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

Judul Prosiding (Artikel)	:	The Effect of pH and Current Density on Electrocoagulation Process for Degradation of Chromium (VI) in Plating Industrial Wastewater		
Nama Penulis	:	**Aji Prasetyaningrum**, Bakti Jos, Yudhy Dharmawan, I. R. Praptyana		
Jumlah Penulis	:	4 orang		
Status Pengusul	:	**Penulis Pertama**		
Identitas Prosiding	:	a. Nama Prosiding	:	Journal of Physics: Conference Series
		b. Nomor ISSN	:	1742-6596
		c. Volume, Nomor, Bulan, Tahun	:	Vol. 1295, No. 012064, 2019
		d. Penerbit	:	IOP Science
		e. Alamat repository PT/web prosiding	:	https://iopscience.iop.org/article/10.1088/1742-6596/1295/1/012064
		f. DOI artikel (jika ada)	:	doi:10.1088/1742-6596/1295/1/012064
		g. Terindeks	:	Scopus

Kategori Publikasi Makalah Ilmiah (beri ✓pada kategori yang tepat) :

- [√] Prosiding Forum Ilmiah International (terindeks SCOPUS)
- [ ] Prosiding Forum Nasional

Hasil Penilaian Peer Review:

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	**Reviewer II**	
a. Kelengkapan unsur isi artikel (10%)	3,0	3,0	3,0
b. Ruang lingkup dan kedalaman pembahasan (30%)	5,5	5,3	5,4
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	5,0	4,8	4,9
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	6,5	7,0	6,7
Total = 100%	**20,0**	**20,1**	**20,0**
Nilai Pengusul (60% x nilai total)	**12,0**	**12,0**	**12,0**

Semarang,

Reviewer 2

Prof. Ir. Didi Dwi Anggoro., M. Eng., P.hD
NIP. 196711141993031001
Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

Reviewer 1

Prof. Dr. Moh. Djaeni, S.T., M.Eng
NIP. 197102071995121001
Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

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Kategori Publikasi Makalah Ilmiah (beri ✓pada kategori yang tepat) :

☑ Prosiding Forum Ilmiah International (terindeks SCOPUS)

☐ Prosiding Forum Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimum Prosiding		
	Internasional ☑	**Nasional** ☐	**Nilai Akhir Yang Diperoleh**
a. Kelengkapan unsur isi artikel (10%)	3,0		3,0
b. Ruang lingkup dan kedalaman pembahasan (30%)	9,0		5,5
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9,0		5,0
d. Kelengkapan unsur dan terbitan/prosiding (30%)	9,0		6,5
Total = (100%)	**30,0**		**20,0**
Nilai Pengusul = (60%x20,0)=12.0			

Catatan Penilaian Artikel oleh Reviewer:

- **Kelengkapan unsur isi artikel (10%)**
  Hasil penelitian ini dipublikasikan pada Journal of Physics: Conference Series, Vol. 1295, No. 012064 tahun 2019. Artikel tersusun secara sistematis, terdiri dari Title, Abstract, Introduction, Material and methods, Results and Discussion serta Conclusion.
- **Ruang lingkup dan kedalaman pembahasan (30%)**
  Paper ini membahas tentang pengaruh pH dan current density terhadap proses elektrokoagulasi limbah Cr pada industri elektroplating. Pengujian kadar logam di dalam sampel air limbah dengan peralatan UV Vis. Hasil penelitian menunjukkan signifikansi pengaturan pH dan current density terhadap penurunan kadar logam pada limbah. Penjabaran hasil penelitian yang disajikan pada pembahasan terlalu singkat. Kurang dijelaskan kenapa pada pH tertentu jumlah logam dihilangkan naik sejalan dengan naiknya pH, tapi kemudian menurun saat pH ditingkatkan lebih tinggi lagi. Secara umum, teknik pembahasan sudah cukup baik, dimana sebanyak 6 referensi yang dicitasi.
- **Kecukupan dan kemutahiran data/informasi dan metodologi (30%)**
  Nilai kemutakhiran dan novelty agak kurang dimana referensi dalam 10 tahun terakhir sebanyak 5 dari 16 artikel yang dijadikan sitasi (31,25%). Metode yang dituliskan dalam artikel cukup baik, namun perlu dijelaskan bagaimana pengaturan pH dan arusnya. Data yang disajikan sudah sesuai tujuan yang diinginkan, walaupun aspek yang dikaji sedikit.
- **Kelengkapan unsur dan terbitan/prosiding (30%)**
  Artikel ini diterbitkan oleh Penerbit Proseding IOP Science Journal of Physics: Conference Series, dan terindeks di Scopus dan Scimagojr dengan SJR=0.22 (tahun 2018) dan Hindex = 65. Kualitas terbitan sudah baik untuk kategori jurnal internasional (conference series). Paper ini memiliki nilai similaritas artikel berdasarkan Turnitin sebesar 12%.

