

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

Judul Karya Ilmiah (artikel) : Identification of *Salmonella typhi* Contamination by Amplification *fliC* Gene In Grass-jelly from Traditional Markets and Minimarket In Semarang City
 Nama Penulis : Aditya Rahman Ernanto, Junita Rensa Palimbongan, Anjar Richardo Manufandu, **Sri Darmawati**
 Jumlah Penulis : 4 (empat)
 Status Pengusul : ~~penulis pertama~~ / **penulis korespondensi***
 Identitas Jurnal Ilmiah: a. Nama Jurnal : Jurnal Teknologi Laboratorium
 b. Nomor ISSN : 2338-5634
 c. Volume, Nomor, Bulan Tahun : Vol. 9, No. 2, Agustus 2020
 d. Penerbit : Poltekkes Kemenkes Yogyakarta
 e. DOI artikel (jika ada) :

<https://doi.org/10.29238/teknolabjournal.v9i2.207>

Kategori Publikasi Jurnal Ilmiah (beri √ pada kategori yang tepat)

- Jurnal Ilmiah Nasional Terakreditasi Dikti*
 Jurnal Ilmiah Nasional Terakreditasi Peringkat 1 **2** / 3 / 4 / 5 / 6*

Hasil Penilaian Peer Review :

Komponen yang dinilai	Nilai Maksimal Jurnal Ilmiah				Nilai Akhir yang Diperoleh
	Nasional terakreditasi Dikti <input checked="" type="checkbox"/>	Nasional terakreditasi peringkat 1 dan 2 <input type="checkbox"/>	Nasional terakreditasi peringkat 3 & 4 <input type="checkbox"/>	Nasional terakreditasi peringkat 5 dan 6 <input type="checkbox"/>	
e. Kelengkapan unsur isi artikel (10%)	2.5	2.0	1.5	1.0	2,0
f. Ruang lingkup dan kedalaman pembahasan (30%)	7.5	6.0	4.5	3.0	7,3
g. Kecukupan dan kemutakhiran data /informasi dan metodologi (30%)	7.5	6.0	4.5	3.0	7,3
h. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	7.5	6.0	4.5	3.0	6.5
Total = 100%	25	20	15	10	23,1
Nilai Pengusul	$40\% \times 23,1 = 9,24$				9,24
Nilai rata-rata reviewwer 1 dan 2	$(9,24 + 9,88)/2 = 9,56$				9,56

Catatan penilaian artikel oleh Reviewer 1 :

- Kesesuaian dan kelengkapan unsur isi jurnal:** Format penulisan sesuai dengan "Guide for Author" (Title, Abstract, Introduction, Materials and methods, Results and Discussion, Conclusion, Acknowledgement, References). Naskah lengkap. Substansi artikel sesuai bidang ilmu pengusul/penulis (**Mikrobiologi/Bioteknologi**). tampak adanya benang merah dalam struktur penulisannya (skor=2,0).
- Ruang lingkup dan kedalaman pembahasan:** Pembahasan permasalahan sudah sesuai. Substansi artikel sesuai dengan ruang lingkup jurnal Teknologi Laboratorium. Pembahasan lengkap dan sangat baik (18 dari 27 buah rujukannya dilibatkan dalam proses membahas hasil) (skor=7,3).
- Kecukupan dan kemutakhiran data/informasi dan metodologi:** Data-data hasil penelitian cukup menunjukkan ada kebaruan informasi. Terdapat 15 buah pustaka dari 27 yang kurang dari 10 th terakhir. Sebanyak 23 dari 27 pustaka berupa Jurnal . (ini menunjukkan proses review dan kecukupan pustakanya memenuhi (skor =7,3).
- Kelengkapan unsur dan kualitas terbitan:** Jurnal ini tergolong Jurnal nasional terakreditasi dengan SK akreditasi Keputusan DirjenDikti atau terakreditasi nasional dengan peringkat **SINTA 2**, tanggal bulan tahun. 03 October 2017 indexed dalam DOAJ, Editorial board lebih dari 5 universitas dan 5 negara, Terbit 2 kali setahun (Juni dan Desember), eISSN : 25800191 | pISSN : 23385634 Mutu penyuntingan, gaya dan format, proses editorial baik (skor=6,5).

10 November 2021

Reviewer 1:



Prof. Dr. Suwarno Hadisusanto, SU
 NIP/NIDN : 19541116 19830331002/0016115402
 Unit Kerja : Universitas Gadjah Mada Yogyakarta
 Jabatan Fungsional: Guru Besar
 Bidang Ilmu : Biologi

*Coret yang tidak perlu

Prosentase Angka Kredit Penulis untuk :

- **jurnal dan prosiding :**

4. Penulis Pertama sekaligus korespondensi = 60%

5. Terdiri dari : Penulis pertama; Korespondensi; Pendamping = : 40% ; 40%; 20%

6. Terdiri dari : Penulis pertama; korespondensi = 50% ; 50%

- **Karya ilmiah lain :** Penulis pertama; Pendamping= 60%;40%

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

Judul Karya Ilmiah (artikel) : Identification of *Salmonella typhi* Contamination by Amplification *fliC* Gene In Grass-jelly from Traditional Markets and Minimarket In Semarang City
 Nama Penulis : Aditya Rahman Ernanto, Junita Rensa Palimbongan, Anjar Richardo Manufandu, **Sri Darmawati**
 Jumlah Penulis : 4 (empat)
 Status Pengusul : ~~penulis pertama~~/penulis korespondensi*
 Identitas Jurnal Ilmiah: a. Nama Jurnal : Jurnal Teknologi Laboratorium
 b. Nomor ISSN : 2338-5634
 c. Volume, Nomor, Bulan Tahun : Vol. 9, No. 2, Agustus 2020
 d. Penerbit : Poltekkes Kemenkes Yogyakarta
 e. DOI artikel (jika ada) : <https://doi.org/10.29238/teknolabjournal.v9i2.207>

Kategori Publikasi Jurnal Ilmiah (beri \surd pada kategori yang tepat)
 Jurnal Ilmiah Nasional Terakreditasi Dikti*
 Jurnal Ilmiah Nasional Terakreditasi Peringkat 1 **(2)** 3 / 4 / 5 / 6*

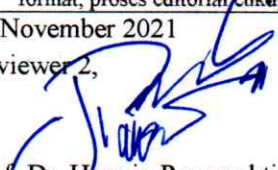
Hasil Penilaian Peer Review :

Komponen yang dinilai	Nilai Maksimal Jurnal Ilmiah				Nilai Akhir yang Diperoleh
	Nasional terakreditasi Dikti	Nasional terakreditasi peringkat 1 dan 2	Nasional terakreditasi peringkat 3 & 4	Nasional terakreditasi peringkat 5 dan 6	
a. Kelengkapan unsur isi artikel (10%)		V	<input type="checkbox"/>	<input type="checkbox"/>	2.5
b. Ruang lingkup dan kedalaman pembahasan (30%)		7.5			7.5
c. Kecukupan dan kemutakhiran data /informasi dan metodologi (30%)		7.5			7.5
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)		7.5			7.3
Total = 100%		25			24,70
Nilai Pengusul		(40 % x 24,70) = 9,88			9,88
Nilai rata-rata Reviewer 1 dan 2		(9,24+9,88)/2=9,56			9,56

