

# Molecular Characterization of Fermentative Bacteria on Local Microorganisms of *Pomacea canaliculata*

Yuliana Retnowati<sup>1\*</sup>; Abubakar Sidik Katili<sup>1\*</sup>

<sup>1</sup>Biology Department, Faculty of Mathematics and Sciences, Universitas Negeri Gorontalo; Jalan Prof. Dr.Ing. B.J. Habibie Kabupaten Bone Bolango, Gorontalo 96119. \*e-mail. [yuliana\\_r@yahoo.com](mailto:yuliana_r@yahoo.com); [abubakarsidik@ung.ac.id](mailto:abubakarsidik@ung.ac.id)

## ABSTRACT

Local Microorganisms (LMO) is a fermented liquid containing various microorganisms potentially as decomposer and bio-fertilizer. *P.canaliculata* is one of the rice weeds that potential as a basic ingredient of LMO because the high protein content. The objective of this study was to determine the types of fermentative bacteria on Local Microorganisms of *P.canaliculata*. The fermentation of LMO was conducted for 21 days and acidity changing was detected. Microbial population was determined at 7 day intervals based on the Total Plate Count method. Characterization and identification based on polyphasic taxonomy including macroscopic and microscopic morphological characters, and molecular characters based on 16S rRNA gene sequences. The results showed that LMO of *P.canaliculata* had a low degree of acidity and tended to decrease during the incubation period, from pH 5.3 to 4.0. Bacterial population tends to increase at 0-14 fermentation days and decreases after 21 days. Isolation results obtained 3 types of bacteria based on morphological differences, namely isolates BFPc-01, BFPc-02, and BFPc-03, with each color of colony as milky white colony, colony pink, and yellow colonies. The molecular characterization of fermentative bacteria isolates showed that the BFPc-01 isolate showed similarities to *Klebsiella pneumoniae* MT604895.1 (99.04%), each of BFPc-02 and BFPc-03 isolates were closely related to *Serratia* sp (100%) and *Microbacterium* sp (100%).

Key word. Molecular characterization, fermentative bacteria, Local Microorganisms, *Pomacea canaliculata*

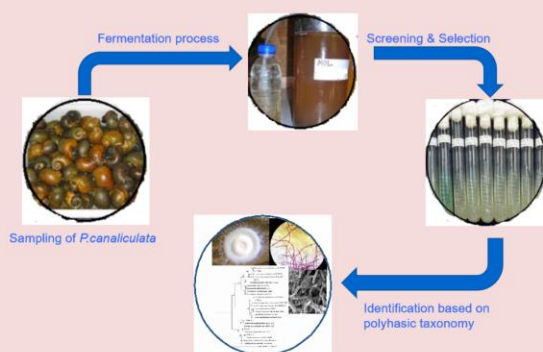
## INTRODUCTION

Local Microorganisms (LMO) is a liquid containing various types of microorganisms that are involved in the process of overhauling various organic wastes. The degradative ability of microorganisms in LMO has been widely used for activation in the composting process so as to accelerate the compost ripening process and shorten the composting time. The microorganisms contained in LMO are also bio-fertilizing agents that have potential as commercial biological agents. The use of LMO has also been applied as a fertilizer to fertilize plant leaves, stimulate plant growth, and control pest and disease agents (Manullang et al., 2017; Sigit, 2018).

Local Microorganisms can be sourced from a variety of local materials, including cow urine, banana stalks, gamal leaves, fruits, stale rice, household waste, bamboo shoots, Cebreng leaves / legumes, banana weevils, vegetables, and elephant grass, so that it can play a role in the process of waste management, both solid and liquid waste (Manullang et al., 2017; Sigit, 2018). Another material that has the potential as a basic material for LMO is the golden snail (*P.canaliculata*). *P.canaliculata* is a member of the Ampullaridae tribe which is known as a pest on rice plants. The presence of this pest can damage thousands of hectares of rice seedlings or at a young age. These animals contain protein and high fat so that they have the potential to be a source of local microorganisms.

Local Microorganisms is composed of various types of microbes that play a role in the process of breaking down macromolecules in basic materials. Some of the microorganisms in LMO act as bio-fertilizers are *Rhizobium* sp, *Azospirillum* sp, *Azotobacter* sp, *Pseudomonas* sp, and *Bacillus* sp. Suhastyo et al (2013) reported that the LMO of banana weevil contains a number of bio-fertilizer bacteria, including *Bacillus* sp, *Aeromonas* sp, and *Aspergillus* sp. Some of these bio-fertilizer microbes show activity as a solubilizing phosphate and produce indole acetic acid (IAA) growth hormone. Rani et al (2017) reported that the LMO of Bintaro fruit contains a number of solubilizing phosphate and IAA-producing bacteria. The importantly of LMO role and its potential to be developed as a commercial product, this study aims to reveal the fermentative bacteria in LMO of *P.canaliculata*. The results of this study are expected to be preliminary data for the development of LMO *P.canaliculata* in the next analysis, including the ability to solubilizing phosphate and produce of IAA growth hormone.

