

**Volume : 5 No. 2 | 2017**

**(AJAS)**

# **ASIAN JOURNAL OF APPLIED SCIENCES**

**ISSN : 2321-0893**



## Editorial Team

### Managing Editor

[Managing Editor AJAS](#), Asian Journal of Applied Sciences

### Editors

[Dr. Habibolla Latifzadeh](#), Faculty of Basic Sciences, Shiraz University of Technology, , Shiraz, Iran, Islamic Republic of

[Dr. Ferid Hedi Hammami](#), PHYSICS DEPARTMENT, SCIENCE COLLEGE, JAZAN UNIVERSITY, Saudi Arabia

[Dr. Kewen Zhao](#), Institute of Appl. Math. Inform. Sci. University of Qiongzhou Sanya, Hainan, China

[Dr. Mohamed Amin Mahmoud Uosif](#), Faculty of Science, Al-Azhar University, Egypt

[Dr. Vishnu Narayan Mishra](#), Sardar Vallabhbhai National Institute of Technology,, India

[Dr Ho soonmin](#), INTI International University, Malaysia

[Dr. Arun Kumar Gupta](#), Associate Professor, Department of Mathematics, M.S.College, Saharanpur, U.P., India

[Dr. Faisal G. Khamis](#), Al Ain University of Science and Technology, United Arab Emirates

## Table of Contents

### Articles

- [The Juazeiro \(\*Ziziphus Joazeiro Mart.\*\) and the Formation of Concepts and Parameters in Chemical Technology Education](#) [PDF](#)  
 José Carlos Oliveira Santos, Ana Paula da Costa, Aline de Lima Araújo, Jakeline Santos Martins, Lioran Fagner Bento de Oliveira, Vagne Cunha Lima, Romário Jonas de Oliveira, Danilo Lima Dantas, Frank Madson Araújo Melo
- [Applying Artificial Neural Networks to Monitor Deposition Rate of Roll-to-roll Sputtering System in Real Time](#) [PDF](#)  
 Jiun-Shen Chen, Tzong-Daw Wub
- [The Design of Color Detector Device for Visually Impaired People](#) [PDF](#)  
 Mochamad Bintang Rivani, Kristiana Asih Damayanti, Ali Sadiyoko
- [Measurement of Interconnecting Network for Roadside Unit Placement on Cellular Network to Support Intelligent Transportation System](#) [PDF](#)  
 Okkie Puspitorini, Nuradi Siswandari, Haniah Mahmudah, Ari Wijayanti
- [Saccharification of Lignocellulosic Materials by Cellulolytic and Xylanolytic \*Paenibacillus illioisensis\* CX11](#) [PDF](#)  
 Abeer Ahmed Qaed Ahmed, Tracey McKay
- [The Role of \*L. plantarum\* as an Immunomodulator Secretion of Transforming Growth Factor- \$\beta\$ 1, Transforming Growth Factor- \$\beta\$ 3, and Interferon- \$\alpha\$  Macrophages and Dermal Fibroblasts](#) [PDF](#)  
 Rita Shintawati, Sunarjati Sudigdoadi, Tita Husnitawati Madjid, Endang Sutedja
- [The Development of Sustainable Community Food Barn in Wonogiri Regency, Central Java, Indonesia](#) [PDF](#)  
 Erlyna Wida Riptanti, Suprapti Aulia Qonita
- [Assessing the Genetic Diversity of \*Alternaria Bataticola\* in South Africa using Molecular Markers](#) [PDF](#)  
 J. Chalwe, P. Adebola, M. Pillay
- [Effect of Hall Current on MHD Oscillatory Slip Flow with Varying Temperature and Concentration](#) [PDF](#)  
 K. Sumathi, T. Arunachalam, N. Radha
- [Dimension of Work Life Balance in Software Companies](#) [PDF](#)  
 Deivasigamani J., Dr. Shankar
- [A Study on Problems Related to Work Life Balance among Women Employees in Information Technology Sector, Chennai](#) [PDF](#)  
 Deivasigamani Jothimani, Dr. Shankar
- [X-ray Fluorescence \(XRF\) Geochemical Investigation of Delta Steel Company \(DSC\), Ovwian–Aladja, western Niger Delta, Nigeria, Steelmaking Slag for use as Iron making Blastfurnace Feed and Fertilizer](#) [PDF](#)  
 Napoleon A. Wessey