Catatan penilaian artikel oleh Reviewer 2 :

- Kesesuaian dan kelengkapan unsur isi jurnal:** Penulisan sudah sesuai dengan "Guide for Author" (Title, Abstract, Introduction, Materials and methods, Results and Discussion, Conclusion, Acknowledgement, References). Naskah lengkap. Substansi artikel sesuai bidang ilmu pengusul/penulis (Mikrobiologi/Bioteknologi). Struktur penulisannya saling gayut (skor=2,5).
- Ruang lingkup dan kedalaman pembahasan:** Pembahasan baik dan sesuai permasalahan. Substansi artikel sesuai dengan ruang lingkup jurnal Teknologi Laboratorium. Pembahasan mendalam dimana 8 dari 27 buah rujukannya dilibatkan dalam proses membahas hasil (skor=7,5).
- Kecukupan dan kemutakhiran data/informasi dan metodologi:** Data-data hasil penelitian cukup menunjukkan ada kebaruan informasi. Terdapat 15 buah pustaka dari 27 yang kurang dari 10 th terakhir. Sebanyak 23 dari 27 pustaka berupa Jurnal. Hal ini menunjukkan proses review dan kecukupan pustakanya memenuhi (skor = 7,5).
- Kelengkapan unsur dan kualitas terbitan:** Jurnal ini tergolong Jurnal nasional terakreditasi dengan SK akreditasi Keputusan DirjenDikti atau terakreditasi nasional dengan peringkat **SINTA 2**, tanggal bulan tahun. 03 October 2017 indexed dalam DOAJ, Editorial board lebih dari 5 universitas dan 5 negara, Terbit 2 kali setahun (Juni dan Desember), eISSN : 25800191 | pISSN : 23385634 Mutu penyuntingan, gaya dan format, proses editorial cukup baik namun penulisan nama ilmiah ada yang kurang sesuai dengan kaidah yaitu di halaman 2 (skor=7,3).

10 November 2021

Reviewer 2,


Prof. Dr. Hermin Pancasakti Kusumaningrum, S.Si, M.Si
 NIP/NIDN : 197002081994032001/0008027003
 Unit Kerja : Fak. Sains dan Matematika UNDIP
 Jabatan Fungsional : Guru Besar
 Bidang Ilmu : Biologi

Prosentase Angka Kredit Penulis untuk :

- Jurnal dan prosiding :**
 - Penulis Pertama sekaligus korespondensi = 60%
 - Terdiri dari : Penulis pertama; Korespondensi; Pendamping = 40% ; 40%; 20%
 - Terdiri dari : Penulis pertama; korespondensi = 50% ; 50%
- Karya ilmiah lain :** Penulis pertama; Pendamping= 60%;40%

*Coret yang tidak perlu

Identification of Salmonella typhi contamination by amplification fliC gene in grass-jelly from traditional markets and minimarket in Semarang city

AR Ernanto, JR Palimbongan... - Jurnal Teknologi ..., 2020 - teknolabjournal.com

Grass-jelly is one of the most popular plants consumed by people in various forms. Contamination can cause various diseases, one of those is typhoid fever by Salmonella typhi. The purpose of this study was to detect S. typhi in grass-jelly based on molecular detection by amplification of the fliC gene using PCR. Validation was done by culture methods on SSA media and biochemical testing. The fliC gene amplification results in grass-jelly samples (A1, A2, B1, B2, C1, and C3) showed the DNA fragments size of about 1500 ...

☆ [Simpan](#) [Kutip](#) [Artikel terkait](#) [4 versi](#) [↔](#)

Menampilkan hasil terbaik untuk penelusuran ini. [Lihat semua hasil](#)



Jurnal Teknologi Laboratorium

About this journal



Browse this journal



Journal information

Print ISSN: 2338-5634 | **Online ISSN: 2580-0191**

Published 2 issues per year (June and December)

The **Jurnal Teknologi Laboratorium** is indexed/tracked/covered by the following services:

1. **Directory of Open Access Journal (DOAJ)**
2. **Google Scholar**
3. **Index Copernicus International**
4. **PKP INDEX**
5. **Indonesia One Search by Perpunas**
6. **Journal Factor**
7. **Bielefeld Academic Search Engine (BASE)**
8. **Cosmos Impact Factor**
9. **ResearchBib**
10. **SINTA**
11. **Eurasian Scientific Journal Index (ESJI)**
12. **Directory of Research Journals Indexing (DRJI)**
13. **Microsoft Academic**
14. **International Committee of Medical Journal Editors (ICMJE)**
15. **Open Science Directory (EBSCO)**
16. **Indonesian Publication Index (IPI)**



Jurnal Teknologi Laboratorium

About this journal



Browse this journal



Editorial Team

Editor-in-Chief

Budi Setiawan (Parasitologist)

(Department of Medical Laboratory Technology, Health Polytechnic of Yogyakarta, Indonesia)

Editorial Board

Dora Dayu Rahma Turista (Microbiologist)

(Department of Biology, [University of Mulawarman](#), Indonesia)

Dipak Kumar Yadav (Physician)

([Kathmandu University](#), Nepal)

Christian Ebere Enyoh (Chemical)

([Imo State University](#), Owerri, Nigeria)

Gunes Bolatli (Physician)

(Department of Anatomy, Faculty of Medicine, [Siirt University](#), Siirt, Turkey)

Anis Nurwidayati (Biologist)

(Vector-Borne Disease Research Unit Donggala, National Institute of Health Research and Development, Ministry of Health, Donggala, Central Sulawesi Province, Indonesia)



About this journal




Browse this journal



 **Vol. 9 No. 2 (2020): 2020 (2)**



DOI: <https://doi.org/10.29238/teknolabjournal.v9i2>

 Published : 2021-02-06



In-vitro antibacterial activity of the seed extract of three-member *Artocarpus* towards Methicillin-Resistant *Staphylococcus aureus* (MRSA) >

Muhammad Evy Prastiyanto, Inas Hasna Azizah, Hafizha Dara Haqi, Bagus Dwi Yulianto, Aulia Bella Agmala, Zhafira Dias Radipasari, Nita Ayu Dwi Astuti, Arifani Rahma Putri

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.237>

Pages: 128-135

Published : 2020-12-31

146	97
Views	Downloads

Identification of *Salmonella typhi* contamination by amplification *fliC* gene in grass-jelly from traditional markets and minimarket in Semarang city >

Aditya Rahman Ernanto, Junita Rensa Palimbongan, Anjar Richardo Manufandu, **Sri Darmawati**

