

## DAFTAR PUSTAKA

- Amer, R. A., and Yasser, R. F. 2014. Hydrocarbonoclastic Marine Bacteria in Mediterranean Sea, EL-Max, Egypt: Isolation, Identification, and Site Characterization. *Jokul Journal.* 64(4): 223-249.
- Antriana, N. 2014. Isolasi Bakteri Asal Saluran Pencernaan Rayap Pekerja *Macrotermes* sp. *Jurnal Unej.* 16(1): 18-20.
- Amelia, N., dan Harmin, S. T. 2021. Kajian Pengaruh Penggunaan Biosurfaktan Rhamnolipida dan Surfaktin pada Proses Bioremediasi Tanah Tercemar Crude Oil. *Jurnal Teknik ITS.* 10(2): 76-81.
- Bezza, F. A. and Chirwa, E. M. N. 2015. Production and applications of lipopeptide biosurfactant for bioremediation and oil recovery by *Bacillus subtilis* CN2. *Biochemical Engineering Journal.* 101. 168-178.
- Balakrishnan, S., Narasingam, A., Marimuthu, R. R., Purushothaman, I., Nallusamy, V., Khalid, S. A., Saeedah, M. A., and Tse-Wei, C. 2022. Molecular characterization of biosurfactant producing marine bacterium isolated from hydrocarbon-contaminated soil using 16S rRNA gene sequencing. *Journal of King Saud University-Science.* 34: 1-5.
- Brooks, G. F., Jawetz, E., Melnick, J. L., and Adelberg, E. A. 2013. Jawetz, Melnick and Adelberg's Medical Microbiology. *Climate Change 2013 - The Physical Science Basis.* 53: 1-30.
- Cappuccino, J. G., dan Sherman, N. 2014. Manual Laboratorium Mikrobiologi. 8th edn. Buku Kedokteran EGC, Jakarta.
- Cookson, J.T. Jr. 1995. Bioremediation Engineering Design and Application. Mc Graw-Hill, Inc USA
- Dhabaan, A. F. A. 2019. Morphological, Biochemical and Molecular Identification of Petroleum Hydrocarbons Biodegradation Bacteria Isolated from Oil Polluted Soil in Dhahran, Saudi Arabia. *Saudi Journal of Biological Sciences.* 26: 1247-1252.
- Das, N., and Preethy, C. 2011. Microbial Degradation of Petroleum Hydrocarbon Contaminants: An Overview. *Biotechnology Research International*
- Ghyslain, B., Hyun, J. C., Hakho, L., and Ralph, W. 2012. A 'Magnetic' Gram Stain for Bacteria Detection. National Institutes of Health NCBI. 51(31): 587-590.
- 
tha, K., Ananya, S., Jenishia, M., Melita, A., Bharath, B., and P. S. 2020. Isolation and Characterization of Bacteria from Effluent for Degradation of Petroleum Crude Oil in Seawater. *Journal of Pure and Applied Microbiology.* 14(1): 473-484.
8. Mikroorganisme Pendegradasi TPH (Total Petroleum bon) Sebagai Agen Bioremediasi Tanah Tercemar Minyak Bumi