[Assessment of Chennai's Ambient Air Quality Data using Multivariate Analysis from 2005 to 2015](#) PDF

Srinivasan Karunanithi, Thirumalini Perumal, Kabbilawsh

[Kind of Weak Separation Axioms by  \$D\_\omega\$ ,  \$D\_{\(\alpha-\omega\)}\$ ,  \$D\_{\(\text{pre-}\omega\)}\$ ,  \$D\_{\(b-\omega\)}\$  and  \$D\_{\(\beta-\omega\)}\$ -Sets](#) PDF

Mustafa H. Hadi

[Occurrence of Carangid Fish \*Uraspis helvola\* \(Forster, 1801\) from the Iraqi Marine Waters, Arabian Gulf](#) PDF

Abdul-Razak M. Mohamed, Abbas J. Al-Faisal, Talib A. Jaayid

[Effect of Concentrator, Blade Diameter and Blade Number on the Savonius Wind Turbine Performance](#) PDF

Ida Bagus Alit, Rudy Sutanto, I Made Mara, Mirmanto Mirmanto

[Outcome and Clinical Spectrum of Post-streptococcal Glomerulonephritis in Children in Developing Countries](#) PDF

Saber A. M. El-Sayed, Yasser F. Ali, Mostafa M. Ahmady, Salah F. Alsayed, Ahmed M. Baraka

[Comparison of Two Independent Samples Method Based on the Normal Distribution](#) PDF

Osman Osmanaj, Lazim Kamberi

[Making a Low Risk Kampong to Urban Fire](#) PDF

Adjie Pamungkas

[Strengthening Social Capital to Enhance Participation In Public Sector](#) PDF

Hasniati, Rabina Yunus, Nurlinah, Sakaria

[Release Activity of Encapsulated \*Lactobacillus plantarum\* NBRC 3070 in Optimum Alginate - \*Aloe vera\* Matrices during Simulated Gastric Fluid \(SGF\) and Simulated Intestinal Fluid \(SIF\) Exposure](#) PDF

Nur Syahirah Sallehudin, Khalilah Abdul Khalil, Maslinda Musa, Hifa Nazirah Mohd Yazid, Anida Yusof

[The Influence of Clamshell on Mechanical Properties of Non-Structure Concrete as Artificial Reef](#) PDF

Ridho Bayuaji, Rudhy Akhwady

[HAZOP Study and Determination of Safety Integrity Level Using Fault Tree Analysis on Fuel Gas Superheat Burner of Ammonia Unit in Petrochemical Plant, East Java](#) PDF

Ronny D. Noriyati, Amarendra B. Prakoso, Ali Musyafa, Adi Soeprijanto

[Multi-criteria Approach for Prioritizing Bridge Maintenance in Developing Country \(Case Study of Bali Province, Indonesia\)](#) PDF

Putu Alit Suthanaya, Ida Bagus Artamana

[Prevalence of Hematological Disorders among Children with Brucellosis](#) PDF

Saber A. M. El-Sayed, Yasser F. Ali, Mostafa M. Ahmady, Salah F. Alsayed, Ahmed M. Baraka

[Y-coretractable and Strongly Y-coretractable Modules](#) PDF

Inaam Mohammed Ali Hadi, Shukur Neamah Al-aeashi

[Adaptive Beam Formation in Smart Antenna Using VSLMS and VSNLMS Algorithms for Side Lobe Level Reduction](#)

[PDF](#)

Monisha Bairagya

[Anthropometric Characteristics and Mineral Distribution and Contamination in Artisanal Small-scale Gold Mining Site of Ciguha in Gunung Pongkor, Bogor](#)

[PDF](#)

Haryoto Kusnoputranto, Jonatan Oktoris Simanjuntak, Nila Puspita Sari, Bambang Wispriyono, Abdur Rahman

ISSN: 2321 - 0893

# The Role of *L. plantarum* as an Immunomodulator Secretion of Transforming Growth Factor- $\beta$ 1, Transforming Growth Factor- $\beta$ 3, and Interferon- $\alpha$ Macrophages and Dermal Fibroblasts

Rita Shintawati<sup>1</sup>, Sunarjati Sudigdoadi<sup>2</sup>, Tita Husnitawati Madjid<sup>3</sup>, Endang Sutedja<sup>4</sup>