Semarang,

Reviewer 1

Prof. Dr. Moh. Djaeni, S.T., M.Eng
NIP. 197102071995121001
Bidang Ilmu/Unit kerja : Teknik Kimia FT UNDIP

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☐ Prosiding Forum Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimum Prosiding		
	Internasional ☑	**Nasional** ☐	**Nilai Akhir Yang Diperoleh**
e. Kelengkapan unsur isi artikel (10%)	3,0		3,0
f. Ruang lingkup dan kedalaman pembahasan (30%)	9,0		5,3
g. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9,0		4,8
h. Kelengkapan unsur dan terbitan/prosiding (30%)	9,0		7,0
Total = (100%)	**30,0**		**20,1**
Nilai Pengusul = (60%x20,1)=12,0			

Catatan Penilaian Artikel oleh Reviewer:

- **Kelengkapan unsur isi artikel (10%)**
  Artikel ini dituliskan dengan kelengkapan unsur isi artikel sesuai dengan panduan penulisan. Unsur dan isi artikel lengkap.
- **Ruang lingkup dan kedalaman pembahasan (30%)**
  Secara umum ruang lingkup makalah sudah baik dan sesuai bidang ilmu Teknik Kimia, khususnya membahas tentang proses elektrokoagulasi logam krom dari limbah elektroplating. Data hasil penelitian menunjukkan pengaturan variabel pH dan current density berpengaruh terhadap performansi proses elektrokoagulasi. Artikel memiliki novelty baik, namun kedalaman pembahasan sangat kurang. Tidak dijabarkan fenomena proses elektrokoagulasi dan mekanisme reaksi yang terjadi. Tinjauan pembahasan masih kurang lengkap dan belum menunjukkan kajian pengembangan dan kontribusi pada bidang ilmu terkait. Jumlah artikel yang digunakan sebagai rujukan dalam pembahasan sebanyak 6 dari 16 pustaka yang digunakan (37,5%).
- **Kecukupan dan kemutahiran data/informasi dan metodologi (30%)**
  Kecukupan dan kemutakhiran data dan informasi cukup baik, dengan jumlah sitasi terkini adalah 5 buah dari 16 pustaka. Metodologi yang digunakan pada penelitian cukup baik, namun spesifikasi peralatan yang digunakan belum dijelaskan detil. Data yang disajikan dengan kelengkapan grafik dan tabel namun pembahasan sangat singkat sehingga kurang lengkap.
- **Kelengkapan unsur dan terbitan/prosiding (30%)**
  Journal of Physic berkualitas baik penerbitnya dan merupakan conference series dengan H Indeks tinggi. IOP merupakan publisher yang cukup baik yang terindeks pada data Scopus. Nilai SJR cukup tinggi, yaitu =0.22 (2018). Nilai similaritas karya ilmiah adalah 12%. Penerbitan dengan No. ISSN: 1742-6596 pada Vol. 1295 tahun 2019.