## METHODOLOGY



## RESULT

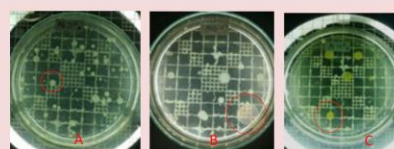


Fig. 1. Colony morphology of fermentative bacteria on local microorganism of *P.canaliculata*. A. BFPc-01; B. BFPc-02; C. BFPc-03

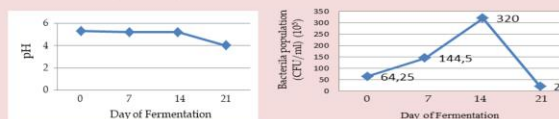


Fig. 2. The acidity changing and bacterial population of *Pcanaliculata* fermentation for 21 days .

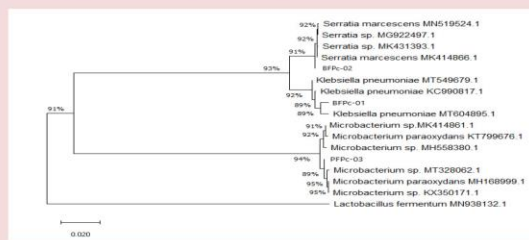


Fig 3. Neighbour-joining phylogenetic tree inferred from 16S rRNA gene sequences of fermentative bacteria in LMO of *P.canaliculata*. Bootstrap values are expressed as percentages of 1000 replications. Bootstrap value,  $\geq 50\%$  are shown at branch points. Scale bar represents 1 nucleotide substitution per 100 nucleotides.

## CONCLUSION

Local microorganisms (LMO) of *Pomacea canaliculata* consist of various type of fermentative bacteria. The bacteria activities was decreasing the acidity of LMO liquid up to pH 4.0 for 21 days fermentation process. The fermentative bacteria consist of three bacteria namely BFPc-01, BFPc-02, and BFPc-03 which closely related by *Klebsiella pneumoniae* MT604895.1 (99.04%), *Serratia* sp, and *Microbacterium* sp of 100% respectively.

## ACKNOWLEDGEMENT

The authors are grateful for the funding from "Penerimaan Negara Bukan Pajak (PNBP) of Universitas Negeri Gorontalo, 2020. We are also thankful for Adam Sudari, S.Pd as a Laboratory Assistant of Microbiology Laboratory, Biology Department, Faculty of Mathematics and Sciences.

## REFERENCES

- Swastika AANG., Sutari N.W.S., dan Muriani N.W. 2015. Analisis Kualitas Larutan Mikroorganisme Lokal Daun Gamal (*Gliricidia septium*) pada Beberapa Waktu Inkubasi. *AGROTROP*, 3 (2): 206-213
- Budyani NM., Somiani N.N., Sutari N.W.S. 2016. Analisis Kualitas Larutan Mikroorganisme Lokal (MOL) Bonggol Pisang. *E-Jurnal Agroekoteknologi Tropika* Vol. 5, No. 1
- Manullang R.R., Rusmini, dan Daryono. 2017. Kombinasi Mikroorganisme Lokal Sebagai Bioaktivator Kompos. *Jurnal Hutan Tropis* Volume 5 No. 3 November
- Marsiningsih N.W., Swastika A.A.N.G., dan Sutari N.W.S. 2015. Analisis Kualitas Larutan Mol (Mikroorganisme Lokal) Berbasis Ampas Tahu. *E-Jurnal Agroekoteknologi Tropika* ISSN: 2301-6515 Vol.



# CERTIFICATE

No. 3856/JUN.26.17/DL.07.00/2020

The organizing committee certifies that

**Yuliana Retnowati**

has contributed as

**PRESENTER**

at

The 3<sup>rd</sup> International Conference on Applied Sciences, Mathematics, and Informatics (ICASMI)  
Virtual International Conference  
“*Natural Science, Mathematics, and Informatics in Industrial Revolution (IR) 4.0  
toward The Sustainable Development Goals (SDGs)*”

Held by Faculty of Mathematics and Natural Sciences, University of Lampung  
September 3<sup>rd</sup> – 4<sup>th</sup>, 2020, Bandar Lampung, Indonesia



Dr. Eng. Suripto Dwi Yuwono, S.Si., M.T.  
Dean



Prof. Dr. Rudy TM Situmeang, M.Sc.  
Chairman