

DAFTAR PUSTAKA

- Andrecka, J., Lewis, R., Brückner, F., Lehmann, E., Cramer, P., & Michaelis, J. (2008). Single-molecule tracking of mRNA exiting from RNA polymerase II. *Proceedings of the National Academy of Sciences*, 105(1), 135-140.
- Brennan, P. J., Young, D. B., Robertson, B. D., Andersen, P., Barry III, C. E., & Britton, W. (2008). Handbook of anti-tuberculosis agents. *Tuberculosis*, 88(2), 85-170.
- Bolly, H. M. B., & Ngili, Y. (2016). Analysis of mutations in the *rpoB* and *katG* gene through the study of multiplex PCR and nucleotide sequence analysis in patients with TB in Jayapura-Indonesia. *Der Pharma Chemica*, 8(14), 19–24.
- Chandra-Yowani, S., Sukardika, I. K., Mantik-Astawa, I. N., & Junitha, I. K. (2012). Mutations in 1700 bp fragment of *rpoB* gene of multidrug-resistant *Mycobacterium tuberculosis* isolate. *Indonesian Journal of Biomedical Sciences*, 6(2), 43–46.
- Chai, Q., Zhang, Y., & Liu, C. H. (2018). *Mycobacterium tuberculosis*: an adaptable pathogen associated with multiple human diseases. *Frontiers in cellular and infection microbiology*, 8, 158.
- Chaidir, L., Ruesen, C., Dutilh, B. E., Ganiem, A. R., Andryani, A., Apriani, L., Huynen, M. A., Ruslami, R., Hill, P. C., van Crevel, R., & Alisjahbana, B. (2019). Use of whole-genome sequencing to predict *Mycobacterium tuberculosis* drug resistance in Indonesia. *Journal of Global Antimicrobial Resistance*, 16, 170–177.
- Cita, Y. P., & Putri, D. H. (2017). Analisis Mutasi pada Kodon 531 Pada Gen Rpob *Mycobacterium tuberculosis* Penyebab Resistensi Rifampisin. *JURNAL ILMU KEFARMASIAN INDONESIA*, 15(2), 140-147.
- Erawati, M., Widayastiti, N. S., Winarni, T. I., & Dharmana, E. (2019). β -glucan increases IFN- γ and IL-12 production of peripheral blood mononuclear cells with/without induction of *Mycobacterium tuberculosis* wild-type/mutant DNA. *The Indonesian Biomedical Journal*, 11(2), 200–204.
- Erawati, M., Kusumaningrum, N. S. D., & Andriany, M. (2017). Mutations in the RpoB gene of multidrug-resistant *Mycobacterium tuberculosis* isolates from Semarang, Indonesia. *International Journal of Molecular and Clinical Microbiology*, 7(2), 816–823.

- Hillemann, D., Rüsch-Gerdes, S., & Richter, E. (2005). Rapid detection of rifampin resistance in *Mycobacterium tuberculosis* complex strains by a line probe assay. *Journal of Clinical Microbiology*, 43(8), 3699-3703.
- Irianti, D., & Mada, A. (2018). Identifikasi *Mycobacterium tuberculosis* dan resistensi antibiotik. *Jurnal Kesehatan Lingkungan*, 14(2), 145-152.
- Jinyi, W., Zhang, Y., Wang, K., & Peng, P. (2024). Global, regional, and national mortality of tuberculosis attributable to alcohol and tobacco from 1990 to 2019: A modelling study based on the Global Burden of Disease study 2019. *Journal of Global Health*, 14, 04023.
- Kolyva, A. S., & Karakousis, P. C. (2012). Old and new TB drugs: mechanisms of action and resistance. *Understanding Tuberculosis-New approaches to fighting against drug resistance*, 209-232.
- Maladan, Y., Wahyuni, T., & Krismawati, H. (2021). Single nucleotide polymorphism in the gene *rpoB* *Mycobacterium tuberculosis* from Papua-Indonesia and its impact on rifampicin resistance: A whole-genome sequencing analysis. *Microbiology Indonesia*, 15(2), 37–44.
- Skalska, L., Beltran-Nebot, M., Ule, J., & Jenner, R. G. (2017). Regulatory feedback from nascent RNA to chromatin and transcription. *Nature reviews Molecular cell biology*, 18(5), 331-337.
- Suresh, N., Singh, U. B., Arora, J., & Pant, H. (2018). Genetic mutations associated with rifampicin and isoniazid resistance in *Mycobacterium tuberculosis*. *Frontiers in Microbiology*, 9, 968.
- Skolnik, D. A., & Wallace, J. W. (2010). Critical assessment of interstory drift measurements. *Journal of structural engineering*, 136(12), 1574-1584.
- Syafira, S. Z., Zavitri, N. G., Yan, S., Sribudiani, Y., Lezhava, A., & Chaidir, L. (2020). Positivity rate of pyrosequencing to diagnose drug-resistant tuberculosis directly from sputum with different bacterial load. *The Indonesian Biomedical Journal*, 12(4), 313–319.
- Rahman, I. W., Arfani, N., Faisal, M. W., Kesrianti, A. M., Fadlila, R. N., & Rantisari, A. M. D. (2022). Analisis mutasi gen *rpoB* sebagai penanda resistensi rifampisin pada penderita tuberkulosis paru di BBKPM Makassar. *Sang Pencerah: Jurnal Ilmiah Universitas Muhammadiyah Buton*, 8(2), 353–362.
- Tania, T., Sudarmono, P., Kusumawati, R. L., Rukmana, A., Pratama, W. A., Regmi, S. M., Kaewprasert, O., Chaiprasert, A., Chongsuvivatwong, V., & Faksri, K. (2020). Whole-genome sequencing analysis of multidrug-resistant