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.207>

Pages: 136-144

Published : 2020-12-31

142	96
Views	Downloads

The potential of ethanol extract of white pomegranate leaves (*Punica granatum* L) as anti-bacterial >

Ni Made Susilawati, I Gede Putu Arnawa, Karol Octrisdey, Norma Tiku Kambuno

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.258>

Pages: 145-150

Published : 2020-12-31

79	65
Views	Downloads

Hematology



[IAMBAKIOROK, Semarang, Indonesia >](#)

Budi Santosa, Herlisa Anggraini, Ika Dyah Mawarni, Niza Muliatur, Ardiansyah Nugroho, Uly Syarah, Siti Atika Risqoeni

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.213>

Pages: 151-158

Published : 2020-12-31

107	61
Views	Downloads

[Peripheral stem cell mobilization strategies in patients with autologous hematopoietic cell transplantation: A single center's experience >](#)

SÄ°NEM NAMDAROÄžLU, TugÄ°se Nur Yigenoglu, Hikmetullah Batgi, Bahar Uncu Ulu, Dicle Ä°skender, Merih Ä°řakar, Mehmet Sinan Dal, Fevzi AltuntaÄ°

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.247>

Pages: 159-167

Published : 2020-12-31

56	48
Views	Downloads

▣ Parasitology

[Detection of B1 gene as Toxoplasmosis marker in women of childbearing age in West Bandung Regency, Indonesia >](#)

Patricia Gita Naully, Selvi Anggraeni Supendi

DOI : <https://doi.org/10.29238/teknolabjournal.v9i2.204>

Pages: 168-175

Published : 2020-12-31

61	46
Views	Downloads

▣ Clinical Chemistry

[Anti-inflammatory activities of squalene compound of methanol extract of Abroma augusta L >](#)



Original Research



The potential of ethanol extract of white pomegranate leaves (Punica granatum L) as anti-bacterial

Ni Made Susilawati^{1a*}, I Gede Putu Arnawa^{2b}, Karol Octrisdey^{1c}, Norma Tiku Kambuno^{1d}

- ¹ Department of Medical Laboratory Technology, **Poltekkes Kemenkes Kupang**, Nusa Tenggara Timur, Indonesia
- ² Department of Sanitation, Poltekkes Kemenkes Kupang, Nusa Tenggara Timur, Indonesia

^aE-mail address: madeanalisis@yahoo.co.id

^bE-mail address: igedeputu_arnawa@yahoo.co.id

^cE-mail address: octrisdeykarol@gmail.com

^dE-mail address: norma.kambuno@gmail.com

HIGHLIGHTS

We were found that the extract of white pomegranate leaves was able to inhibit the growth of positive Gram bacteria strains MRSA and the extract was unable to inhibit the growth of Escherichia coli bacteria strain ESBL.

ARTICLE INFO

Article history

Received Date: March 29th, 2020

Revised Date: April 21st, 2020

Accepted Date: June 04th, 2020

Keywords

Pomegranate leaf
Methicillin-Resistant Staphylococcus aureus
Extended Spectrum Beta-Lactamase

ABSTRACT

Treatment of infections using penicillin-derived antibiotics such as methicillin has been found to cause antibiotic-resistant bacteria. This bacteria could produce a beta-lactamase enzyme to form a resistant strain. Research on antibacterial activity continues to develop. Pomegranate (*Punica granatum L.*) was one of the herbal plants whose fruit has long been used for the treatment and prevention of various diseases. This study aimed to determine the potential inhibition of white pomegranate leaf extracts (*Punica granatum L.*) on the growth of Gram-negative bacteria including *Escherichia coli* Extended-Spectrum Beta-Lactamase (ESBL) strain and Gram-positive bacteria *Staphylococcus aureus* Methicillin-Resistant *Staphylococcus aureus* (MRSA) strain. White pomegranate leaf extract macerated with ethanol 96%, evaporated to obtain pure extracts made with a concentration of 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% and with 100% tested with invitro diffusion method. It was found that the extract of white pomegranate leaves with 30% (10.00 ± 0.0) concentration was able to inhibit the growth of positive Gram bacteria strains MRSA and the extract was unable to inhibit the growth of *Escherichia coli* bacteria strain ESBL.

[This is an open-access article under the CC-BY-SA license.](#)



*Corresponding Author:

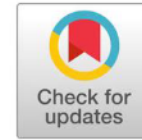
Ni Made Susilawati

Prodi Teknologi Laboratorium Medis, Poltekkes Kemenkes Kupang, Jalan Farmasi Liliba
Kupang, Nusa Tenggara Timur, 85000

E-mail: madeanalisis@yahoo.co.id

Phone: +62 813-3756-7118





Original Research

Peripheral stem cell mobilization strategies in patients with autologous hematopoietic cell transplantation: A single center's experience

Sinem Namdaroglu^a, Tuğçe Nur Yigenoglu^b, Hikmetullah Batgi^c, Bahar Uncu Ulu^d, Dicle İskender^e, Merih Çakar^f, Mehmet Sinan Dal^g, Fevzi Altuntaş^h

Department of Hematology, Stem Cell Transplantation Unit, Ankara Oncology Training, and Research Hospital, Ankara, [Turkey](#)

^aE-mail address: drsinemnamdaroglu@gmail.com

^bE-mail address: tnur@hotmail.com

^cE-mail address: hbatg@yahoo.com

^dE-mail address: bulu@yahoo.com

^eEmail address: dicle@yahoo.com

^fEmail address: mcakar@yahoo.com

^gEmail address: ms@yahoo.com

^hEmail address: falt@yahoo.com

HIGHLIGHTS

The white blood cell count was inversely correlated with the success of mobilization

ARTICLE INFO

Article history

Received Date: Oct 24th, 2020

Revised Date: Dec 18th, 2020

Accepted Date: Dec 30th, 2020

Keywords:

Bone marrow

Hematopoietic peripheral

Stem cell transplantation

Stem cell mobilization

ABSTRACT

This research is to investigate the parameters which may affect the mobilization of stem cells in patients receiving autologous hematopoietic peripheral blood stem cell transplantation (PBSCT). A retrospective study was carried out using the data derived from the medical files of 242 patients who received PBSCT. Descriptive, clinical, and laboratory parameters were compared between patients with successful and unsuccessful stem cell mobilization. Successful stem cell mobilization ratio was 4.463 times higher when preemptive plerixafor was administered; 1.032 times higher when CD34+ cell count increased 1 unit at the beginning of mobilization. The white blood cell count was inversely correlated with the success of mobilization. An increase of 1 unit in WBC count was associated with a 1.027 times decrease in the success rate. The data indicated that the administration of preemptive plerixafor and CD34+ cell count at the beginning of mobilization were directly related to the success of mobilization after PBSCT. On contrary, WBC count was inversely associated with the success rate.