Semarang,

Reviewer 2

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Certificate

DEPARTMENT OF CHEMICAL ENGINEERING
FACULTY OF ENGINEERING DIPONEGORO UNIVERSITY

— proudly certifies —

Aji Prasetyaningrum

who has successfully accomplished his/her role
as

Presenter

in The 3rd International Conference on Chemical and Material Engineering (ICCME)
19th September 2018
Grand Candi Hotel, Semarang, Indonesia

Dean of Faculty of Engineering,
Diponegoro University

Ir. M. Agung Wibowo, MM, MSc,PhD

The ICCME 2018
Organizing Committee Chairperson

Dyah Hesti Wardhani, ST, MT, PhD

Document details

Journal of Physics: Conference Series
Volume 1295, Issue 1, 8 November 2019, Article number 012064
3rd International Conference on Chemical and Material Engineering, ICCME 2018; Department of Chemical Engineering, Faculty of Engineering, Diponegoro UniversitySemarang; Indonesia; 19 September 2018 through 20 September 2018; Code 155151

The Effect of pH and Current Density on Electrocoagulation Process for Degradation of Chromium (VI) in Plating Industrial Wastewater (Conference Paper) (Open Access)

Prasetyaningrum, A.[a], Jos, B.[a], Dharmawan, Y.[b], Praptyana, I.R.[a]

[a]Department of Chemical Engineering, Diponegoro University, Indonesia
[b]Departement of Public Health, Faculty of Public Health, Diponegoro University, Jl. Prof. Soedarto, Kampus Undip Tembalang, Semarang, 50275, Indonesia

Abstract

View references (16)

The heavy metal of chromium is one of the most common pollutants of the plating industrial wastewater. Cr (VI) is one of toxic metal that cause serious threat to human health and the environment due to its cumulative effects and non-degradability. Among the technologies for removing these pollutants, electrocoagulation can be considered as an effective method. This method has some advantages such as fewer amounts of produced sludge and high efficiency in removal of pollutants. This research intended to study effect initial pH and current density on the degree of Cr (VI) removal from wastewater of plating industry by using the electrocoagulation method. The process is done at pH values of (3-9) at current density of 0.42, 0.63, 0.83, 1.04, and 1.25 mA/cm^2. Synthetic chromium wastewater was prepared at the initial concentration of 50 mg L^{-1} during 30 minutes of electrocoagulation process. After electrocoagulation treatment, concentration of Cr (VI) analysed by UV-Vis spectrophotometer. The result revealed that the best removal was achieved at pH 7 and current density of 1.25mA/cm^2. © 2019 Published under licence by IOP Publishing Ltd.

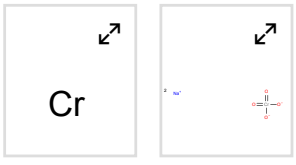
SciVal Topic Prominence

Topic: Electrocoagulation | Textile Wastewater | Decolorization

Prominence percentile: 98.857

Chemistry database information

Substances



Indexed keywords

Engineering controlled terms: Coagulation | Current density | Health risks | Heavy metals | pH effects | Pollution

Engineering uncontrolled terms: Cumulative effects | Degradability | Electro coagulations | High-efficiency | Industrial wastewaters | Initial concentration | Plating industry | UV-Vis spectrophotometers

Engineering main heading: Chromium compounds

Funding details

Funding sponsor	Funding number	Acronym
	2018	

Funding text

This work was supported by Directorate General of Higher Education, Ministry of National Education Republic of Indonesia through Hibah Pengabdian Kepada Masyarakat-HILINK 2018.