<sup>1</sup> Department of Biology Education, Indonesia University of Education  
Jl. Dr. Setiabudi 229 Bandung 40154 West Java, Indonesia

<sup>2</sup> Department of Microbiology, Medical Faculty of Padjadjaran University

<sup>3</sup> Department of Obstetri and Gynecology, Medical Faculty of Padjadjaran University

<sup>4</sup> Department of Dermatology, Medical Faculty of Padjadjaran University  
Jl. Prof.Dr. Eijkman 38 Bandung 40161

\*Corresponding author's email: rita\_shintawati [AT] yahoo.com

**ABSTRACT**— This research aims to see the effect of *L.plantarum* in modulating the secretion of Transforming Growth Factor-TGF $\beta$ 1, TGF $\beta$ 3 macrophages and fibroblasts, Interferon-IFN $\alpha$  macrophages, and to analyze the possibility of *L.plantarum* potency in supporting the process of scarless wound healing. The culture of peritoneal macrophages was treated with *L.plantarum* for 24 hours, while another macrophage was *S.aureus* stimulated for 6 hours before treatment of *L.plantarum* for 24 hours. The formed supernatant was separated and centrifuged to serve as a treatment on the culture of rat dermal fibroblasts for 24 hours. The supernatant was then separated and centrifuged; its cytokine level was measured with enzyme-linked immunosorbent assay-ELISA. Treatment of *L.plantarum* with medium and high doses increased the secretion of IFN $\alpha$  macrophages compared with the control; all *L.plantarum* doses can stimulate the secretion of TGF $\beta$ 1 fibroblast and TGF $\beta$ 3 macrophage significantly, but it does not affect the secretion of TGF $\beta$ 1 macrophages. It can be concluded that *L.plantarum* increased the secretion of IFN $\alpha$  macrophages higher than the treatment preceded by *S.aureus* stimulation. The secretion of TGF $\beta$ 1 fibroblasts and TGF $\beta$ 3 fibroblasts also increased, but it was not as high as *L.plantarum* treatment stimulated by *S.aureus*. Therefore, the application of *L.plantarum* to support the process of wound healing, prophylactic of the excessive scar and fibrosis can be researched further.

**Keywords**— *L.plantarum*, TGF $\beta$ 1, TGF $\beta$ 3, IFN $\alpha$

## 1. INTRODUCTION

Skin is one of areas in human body inhabited by a complex ecosystem with thousands of microbe species, including *Lactobacilli*. There are many researches about benefit of probiotic and several mechanisms which allow probiotic to affect health. Host-microbe interactions underlie the mechanism of *Lactobacilli* until it has an important role in the physiology of host.

The modulation of immune response has been acknowledged as one of several benefits of probiotic. In order to modulate the immunity, the probiotic microbe must communicate with the immune cells equipped with the receptor which is able to identify the molecule from microbe-PRRs. *Lactobacilli* can cause innate and adaptive immune responses on host through the bond on pattern recognition receptors-PRRs on the surface of macrophage cells. The interaction between PRRs and microbe-associated molecular patterns-MAMPs on macrophages causes a signaling sequence[1],[2]. The signaling pathways of Toll-like receptors-TLRs will activate the transcription factors and stimulate the cytokine secretion and growth factors by macrophages[3],[4].

During wound healing process, transforming growth factor-beta-TGF $\beta$ 1 and TGF $\beta$ 3 play important role in inflammation, angiogenesis, re-epithelialization, and regeneration of connective tissue. TGF $\beta$ 1 facilitates the recruitment of inflammation cells and improves the function of macrophage in tissue debridement[5],[6]. However, TGF $\beta$ 1 also plays a role in fibrosis pathogenesis. Meanwhile, TGF $\beta$ 3 plays a very important role in stopping the final differentiation in the healing process, so TGF $\beta$ 3 is able to hamper the excessive scar and improve better collagen organization[7],[8]. Furthermore, interferon alpha-IFN $\alpha$  can be produced by almost all cells on the response of infection from virus and bacteria. On the macrophage cells, IFN $\alpha$  is produced as the result of bond of TLR3 and TLR9 with microbe DNA, and the induction of interferon regulatory factor-IRF7 transcription factor and expression of IFN genes type I. Due to its