[This is an open-access article under the CC-BY-SA license.](#)



*Corresponding Author:

Sinem Namdaroglu

Department of Hematology, Stem Cell Transplantation Unit, Ankara Oncology Training, and Research Hospital, Ankara, Turkey

Email: drsinemnamdaroglu@gmail.com



1. INTRODUCTION

High dose chemotherapy and bone marrow transplantation are common therapeutic modalities used in the management of hematological malignancies. An adequate number and

Identification of Salmonella thypi contamination by amplification fliC gen in grase-jelly from traditional markets and minimarkes in Semarang city

by Sri Darmawati

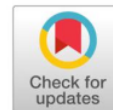
Submission date: 07-Oct-2021 08:57PM (UTC+0700)

Submission ID: 1667754164

File name: document_22.pdf (426.74K)

Word count: 4332

Character count: 23338



Original Research.

Identification of Salmonella typhi contamination by amplification fliC gene in grass-jelly from traditional markets and minimarket in Semarang city

Aditya Rahman Ernanto^a, Junita Rensa Palimbongan^b, Anjar Richardo Manufandu^c,
 Sri Darmawati^d

Department of Medical Laboratory Technology, Universitas Muhammadiyah Semarang, Semarang, Indonesia

^aE-mail address: ernanto.aditya@gmail.com

^bE-mail address: rensapalimbongan@gmail.com

^cE-mail address: anjarrichardo8@gmail.com

^dE-mail address: ciciekdarma@unimus.ac.id

HIGHLIGHTS

We found positive samples with *S. typhi* in the markets by amplification of *fliC* gene but amplification of only *fliC* gene cannot specific for *S. typhi* detection

ARTICLE INFO

Article history

Received Date: Feb 24th, 2020

Revised Date: May 27th, 2020

Accepted Date: Aug 26th, 2020

Keywords:

fliC gene

Grass-Jelly

Salmonella typhi

ABSTRACT

Grass-jelly is one of the most popular plants consumed by people in various forms. Contamination can cause various diseases, one of those is typhoid fever by *Salmonella typhi*. The purpose of this study was to detect *S. typhi* in grass-jelly based on molecular detection by amplification of the *fliC* gene using PCR. Validation was done by culture methods on SSA media and biochemical testing. The *fliC* gene amplification results in grass-jelly samples (A1, A2, B1, B2, C1, and C3) showed the DNA fragments size of about 1500 bp. Colony and biochemical characters isolate Peterongan were lead to *S. typhi*, whereas another isolate was another *Salmonella* spp. Grass-jelly samples from the Peterongan market in Semarang were positively contaminated by *S. typhi* and isolate from Pedurungan and the minimarket was another *Salmonella* spp. Molecular-based food testing is fast enough and accurate for detecting types of bacterial contaminants but the amplification of only the *fliC* gene cannot specific for *S. typhi*.

3

[This is an open-access article under the CC-BY-SA license.](#)



*Corresponding Author:

Sri Darmawati

Universitas Muhammadiyah Semarang, Departement Magister of Medical Laboratory
 Science, Indonesia

Email: ciciekdarma@unimus.ac.id



1. INTRODUCTION

Grass-jelly or commonly called cincau is a gel-like jelly that is processed from soaking certain plant leaves in water. The gel is formed because the carbohydrate content in the leaves is bind to water molecules.¹ In general, there are 2 types of grass-jelly on the market one of those is black grass-jelly, commonly called janggolan made from the leaves of *Mesona palustris* has fiber content that is useful for human digestion and green grass-jelly from the

leaves of *Premna oblongifolia* has several active compounds to relieve sore throat and keep blood pressure stable.² Both have a distinctive aroma and taste characters and both are popular drink mixes in the community.

The process of making grass-jelly recently is mostly done conventionally. It is food processing that was done traditionally with the usual procedures without good manufacturing practices such as the hygiene process. In order, the contamination of microorganisms can occur in grass-jelly due to several factors such as water for processing, pieces of equipment, and processing facilities, as well as people doing the processing.³ This condition factors causing contamination by various pathogenic bacteria to black grass-jelly that sold in the market, one of which is *S. typhi* that causes typhoid fever.

A study on the identification of microbial contamination in grass-jelly at Wonodri Market, Semarang has been done.⁴ The results of the study using culture methods and biochemical tests showed that there was contamination by *S. paratyphi A*, *Proteus mirabilis*, *Klebsiella oxytoca* and *Citrobacter diversus*.⁵ stated that in Dr. Kariadi Hospital in Semarang city, population typhoid fever was associated with poor housing and inadequate food and personal hygiene. Based on the National Food and Drug Agency⁶ Regulation No. 13 of 2019 concerning Maximum Limits of Microbial Contamination in Food should not contain *Salmonella sp.*, in the Fruit-Based Dessert Includes Fruit-Based Water-Based Dessert Food that is black and green grass-jelly included in it. Therefore a fast and accurate detection of the *Salmonella spp* group is needed to be done.

Salmonella is a broad spectrum of disease-causing bacteria. They can cause significant morbidity, and in some cases, death in humans and animals.⁷ *S. enterica serovar typhi* or commonly called *S. typhi* is a rod-shaped, solitary, flagellar bacteria (peritric type or around on the entire cell surface), Gram-negative, intracellular bacteria, including in the family *Enterobacteriaceae*, causes typhoid fever and gastroenteritis in humans, with mild to severe clinical symptoms.^{8,9} This bacterium has somatic antigen O composed of lipopolysaccharides, flagellate antigens or H antigens composed of flagellin proteins, Vi capsule antigens composed of carbohydrates and fimbriae antigens composed of fillins protein.^{8,10} The gene that codes for the flagellin protein in *S. Typhi* is the *fliC* gene.¹¹

The *fliC* gene in *S. typhi* has a unique sequence and size. The *S.typhi* H1 antigen consists of 2 serovars namely H1-d which is widespread in the world and H1-j which is only found in Indonesia. Both are encoded by the *fliC* gene that is on the bacterial chromosome, but the *fliC* gene that encodes the j antigen has deletion 251 bp which results in changes in shape in the antigen epitope of the flagel.¹² The study by amplification *fliC* gene with primer LPW 1857 Forward and LPW 1857 Reverse showed DNA about 1260 bp using *S. typhi* isolates from Salatiga and different from 9 other strains about 1500 bp.¹³ Similar studies have also conducted the results showed that the flagellin *fliC* gene had a DNA band size of 1260 bp.^{12,14} Previous research conducted by results showed the flagellin *fliC* gene had a DNA size of 1260 bp.^{12,14} The purpose of this study was to detect contamination of *S. typhi* in grass-jelly from a traditional market in Semarang based on molecular detection by amplification of the *fliC* gene using PCR.

2. MATERIAL AND METHOD

The samples in this study were black grass-jelly from two traditional markets in Semarang, namely Pedurungan Market, Peterongan Market, and one of the branded packaging products from a minimarket. The research was conducted at the Laboratory of Molecular Biology and Microbiology of Program of Study in Medical Laboratory Technology, Universitas Muhammadiyah Semarang.