ISSN: 17426588
Source Type: Conference Proceeding
Original language: English
DOI: 10.1088/1742-6596/1295/1/012064
Document Type: Conference Paper
Publisher: Institute of Physics Publishing

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Source details

Journal of Physics: Conference Series

Scopus coverage years: from 2005 to 2020

Publisher: Institute of Physics Publishing

ISSN: 1742-6588 E-ISSN: 1742-6596

Subject area: Physics and Astronomy: General Physics and Astronomy

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Preface

International Conference on Chemical and Material Engineering (ICCME) 2018

The 3rd International Conference on Chemical and Material Engineering (ICCME) 2018 was held by the Department of Chemical Engineering - Universitas Diponegoro in conjunction with the 60th anniversary of Faculty of Engineering - Universitas Diponegoro. The event was conducted on September 19th 2018 in Grand Candi Hotel Semarang - Indonesia. This event was the continuation of the preceding conferences held in 2013 and 2015. The ICCME 2018 brought "Chemical and Material Engineering for Sustainable Foods, Energy, and Environment" as the grand theme. The objectives of this conference are:

- To disseminate and develop the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions in the fields of chemical and material engineering.
- To encourage international collaborations and joint ventures
- To promote and facilitate the growth of scientific and technical development in the field of chemical and material engineering development in Indonesia and the Asia region

Although the organizing committee received a total of 115 abstract papers, the scientific committee decided that only 97 papers were eligible for oral presentations which came from Indonesia, Malaysia, Myanmar, the Philippines, Taiwan, Japan and Austria. In addition, 3 keynote and 3 invited speakers from abroad were presented during this conference. This special issue proceeding presents 76 papers selected from the presented papers after being thoroughly peer reviewed.

Special thanks are due to all keynote and invited speakers for their participation, to the Organizing Committee members for all their hard work in making the conference to happen, especially Universitas Diponegoro Chemical Engineering Master Program students who generously supported the conference. The Scientific Committee members are also thanked for reviewing the submitted manuscripts and for assisting in the editorial process. Finally, all who travelled to Semarang, Indonesia for the meeting are acknowledged for deciding to attend and contribute to making this a successful conference.

We greatly hope that this proceeding will be advantageous in future implementations of chemical and material engineering, not only to the academia, but also to the industries by which broadening our scientific perspective.

Andri Cahyo Kumoro & Dyah Hesti Wardhani

Conference Scientific and Organizing Committee Chairs

Conference Scientific Committee:

1. Prof. Dr. Andri Cahyo Kumoro, ST, MT (Chair-Indonesia)
2. Prof. Dr. Hadiyanto, ST, MSc (Indonesia)
3. Prof. Hong-Wei Yen (Taiwan)
4. Prof. Abdul Latif Ahmad (Malaysia)
5. Dr. Oki Muraza (Kingdom of Saudi Arabia)
6. Dr. Xosè Antòn Vàzquez Àlvarez (Spain)
7. Dr. Ivan Salmeron Ochoa (Mexico)

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2019

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The 3rd International Conference of Chemical and Materials Engineering 19–20 September 2018, Semarang, Indonesia

Accepted papers received: 09 July 2019
Published online: 08 November 2019

Open all abstracts

Preface

Papers

Heat and Mass Transfer

OPEN ACCESS 012002

Performance study of hybrid solar dryer with auxiliary heater for seaweed drying

Suherman Suherman, Hafid Rizki, Nurfadilla Rauf and Evan Eduard Susanto

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Chemical Reaction Engineering and Catalysis

OPEN ACCESS 012003

Optimization for Production Tert-Butyl Glycoside Nonionic Surfactant Using Response Surface Methodology

Harsa Pawignya, T. D. Kusworo and B. Pramudono

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OPEN ACCESS 012004

Production of solketal (2,2-Dimethyl-1,3-dioxolane-4-methanol) from glycerol and acetone by using homogenous acidic catalyst at the boiling temperature (preliminarry study)

Mahreni, Tjukup Marnoto and Muhamad Maulana Azimatun Nur

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The effect of catalyst loading on the biodiesel production from lard

L Buchori, DD Anggoro, F Tsaniya, MB Elyasa and E Noviariyono

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Separation and Purification

OPEN ACCESS 012006

Simulation of precious metals recovery from nickel smelter slag under high-pressure oxidative acid leaching (HPOXAL)

Khamdan Cahyari and Kholik

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Study of Plasma Electrolysis Method on Starch-Based Hybrid Latex Synthesis