Mycobacterium tuberculosis from Java, Indonesia. *Journal of Medical Microbiology*, 69(7), 1013–1019. <https://doi.org/10.1099/jmm.0.001221>

Telenti, A., Imboden, P., Marchesi, F., Lowrie, D., Cole, S., Colston, M. J., ... & Bodmer, T. (2023). Detection of rifampicin-resistance mutations in *Mycobacterium tuberculosis*. *The Lancet*, 341(8846), 647-650.

Wade, M. M., & Zhang, Y. (2004). Mechanisms of drug resistance in *Mycobacterium tuberculosis*. *Front Biosci*, 9(11), 975-94.

Wijaya, M. D., Rusyanthini, E. P., Pradnyaniti, D. G., Komalasari, K. T., & Sunarti, L. P. S. (n.d.). *Identifikasi mutasi gen rpoB pada isolat Mycobacterium tuberculosis multidrug resistant dengan metode nested polymerase chain reaction*. Universitas Udayana.

Wiradiputra, M. R. D., Yowani, S. C., & Wirajana, I. N. (2016). Deteksi mutasi kodon 510 dan 511 daerah RRDR gen *rpoB* pada isolat klinik *Mycobacterium tuberculosis* multidrug resistant di Bali dengan PCR-restriction fragment length polymorphism. *Cakra Kimia (Indonesian E-Journal of Applied Chemistry)*, 4(2), 161–167.

World Health Organization (WHO). (2021). Global Tuberculosis Report 2021. Geneva: World Health Organization.

World Health Organization (WHO). (2023). Global Tuberculosis Report 2023. Geneva: World Health Organization.

Yowani, S. C. (2021). Sebaran mutasi gen *rpoB* yang berperan dalam resistensi rifampisin pada *Mycobacterium tuberculosis*. *Jurnal Ilmu dan Teknologi Kesehatan*, 8(2), 102–109. <https://doi.org/10.31983/jitk.v8i2.8703>

Zaw, M. T., Emran, N. A., & Lin, Z. (2018). Mutations inside rifampicin-resistance determining region of *rpoB* gene associated with rifampicin-resistance in *Mycobacterium tuberculosis*. *Journal of infection and public health*, 11(5), 605-610.

Zhang, Y., Yew, W. W., & Barer, M. R. (2020). Targeting drug-resistant tuberculosis with new agents: from genetics to drug discovery. *Respirology*, 25(9), 905-915. <https://doi.org/10.1111/resp.138>

LAMPIRAN 1

KARTU KEPK/ EC



**Kementerian Kesehatan
Poltekkes Medan**
Komisi Etik Penelitian Kesehatan
Jalan Jamin Ginting KM. 13,5
Medan, Sumatera Utara 20137
(061) 8368633
<https://poltekkes-medan.ac.id>

KETERANGAN LAYAK ETIK
DESCRIPTION OF ETHICAL EXEMPTION
"ETHICAL EXEMPTION"

No.01.26.1405/KEPK/POLTEKKES KEMENKES MEDAN 2025

Protokol penelitian versi 1 yang diusulkan oleh :
The research protocol proposed by

Peneliti utama : Hotria Marito Situngkir
Principal Investigator

Nama Institusi : Kemenkes Poltekkes Medan
Name of the Institution

Dengan judul:
Title

"Studi Literatur: Peta Sebaran Mutasi Gen rpoB Terhadap Resistensi Rifampisin Isolat Mycobacterium tuberculosis"

"Distribution Map of rpoB Gene Mutations on Rifampicin Resistance of Mycobacterium tuberculosis Isolates"

Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksplorasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Consent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 04 Juli 2025 sampai dengan tanggal 04 Juli 2026.