DNA extraction

The sample came from 1 g of grass-jelly homogenized with 9 ml physiological NaCl then inoculated to the Brain Heart Infusion (BHI) slant agar medium and incubated 24 hours in 37°C. The growing colonies were then inoculated into 15 ml BHI broth media with 24-hour incubation in 37°C. After that, centrifuged 3000 RPM for 15 minutes to get pellets.

The DNA extraction protocol uses Phenol Chloroform Isoamyl Alcohol (PCIA) with composition 25:24:1. Pellets biomass added 750 μ l lysis buffer (100 mM NaCl, 100 mM Tris-HCl pH 8, 50 mM EDTA, 2% SDS) and added 20 proteinase-K 10 mg/ml, then incubated at 55 °C in a water bath for 1 hour with shaking every 10 minutes. After incubation, the solution was centrifuged at 3000 RPM for 15 minutes. The supernatant was taken and added 700 μ l PCIA (1:1) then centrifuged at 3000 RPM for 15 minutes. Furthermore, the aqueous phase in the supernatant is transferred to new conicals and cold absolute ethanol (1:1) was added then thread-like DNA will form. The DNA was transferred to a new microtube tube. Then washed with 500 μ l 70% ethanol 3 times. After that, let dry and added with 50 μ l Tris-EDTA (TE).

Analyze quality of genomic DNA by 1% agarose electrophoresis

Agarose gel was made with a concentration of 1%. The DNA dye used SBYR safe. Buffer electrodes used Tris Acetic-EDTA (TAE). The sample was mixed with loading dye and then put in a gel pit. The electrophoresis was run with a voltage of 100 volts for 30 minutes.

DNA amplification

The Polymerase Chain Reaction (PCR) mix was made in a total volume of 25 μ l containing 12.5 μ l master mix (Promega) kits, Forward primers (5'-TTAACGCAGTAAAGAGAGACGTT-3') and Reverse (5'-ATGGCACAAGTCATTAATACAA-3')¹⁴ each 2 μ l, DNA template 1 μ l and nuclease-free water 7.5 μ l. The thermal cycler settings are predenaturation 95 °C for 4 minutes, denaturation 95 °C for 30 seconds, annealing 48 °C for 30 seconds, extension 72 °C for 2 minutes, with the PCR cycle repeated 35 times. Post extension 72 °C for 10 minutes, then temperature 4 °C for 10 minutes to maintain PCR product stability.

Analysis of PCR results with 2% agarose electrophoresis

Agarose gel was made with a concentration of 2%. The DNA dye used is SBYR safe. Buffer electrodes used TAE. The PCR sample was inserted into the wells and used a 100 bp (Vivantis) DNA marker. The electrophoresis was run with a voltage of 100 volts for 60 minutes.

Inoculation and culture in *Salmonella Shigella* Agar (SSA) media

Grass-jelly samples are homogenized first. The homogenate sample was put into a test tube and added physiological NaCl in the ratio of 1:9 (sample 1 g, physiological NaCl 9 ml). After being homogeneous it is put into BHI broth media. Incubated for 24 hours at 37 °C. Then cultured on SSA agar, incubated for 24 hours at 37 °C. Morphological characters of the growing colonies were observed, such as color, shape, size, edge, consistency, and elevation.

Biochemical testing

S. typhi suspected colonies with a black center in SSA were cultured on biochemical test media, those were Indol, Methyl Red (MR), Voges Proskauer (VP), Citrate, Motility, Urea and Triple Sugar Iron Agar (TSIA) incubated at 37 °C for 24 hours.

In silico PCR

In silico PCR analysis used website <http://insilico.ehu.eus/>¹⁵ then the sequences from the primer pair were added. These primers analyze in All strains of Genus *Salmonella*.

3. RESULTS AND DISCUSSION

Identification of *S. typhi* contamination in grass-jelly samples is needed to provide protection to consumers and prevent typhoid fever. In the two traditional markets of Semarang City (Pasar Pedurungan and Peterongan) that we observed, the process of selling black grass-jelly was placed in an open condition, exposed to dirty market air, dust, and flies attached to grass-jelly. This allows the contamination of microorganisms.

Grass-jelly samples were taken from Pedurungan Market (A1 and A2), Peterongan Market (B1 and B2), and one of the branded packaging products from minimarket (C1 and

C2) in Semarang City as a comparison of grass-jelly in factory packaging. This market location was chosen because it is the place most visited by the people to buy grass-jelly.

There were 2 steps carried out in this study, the molecular identification stage and the validation stage. The molecular identification stage was by testing the DNA of *S. Typhi* in grass-jelly samples using PCR based on the *fliC* gene. The validation stage was a bacterial culture method from grass-jelly samples using selective media and biochemical tests.

The results of genomic DNA extraction got genomic DNA (gDNA) isolates obtained from suspected *Salmonella* culture from grass-jelly samples visualized using agarose electrophoresis 1% in 100 volts for 30 minutes. The genomic DNA is closest to the good gel because of its large DNA size (Figure 1. A). DNA fragments under the genome bands were might be extrachromosomal DNA such as plasmids. DNA fragments that migrate to the bottom of the gel were suspected debris from cell proteins or protease enzymes while the smears formed are likely short pieces of DNA or RNA.

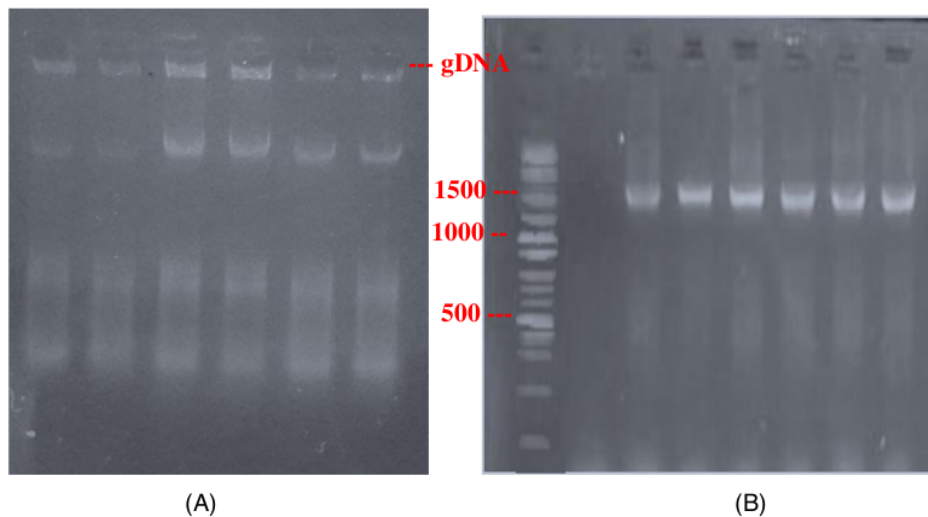


Figure 1. Visualization of genomic DNA (A) and PCR products (B) from isolates culture