N Saksono, A B Junior, E Gustaf, S S R Dyasti and M Chalid

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The Effect of pH and Current Density on Electrocoagulation Process for Degradation of Chromium (VI) in Plating Industrial Wastewater

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Abstract. The heavy metal of chromium is one of the most common pollutants of the plating industrial wastewater. Cr (VI) is one of toxic metal that cause serious threat to human health and the environment due to its cumulative effects and non-degradability. Among the technologies for removing these pollutants, electrocoagulation can be considered as an effective method. This method has some advantages such as fewer amounts of produced sludge and high efficiency in removal of pollutants. This research intended to study effect initial pH and current density on the degree of Cr (VI) removal from wastewater of plating industry by using the electrocoagulation method. The process is done at pH values of (3-9) at current density of 0.42, 0.63, 0.83, 1.04, and 1.25 mA/cm^2. Synthetic chromium wastewater was prepared at the initial concentration of 50 mg L^{-1} during 30 minutes of electrocoagulation process. After electrocoagulation treatment, concentration of Cr (VI) analysed by UV-Vis spectrophotometer. The result revealed that the best removal was achieved at pH 7 and current density of 1.25mA/cm^2.

1. Introduction

The wastewater generated from chemical industries contains very harmful pollutants to the environment [1]. Chromium waste Cr (VI) is a type of heavy metal that is harmful to humans as well as to the environment. Cr (VI) is also more easily absorbed in the human body, especially the digestive tract in humans [2]. In chrome electroplating industry, Cr (VI) was one of heavy metal coating besides of nickel, and copper. Several treatment processes including physicochemical techniques are implemented for example adsorption [3], ion exchange [4], precipitation [5], membrane reserve osmosis [6] and electrocoagulation technology [7].

Electrocoagulation (EC) is a wastewater treatment technique that works through destabilizing suspended or dissolved contaminants in an aqueous medium by introducing a current into the medium and generating coagulant in situ by electrolytic oxidation of an appropriate anode material (aluminium or iron) [8]. The advantages of electrocoagulation over conventional coagulation included economic

IOP Conf. Series: Journal of Physics: Conf. Series **1295** (2019) 012057 doi:10.1088/1742-6596/1295/1/012057

Gas permeation properties and preparation of carbon membrane by PECVD method using indene as precursor

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Abstract. This work could demonstrate a new approach to the fabrication of gas separation membrane using indene as polymeric precursor for low pressure PECVD system. Membrane characterization was done by taking Scanning Electron Microscopy (SEM) and FTIR measurements. For membrane performance testing, permeability and selectivity of the membrane were evaluated with pure gases of H_2, N_2, and CO_2 using a differential permeation technique. PECVD-derived polyindene membrane showed selectivities of 8.2 and 4.0 for H_2/CO_2 and H_2/N_2, respectively, at room temperature. Polyindene (PIn) membrane was successfully fabricated onto a zeolite 5A substrate via radio frequency plasma-enhanced chemical vapor deposition (RF-PECVD) at room temperature.

1. Introduction

Membranes in gas separation has been applied because of its advantages such as low energy requirement and low operating cost. In this perspective, the interest on inorganic membranes such carbon membrane for gas separation has also grown for showing higher selectivity and remarkable high thermal and chemical resistances [1]. Generally, a carbon membrane is fabricated by the pyrolysis of an organic precursor and this membrane shows very good molecular sieving effect in gas separation [2]. Normally, membrane fabrication via pyrolysis technique can be done at processing temperature of 500°C and above [1]. For instance, Teixeira et al. fabricated supported carbon membrane using phenolic resin solution by pyrolysis technique with heating up to 900°C under nitrogen atmosphere. In their research work, the resultant membrane showed significant performance in terms of gas separation and selectivity [3]. In this method, it needs high temperature to decompose the polymeric precursor in membrane fabrication process.