This declaration of ethics applies during the period July 04, 2025 until July 04, 2026.

*July 04, 2025
Chairperson,*



Dr. Lestari Rahmah, MKT

00437/EE/2025/0159231271

LAMPIRAN 2

DAFTAR RIYAWAT HIDUP



Penulis lahir di Sagala Raja pada tanggal 17 Agustus 2005 dan anak keempat dari lima bersaudara dari ayah saya bernama Kosdin Situngkir dan ibu saya bernama Bunga Vera Sagala. Penulis tinggal di Sagala Raja, Dusun Pegagan Julu V, Kecamatan Sumbul, Kabupaten Dairi, Provinsi Sumatera Utara. Penulis memulai jenjang pendidikan dari SD Negeri 030353 Sileu Leu pada tahun 2010 hingga 2016, kemudian melanjutkan ke SMP Negeri 5 Sumbul dari tahun 2016 hingga 2019 dan juga pendidikan di SMA Negeri 1 Sumbul dari tahun 2019 sampai 2022. Penulis juga melanjutkan pendidikan di Kemenkes Poltekkes Medan jurusan Teknologi Laboratorium Medis sejak 2022-2025. Penulis memiliki hobi membaca, bernyanyi, dan berpetualang.

LAMPIRAN 3

KARTU BIMBINGAN KTI



Kementerian Kesehatan
Politekkes Medan
Jalan Jamin Ginting KM. 13,5
Medan, Sumatera Utara 20137
(061) 8460633
<https://poltekkes-medan.ac.id>

PRODI D-III JURUSAN TEKNOLOGI LABORATORIUM MEDIS POLTEKKES KEMENKES MEDAN

KARTU BIMBINGAN KARYA TULIS ILMIAH T.A. 2025

NAMA : Hotria Marito Situngkir
NIM : P07534022214
NAMA DOSEN PEMBIMBING : Febri Sembiring, S.Si, M.Si
JUDUL KTI : Peta Sebaran Mutasi Gen *rpoB*
Terhadap Resistensi Rifampisin
Isolat Mycobacterium
tuberculosis

No	Hari/ Tanggal Bimbingan	Materi Bimbingan	Paraf Dosen Pembimbing
1.	11 Januari 2025	Pengajuan Judul dan ACC Judul	✓
2.	24 Januari 2025	Pengajuan Bab I	✓
3.	31 Januari 2025	Perbaikan latar belakang dan tujuan penelitian	✓
4.	07 Februari 2025	Bimbingan Bab II-III	✓
5.	18 Februari 2025	Perbaikan Bab II-III	✓
6.	17 Februari 2025	ACC Proposal	✓
8.	14 Maret 2025	Revisi Proposal	✓
9.	09 Mei 2024	Diskusi Hasil Penelitian	✓
10.	19 Mei 2025	Bimbingan Bab IV-V	✓
11.	21 Mei 2025	Perbaikan Bab IV-V	✓
12.	23 Mei 2025	ACC KTI	✓

Medan, 23 Mei 2025
Dosen Pembimbing

Febri Sembiring, S.Si, M.Si
NIP. 196705051986032001

LAMPIRAN 4

LAMPIRAN TURNITIN KTI

KARYA TULIS ILMIAH HOTRIA SITUNGKIR.docx			
ORIGINALITY REPORT			
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
16%	15%	6%	4%
PRIMARY SOURCES			
1 www.scribd.com Internet Source			4%
2 text-id.123dok.com Internet Source			2%
3 repository.uinjkt.ac.id Internet Source			1%
4 ecampus.poltekkes-medan.ac.id Internet Source			1%
5 ejurnal.universitas-bth.ac.id Internet Source			1%
6 repository.unpad.ac.id Internet Source			1%
7 repo.poltekkesdepkes-sby.ac.id Internet Source			1%
8 repository.poltekkes-tjk.ac.id Internet Source			1%
9 docplayer.info Internet Source			<1%
10 Submitted to Academic Library Consortium Student Paper			<1%
11 123dok.com Internet Source			<1%
12 core.ac.uk Internet Source			<1%
13 vdocuments.site Internet Source			<1%
14 repository.ub.ac.id Internet Source			<1%
15 www.healthierindonesia.org Internet Source			<1%
16 eprints.umg.ac.id Internet Source			<1%
17 eprints.undip.ac.id Internet Source			<1%
18 rekayasasisipil.ub.ac.id Internet Source			<1%
19 repository.ummy.ac.id Internet Source			<1%
20 sipora.polije.ac.id Internet Source			<1%
21 www.coursehero.com Internet Source			<1%