Primers that are used have specificity on the sequenced of *fliC* gene. The *fliC* and *fliB* genes play a role in the synthesis of flagellin proteins that compose bacterial cell flagella.¹⁶ The results of amplification DNA isolates from grass-jelly based on *fliC* gene primer visualized using agarose electrophoresis 2% showed a single DNA fragment size around 1500 bp (Figure 1. B). This is in correspondence with another research.^{12,13,14}

In silico PCR analysis from <http://insilico.ehu.eus/>¹⁵ using sequences from the primer pair, showed the results of amplified the *fliC* gene with a size of 1521 bp in *S. typhi* strain (Figure 2). The sequence database is derived from the Multiple Drug Resistant (MDS) *Salmonella enterica serovar typhi* CT18.¹⁷ We used *in silico* PCR to matched the size of the PCR product that resulted in this research with the database reference.

```

Primer 1 -> 5'-TTACCGCATTAAGGAGGAGCGTT-3'
Primer 2 -> 5'-ATGGCCAAAGTCATTATACAAC-3'
No mismatches allowed. View
Selected strains
1 - Salmonella bongori H268-08
2 - Salmonella bongori HCTC 12419
3 - Salmonella enterica subsp. arizonae serovar 62:24,23:--
4 - Salmonella enterica subsp. enterica Serovar Cutana str. CFSAN002059
5 - Salmonella enterica subsp. enterica serovar Agona str. 24249
6 - Salmonella enterica subsp. enterica serovar Agona str. 5L483

```

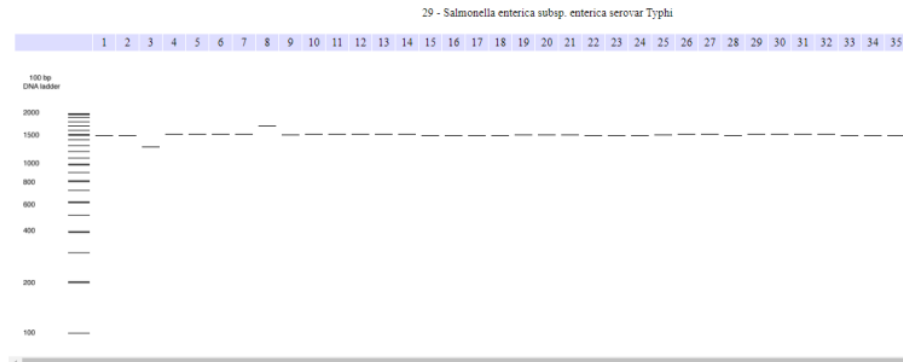


Figure 2. *In silico* amplification of *FliC* gene using primer pairs LPW 1857 from all *Salmonella* genome in a database (<http://insilico.ehu.eus/>)

Molecular identification of *Salmonella* contamination in samples of juice drinks at the Wonodri traditional market, Semarang, was previously conducted it resulted in 3 of 16 fruit juice samples in Gunung Pati District of Semarang were Positive of *Salmonella*.¹⁸ The test uses primers for *invA1* and *invA2* genes that produce 244 bp DNA amplification. Therefore, the study of development primers target for detecting specific genes in certain pathogenic bacteria needs to be carried out. Developing specific primers is important to detect specific bacteria such as the pathogenic strains, so the molecular detection results are precise on target.



Figure 3. Morphology of culture colonies resulted on SSA media

SSA is a bacterial medium that uses lactose as a source of carbohydrates, contains a color indicator of pH changes is Neutral Red, and contains ferric citrate as an indicator of H₂S gas formation. Interpretation of the results of bacterial culture samples on SSA media that were colorless or transparent colony because does not ferment lactose and was able to produce black sediment due to producing H₂S (Figure 3). A colony that had the character of *Salmonella typhi* which is the black center was used for biochemical testing.^{9,19}

Interpretation of the biochemical results of three samples with double repetitions showed differences (Table 1). The indole test was negative because a pink ring did not form when the Kovach reagent was added. Kovac or Erlich reagents containing hydrochloric acid and p-dimethylaminobenzaldehyde in amyl alcohol will react with indole derived from tryptophan hydrolysis by showing pink color.⁹ MR test result in isolates from Pedurungan and

minimarket were negative because there was no red color when Methyl Red reagent was added but in Peterongan isolates were positive. Methyl red is an indicator of organic acids at pH 4.5 and below to indicate the fermentation of glucose. All *S. typhi* isolate was negative in the indole test result and *S. typhi* isolates from Peterongan Market had positive Methyl Red result while others were negative.

The results of the VP test were negative in isolates from Peterongan and minimarket because no red color was formed when the α -Naphthol reagent and 40% KOH were added but in Pedurungan isolates were positive. VP test to see the presence of acetyl-methyl carbinol (acetoin) production from glucose fermentation. Acetoin will be reacted with 40 % KOH to form diacetyl then diacetyl and the guanidine group in the media will be reacted with α -naphthol which will produce condensation showing pink color. Citrate test results were negative because all isolate could not turn media to blue due it uses a color indicator for changing the pH of Bromothymol Blue (BTB). The citrate test is to determine the ability of microorganisms to use citrate for carbon compounds as an energy source. When a bacterium uses citrate, the ammonium salt will be converted to alkaline ammonia so that the pH in the media increases, and the BTB indicator will show blue.⁹ *S. typhi* isolates from Pedurungan Market had a positive result in VP test while others were negative. All *S. typhi* isolates had a negative result in the citrate test.

Motility test using semisolid media with 0.4% agar and Triphenyltetrazolium Chloride (TTC), the results were positive because the media turned turbid and red color formed on the puncture marks from the TTC reaction that showed cell movement. Urea test results were negative because all parts of the media did not turn pink. TSIA results were Alkaline/Acid and H₂S (+), which means red on the slope because it does not ferment sucrose and lactose, while a yellowish black color at the bottom of the media due to glucose fermentation and H₂S formation. Whereas gas formation in Pedurungan and minimarket isolates were positive but in Peterongan isolates were negative.

Table 1. Result of biochemical testing from colony cultures such Indol, MR, VP Citrate, motility, urea, and TSIA test

Biochemical test	Pedurungan Market		Peterongan Market		Minimarket		<i>S. typhi</i> (Hall and Woods, 2017)
	A1	A2	B1	B2	C1	C2	
Indol	-	-	-	-	-	-	-
MR	-	-	+	+	-	-	+
VP	+	+	-	-	-	-	-
Citrate	-	-	-	-	-	-	-
Motility	+	+	+	+	+	+	+
Urea	-	-	-	-	-	-	-
TSIA	Alkaline/ Acid and H ₂ S (+), gas (+)	Alkaline/ Acid and H ₂ S (+), gas (+)	Alkaline / Acid and H ₂ S (+), gas (-)	Alkaline/ Acid and H ₂ S (+), gas (-)	Alkaline / Acid and H ₂ S (+), gas (+)	Alkaline/ Acid and H ₂ S (+), gas (+)	Alkaline/ Acid and H ₂ S (+), gas (-)

Biochemical test results can represent the physiological characteristics of certain bacteria. Based on the results of biochemical tests in this study, isolates from the Peterongan market matched with the characteristics of *S. typhi*^{9,19} supported by the *fliC* gene amplification result. Biochemical identification test results and colony culture on SSA media were used as a comparison of the results of the amplification *fliC* gene in DNA isolated from grass-jelly samples. Identification of *S. typhi* using the *fliC* gene only without biochemical test is less specific because all other *Salmonella* isolates can also amplify the *fliC* gene by PCR.