Production of solketal (2,2-Dimethyl-1,3-dioxolane-4-methanol) from glycerol and acetone by using homogenous acidic catalyst at the boiling temperature (preliminarry study)

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Abstract. Currently, solketal is produced from glycerol and acetone by using heterogeneous catalyst. However, a solid heterogeneous catalyst is not preferable since water contained in the glycerol, is adsorbed on the surface of the catalyst. Water could act as inhibitor in the reaction and lowering the activity of the catalyst. Therefore, homogenous acid catalyst is proposed to avoid the inhibition during the reaction. The aim of this research was to utilize sulphuric acid as the homogenous acid catalyst, to explore the effect of the mole ratio glycerol:acetone to the conversion, and determine the entrophy and entaphy of the reaction . The process was carried out in a three neck reactor equipped with a heater, temperature control, cooler and stirrer. The reaction conditions were set at a constant boiling temperature, the reaction time was varied at 4 - 12 h, and the mole ratio of acetone to glycerol was varied in the range of 2:1 - 7: 1. Results indicated that the highest conversion (>80 %) was recorded at 62°C, 10 h, and 6.9:1 mole ratio. The conversion of glycerol to solketal was influenced by mole ratio which is consistent to Lecatelier principle. From the entropy (ΔS =280.02 J. mole K^{-1}) and enthalpy (ΔH= 95.948 J. $mole^{-1}$), it can be concluded that the reaction of solketal formation was exothermic.

Keywords: acetone; catalyst; glycerol; solketal; sulphuric acid;

1. Introduction

Currently, the production of renewable energy is increasing worldwide. Fossil fuels, which are non-renewable fuels, and the problem of environmental pollutions have driven the demand of the renewable energy [1], [2] [3] . Indonesia is well known as the largest palm oil producer in the world. Recently, biodiesel produced from the palm oil is growing rapidly. Biodiesel is an ester of triglycerides and alkyl is produce by transesterification reaction. Biodiesel is an alkyl ester often named FAME (Fatty acid methyl ester) is produced by the transesterification of oil or fat with alcohol

Morphological and Optical Properties of Polylactic Acid Bionanocomposite Film Reinforced with Oil Palm Empty Fruit Bunch Nanocrystalline Cellulose

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Abstract. Nanocrystalline cellulose (NCC) was derived from oil palm empty fruit bunch (OPEFB) by soda pulping and followed by 2,2,6,6-tetramethylpiperidine-1-oxy (TEMPO) oxidation reaction method. The NCC was used as reinforcing agent in Polylactic acid (PLA) biopolymer film matrix with 0 to 20% loadings. Bionanocomposite film was prepared by dilution in Chloroform and casted on the flat glass with 0.03-0.05 mm casting thickness. TEM shows that the nanocrystalline cellulose (NCC) has a rod like shape of 2-6 nm width and 200-500 nm length. SEM micrograph shows that the surface of PLA-NCC bionanocomposites has a relative good dispersion at low NCC loading (1, 3 and 5 wt.%), and a rougher surface at higher NCC loadings. The PLA bionanocomposites film as obviously seen exhibits decrease in transparency as the NCC content increased. The transparency of neat PLA film has higher transmission value compare to other PLA-NCC and tend to reduce the transmission percentage as the NCC loading increase, especially for 10 and 20%.

1. Introduction

The use of biopolymer is growing as more concerns on environmental impacts of petroleum based plastics. One of the most valuable biopolymer is polylactic acid (PLA) due to some advantage properties, for instances renewability, biodegradability, compatibility and excellent in transparency. However PLA has shortcoming such as low thermal resistance, brittles, and poor gas and water vapor permeability [1]. To extend its applications, improvement of its properties is required. One of the most promising material to enhance the properties of the PLA is cellulose asmany researches have shown recently [2-5].

In general, preparation of biodegradable plastics requires fillers as reinforcing phase made of bioresources. Many studies have shown that various forms of nano-size cellulose have been incorporated into PLA matrix have contributed to improved mechanical and barrier properties of the biocomposites [6, 7]. Growing interest in nanocomposites has been related to several reasons, among them are possible to design and create new materials and structures with exceptional flexibility and physical properties,