mango seed kernel oil was extracted by Soxhlet Extraction (SE) and Microwave-Assisted Extraction (MAE) with ethanol and n-hexane as extraction solvents. To optimize the extraction condition for SE, the temperature was set to 90°C for ethanol and 80°C for n-hexane with varying solvent-to-feed ratios (S/F ratio) of 75/12, 75/10, and 60/6 mL/g. As for MAE, the same S/F ratios were considered. Extraction was done for 5, 10, and 15 minutes with microwave power levels of 120 and 240 W. It was found out that the highest yield per extraction process for SE was: 18.00±0.25 % and 9.38±2.03 % using ethanol and n-hexane, respectively; and 6.69±0.05 % and 4.68±0.06 %using ethanol and n-hexane, respectively for MAE. It was also noted that MAE, with the microwave power level of 120 W has less extraction time for about 15 minutes as compared to SE of 8 hours. Also, the best S/F ratio in this study is 60/6 for all processes. In oil quality determination, the oil extracted was examined through several tests such as FTIR, GC-MS, acid value, % FFA, iodine value, saponification value, and melting point. It was noted that oil extracted in ethanol has a better yield compared to that of n-hexane but the oil extracted using n-hexane would provide superior quality.

**Keywords:** Acid value, Free-fatty acid, Iodine value, Mango seed kernel, Microwave-assisted extraction, Saponification value, Soxhlet extraction

## INTRODUCTION

Mango (*Mangifera indica L.*) is the third most important fruit crop in the Philippines based on export volume and value next to banana and pineapple. About 70% of production is consumed locally wherein the predominant cultivars are Pico (Piko), Katchamita (Indian Mango), and Pahutan (*Mangifera altissima*) and the country's export variety is the Carabao mango (Manggang kalabaw). Its production is mainly for the consumption of its fleshy pulp but other products were also derived from the pulp including mango puree, mango juice, dried mangoes, concentrates, frozen mangoes, mango glaze, edible parts, mango in brine, and mango preserves (BOI 2011). After the

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