Molecular-based food testing is fast enough and accurate to detect types of pathogenic bacteria contaminants qualitatively in food compared to culture methods and biochemical tests but the accuracy has to increase. As a result of [Table 1](#), we can see that isolates from Pedurungan and the minimarket have different biochemical characteristics with reference. For

increases the specificity we can use multiplex PCR with more than one primer such for detecting *S. Typhi* we can use genes such *rfbE*, *fliB*, *fliC* and *invA1*, and *invA2*.^{20,21} However, the use of conventional PCR methods has limitations that can only be used to detect types of bacteria but are unable to count the number of bacterial cells. The method for detecting and calculating the predicted number of bacteria can be done by Quantitative PCR (qPCR).^{22,23,24,25}

Based on the results of this study grass-jelly samples from two traditional markets and one branded packaging product, both were positive for *S. typhi*. In traditional markets it was observed that the process of selling black grass-jelly was placed in an open condition, exposed to air, dust, and the presence of flies attached to grass-jelly so that it was suspected to be a source of contamination beside from its conventional processing. Whereas the branded grass-jelly sample from a minimarket should not contain *S. typhi* because it is more controlled by the regulation of the Good Manufacturing Practice (GMP) system of industrial companies.²⁶ Suspected contamination in branded food samples was predicted comes from suppliers, storage processes, mixing, filling, or packaging processes in the company.²⁷ From the findings of *S. typhi* in the sample, manufacturing companies must improve and pay attention to the hygiene in the manufacturing process to maintain product safety.

4. CONCLUSION

In this study it can be concluded that the three grass-jelly samples from the Peterongan Market were contained *S. typhi* contamination and isolate from Pedurungan and minimarket were *Salmonella* spp. The method of identification pathogenic bacteria of *S. typhi* on food used amplification of *fliC* gene cannot be specific in *S. typhi* because isolates that have different biochemical characters from the *S. typhi* reference remain amplified so reducing the accuracy of the results.

DISCLOSURE STATEMENT

The authors declare that they have no conflict of interest.

ACKNOWLEDGEMENT

The acknowledgment was given to the Medical Laboratory Technology Study Program, Faculty of Nursing, and Health Sciences who have been willing to provide research facilities and reagen.

FUNDING INFORMATION

The authors declared that this case has received no financial support.

REFERENCES

1. Pitojo S, Zumiati. *Cincau : Cara Pembuatan Dan Variasi Olahannya*. Tangerang: PT. Agromedia Pustaka; 2005.
2. Tri Dewanti Widyarningsih. *Cincau Hitam*. Surabaya: Trubus Agrisarana; 2007.
3. Sapers GM. Disinfection of Contaminated Produce with Conventional Washing and Sanitizing Technology. In: *The Produce Contamination Problem*. Second Edi. Elsevier; 2014:389-431. doi:10.1016/B978-0-12-404611-5.00017-8.
4. Muslina S. Identifikasi *Salmonella sp.* Pada Cincau yang Dijual Di Pasar Wonodri Semarang Selatan. 2005.
5. Gasem MH, Dolmans WMVWM V., Keuter MM, Djokomoeljanto RR. Poor food hygiene and housing as risk factors for typhoid fever in Semarang, Indonesia. *Trop Med Int Heal*. 2001;6(6):484-490. doi:10.1046/j.1365-3156.2001.00734.x.
6. BPOM. Summary for Policymakers. In: Intergovernmental Panel on Climate Change, ed. *Climate Change 2013 - The Physical Science Basis*. Cambridge: Cambridge University Press; 2019:1-30. doi:10.1017/CBO9781107415324.004.
7. Eng S-K, Pusparajah P, Ab Mutalib N-S, Ser H-L, Chan K-G, Lee L-H. *Salmonella : A review on pathogenesis, epidemiology and antibiotic resistance*.

- Front Life Sci.* 2015;8(3):284-293. [doi:10.1080/21553769.2015.1051243](https://doi.org/10.1080/21553769.2015.1051243).
8. Abatcha MG, Zakaria Z, Goni DM, Kaur DG. [Typing of Salmonella Species: A Mini-Review](#). *J Nat Sci Res.* 2014;4(5):13-17.
 9. Hall GS, Woods GL. *Chapter 58 - Medical Bacteriology*. Twenty Thi. Elsevier Inc.; 2017. [doi:10.1016/B978-0-323-29568-0.00058-9](https://doi.org/10.1016/B978-0-323-29568-0.00058-9).
 10. Brenner FW, Villar RG, Angulo FJ, Tauxe R, Swaminathan B. Salmonella nomenclature. *J Clin Microbiol.* 2000;38(7):2465-2467. [doi:10.1128/JCM.38.7.2465-2467.2000](https://doi.org/10.1128/JCM.38.7.2465-2467.2000).
 11. McQuiston JR, Parrenas R, Ortiz-Rivera M, Gheesling L, Brenner F, Fields PI. Sequencing and Comparative Analysis of Flagellin Genes *fliC*, *fliB*, and *flpA* from Salmonella. *J Clin Microbiol.* 2004;42(5):1923-1932. [doi:10.1128/JCM.42.5.1923-1932.2004](https://doi.org/10.1128/JCM.42.5.1923-1932.2004).
 12. Baker S, Holt K, van de Vosse E, et al. High-Throughput Genotyping of Salmonella enterica Serovar Typhi Allowing Geographical Assignment of Haplotypes and Pathotypes within an Urban District of Jakarta, Indonesia. *J Clin Microbiol.* 2008;46(5):1741-1746. [doi:10.1128/JCM.02249-07](https://doi.org/10.1128/JCM.02249-07).
 13. Darmawati S, Prastiyanto ME. [Analisis Kekerabatan Salmonella typhi Asal Jateng dan Yogyakarta Berdasarkan Sekuens Gen Flagellin fliC](#). 2014:148-156.
 14. Lau SKP, Woo PCY, Chan CYF, Woo W-L, Woo GKS, Yuen K-Y. Typhoid Fever Associated with Acute Appendicitis Caused by an H1-j Strain of Salmonella enterica Serotype Typhi. *J Clin Microbiol.* 2005;43(3):1470-1472. [doi:10.1128/JCM.43.3.1470-1472.2005](https://doi.org/10.1128/JCM.43.3.1470-1472.2005).
 15. Bikandi J, Millan RS, Rementeria A, Garaizar J. In silico analysis of complete bacterial genomes: PCR, AFLP-PCR and endonuclease restriction. *Bioinformatics.* 2004;20(5):798-799. [doi:10.1093/bioinformatics/btg491](https://doi.org/10.1093/bioinformatics/btg491).
 16. Schreiber F, Kay S, Frankel G, et al. The Hd, Hj, and Hz66 flagella variants of Salmonella enterica serovar Typhi modify host responses and cellular interactions. *Sci Rep.* 2015;5(1):7947. [doi:10.1038/srep07947](https://doi.org/10.1038/srep07947).
 17. Parkhill J, Dougan G, James KD, Parkhill J, Dougan G, James KD, et al. Complete genome sequence of a multiple drug resistant Salmonella enterica serovar Typhi CT18. *Nature.* 2001;413(October):848-852. [doi:10.1038/35101607](https://doi.org/10.1038/35101607).
 18. Hermono BAS, Bintari SH, Mustikaningtyas D. [Identifikasi Salmonella sp Pada Jajanan Jus Buah di Kecamatan Gunungpati Semarang dengan PCR](#). *J MIPA.* 2017;40(2):68-73.
 19. Garrity GM. [Bergey's manual of systematic bacteriology](#), Second edition. Volume two: The Proteobacteria, Part B: Gammaproteobacteria. *Springer-Verlag New York Inc.* 2005;2:883-904.
 20. Woo PCY, Fung AMY, Wong SSY, Tsoi H-W, Yuen K-Y. Isolation and Characterization of a Salmonella enterica Serotype Typhi Variant and Its Clinical and Public Health Implications. *J Clin Microbiol.* 2001;39(3):1190-1194. [doi:10.1128/JCM.39.3.1190-1194.2001](https://doi.org/10.1128/JCM.39.3.1190-1194.2001).
 21. Waturangi DE, Wiratama E, Theresia AS. Prevalence and molecular characterization of Salmonella enterica serovar Typhimurium from ice and beverages in Jakarta, Indonesia. *BMC Res Notes.* 2019;12(1):45. [doi:10.1186/s13104-019-4065-y](https://doi.org/10.1186/s13104-019-4065-y).
 22. Nadkarni MA, Martin FE, Jacques NA, Hunter N. Determination of bacterial load by real-time PCR using a broad-range (universal) probe and primers set. *Microbiology.* 2002;148(1):257-266. [doi:10.1099/00221287-148-1-257](https://doi.org/10.1099/00221287-148-1-257).
 23. Botes M, de Kwaadsteniet M, Cloete TE. Application of quantitative PCR for the

- detection of microorganisms in water. *Anal Bioanal Chem.* 2013;405(1):91-108. [doi:10.1007/s00216-012-6399-3](https://doi.org/10.1007/s00216-012-6399-3).
24. Gunawan AP, Djuminar A, Ernawati E, Chaidir L. Pengembangan Prekultur Oxgall sebagai Sampel Klinis untuk Deteksi Salmonella typhi dengan Metode Real-time PCR. *J Teknol Lab.* 2018;7(2):71-77. [doi:10.29238/teknolabjournal.v7i2.127](https://doi.org/10.29238/teknolabjournal.v7i2.127).
 25. Kralik P, Ricchi M. A Basic Guide to Real Time PCR in Microbial Diagnostics: Definitions, Parameters, and Everything. *Front Microbiol.* 2017;8(FEB):1-9. [doi:10.3389/fmicb.2017.00108](https://doi.org/10.3389/fmicb.2017.00108).
 26. Prasetyo A. *Analisis Good Manufacturing Practice Olahan Pangan*. Jakarta: Indocamp; 2017.
 27. Winarno FG. *GMP (Good Manufacturing Practice) : Cara Pengolahan Pangan Yang Baik*. Bogor: M-Brio Press; 2011.

SHORT BIOGRAPHY



Aditya Rahman ERNANTO. He graduated from Universitas Gadjah Mada, Faculty of Biology in 2017, focused study on Genetics and Molecular Biology. He worked as a lecturer in Universitas Muhammadiyah Semarang, Faculty of Nursing and Health Science since 2018 focus study on Molecular Biology and Microbiology.



Junita Rensa PALIMBONGAN. She was born in Nabire, Papua in 1996. She graduated from D-IV Technology Laboratory Technology Faculty of Nursing and Health Science in 2019. She is working in The General Hospital of the Nabire, Papua district.



Anjar Richardo MANUFANDU. He has been undergraduate student in D-IV Technology Laboratory Technology Faculty of Nursing and Health Science since 2017. He work as assistant laboratory in Molecular Biology Laboratory.



Sri DARMAWATI. She is an associate professor in the Medical Laboratory Science Magister Program Universitas Muhammadiyah Semarang, a lecturer and researcher on Microbiology and Biomolecular field. She was passionate about research on special genetic diversity of Salmonella typhi

Isolation, Identification Similarity And Qualitative Expression Of Metallothionein Gene in IR-Bagendit Rice (Oryza sativa)

ORIGINALITY REPORT

6%

SIMILARITY INDEX

5%

INTERNET SOURCES

4%

PUBLICATIONS

2%

STUDENT PAPERS

PRIMARY SOURCES

1	www.freepatentsonline.com Internet Source	1%
2	repository.untad.ac.id Internet Source	1%
3	www.hilarispublisher.com Internet Source	<1%
4	biotechnologyforbiofuels.biomedcentral.com Internet Source	<1%
5	www.science.gov Internet Source	<1%
6	edepot.wur.nl Internet Source	<1%
7	A M. Omar, Abdelmoniem M. Abdelmoniem, F El-Wekeel. "Microbial Degradation of Ancient Wood Housed in Cheops Boat Museum and Methods of Its Control", Research Square, 2021 Publication	<1%

8

Gelareh Nasiri, Amir Peymani, Taghi Naserpour Farivar, Peyman Hosseini.

"Molecular epidemiology of aminoglycoside resistance in clinical isolates of *Klebsiella pneumoniae* collected from Qazvin and Tehran provinces, Iran", *Infection, Genetics and Evolution*, 2018

Publication

<1 %

9

Submitted to Michigan State University

Student Paper

<1 %

10

Submitted to University of Portsmouth

Student Paper

<1 %

11

archiv.ub.uni-heidelberg.de

Internet Source

<1 %

12

SÃ©bastien P. Faucher, Charles Viau, Pierre-Paul Gros, France Daigle, HervÃ© Le Moual. "The *prpZ* gene cluster encoding eukaryotic-type Ser/Thr protein kinases and phosphatases is repressed by oxidative stress and involved in *Salmonella enterica* serovar Typhi survival in human macrophages", *FEMS Microbiology Letters*, 2008

Publication

<1 %

13

academic.oup.com

Internet Source

<1 %

14

bmcinfectdis.biomedcentral.com

Internet Source

<1 %

15

vi.scribd.com

Internet Source

<1 %

16

doi.org

Internet Source

<1 %

17

uwe-repository.worktribe.com

Internet Source

<1 %

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off