- Jurnal SainHealth.* 2(2): 35-42.
- Husain, D. R., M. Goutx, C. Bezac, M. Gilewicz, and J. C. Bertrand. 1997. Morphological Adaptation of Pseudomonas Nautica Strain 617 to Growth on Eicosane and Modes of Eicosane Uptake. *Letters in Applied Microbiology.* 24(1): 55–58.
- Irene, D. S., I Gusti, N. P. D., dan Ni, L. P. R. P. 2020. Identifikasi Bakteri yang Berpotensi Mendegradasi Hidrokarbon dari Substrat Mangrove dengan Tekstur. *Journal of Marine and Aquatic Sciences.* 6(2): 170–179.
- Khan, Ahmad, Brijdeep Singh, and Swaranjit Cameotra. 2014. Perspectives on Using Biosurfactants in Food Industry. *Biosurfactants:* 306–23.
- Kurniawan, A., dan Agus, J. E. 2014. Biodegradasi Residu Total Petroleum Hidrokarbon Dibawah Konsentrasi 1% (W/W) Hasil Proses Bioremediasi. *Jurnal Manusia dan Lingkungan.* 21(3): 286-294.
- Mohammadi, L., Abbas, R., Edris, B., Hamid, D., Abu, B. H.S., and George, Z. K. 2020. Petroleum Hydrocarbon Removal from Wastewaters: A Review. *Processes.* 8 (447): 1-34.
- Mandri, T., dan Lin. J. 2007. Isolation and characterization of engine oil degrading indigenous microrganisms in Kwazulu-Natal, South Africa. *African Journal of Biotechnology.* 6(1): 23-27.
- Mas'ud, A. 2018. Analisis Kemampuan Biodegradasi Hidrokarbon Petroleum Oleh Isolat Bakteri Laut Dari Kolom Air Pelabuhan Paotere Makassar Secara In Vitro. *Jurnal Ilmu Alam dan Lingkungan.* 9(17): 22-31.
- Murphy, C. W. M., Greg, B. D., John, L. R., Tom, W., Trevor, P. Bastow, A. P. B., Geoffrey, J. P., and Matthew, J. M. 2022. The role of predicted chemotactic and hydrocarbon degrading taxa in natural source zone depletion at a legacy petroleum hydrocarbon site. *Journal of Hazardous Materials.* 430: 1-12.
- Mishra, S., and Singh, S. N. 2012. Microbial degradation of n-hexadecane in mineral salt medium as mediated by degradative enzymes. *Bioresource Technology.* 111: 148-154.
- Nyarko, H.D., Okpokwasili, G. C., Joel, O. F., and Galyon, I. A. K. 2020. Isolation and Characterization of Carbonoclastic Bacteria Diversity in Oil-contaminated Soil in Cape Coast Metropolis, Ghana. *Microbiology Research Journal International.* 30(1): 62-74.
- Ogbo, F. M. and Okhuoya, J. A. 2008. Biodegradation of aliphatic, aromatic, resinic, and tarsic fractions of crude oil contaminated soils by African. *Journal of Technology.* 7(23): 4291- 4297.
- Osatomi, O. I., Peace, K. O., and Olukayode, O. A. 2021. Ecological potentials of petroleum hydrocarbons and heavy metals shape the microbial communities of marine hydrosphere at Atlantic Ocean, Nigeria. *Journal of Environmental Management.* 289: 1-9.



- Patel, V., and Kamlesh, S. 2014. Petroleum Hydrocarbon pollution and its Biodegradation. *International Journal of Chemtech Applications*. 2(3): 63-80.
- Pelczar, M. J. dan Chan, E. C. S. 1986. *Dasar-Dasar Mikrobiologi*. Jilid I. UI Press. Jakarta.
- Rahmayanti, L., Dita, M. R., dan Larashati. 2021. Analisis Pemanfaatan Sumber Daya Energi Minyak Dan Gas Bumi Di Indonesia. *Jurnal Sains Edukatika Indonesia (JSEI)*. 3(2): 9-16.
- Sawadogo, A., Otoidobiga, C. H., Joseph, B. S., Aminata, K., Alfred, S. T., and Dayeri, D. 2014. Isolation and Characterization of Hydrocarbon-Degrading Bacteria from Wastewaters in Ouagadougou, Burkina Faso. *Journal of Environmental Protection*. 5: 1184-1196.
- Sidjabat, O. 2013. The Characteristics Of A Mixture Of Kerosene And Biodiesel As A Substituted Diesel Fuel. *Scientific Contributions Oil dan Gas*. 36(1): 37-44.
- Sihag, S., Pathak, H. and Jaroli, D. P. 2014 Factors Affecting the Rate of Biodegradation of Polyaromatic Hydrocarbons. *International Journal of Pure and Applied Bioscienc*. 2(3): 185-202.
- Syafrizal, Restiya, R., Tri, P., Zulkifliani, Onie, K., Novie, A., Yonny, H., dan Rofiqoh. 2020. Biodegradasi Senyawa Hidrokarbon Minyak Bumi Menggunakan Aktivitas Konsorsium Sedimen Laut Dalam. *LPMGB*. 54(2): 81-91
- Syakti, A.D., Priyati. L., Satya, S., Lilik, K. S., Febrianti, L., Fadliyah.I., Teguh, A., Syafsir, A., Nuning, V. H., Riyanti. 2019. Culturable hydrocarbonoclastic marine bacterial isolates from Indonesian seawater in the Lombok Strait and Indian Ocean. *Heliyon*. 5: 1-9.
- Thakur, S., Archana, A., and Vinay, K. 2021. Biochemical Test for Detecting Hydrogen Sulphide (H<sub>2</sub>S) Producing Bacteria. *AgriCos e-Newsletter*. 2(11): 53-56.
- Uba. B. O., Okoye, E. L., and Chukwurah, I. E. 2016. Bioremediating Potentials of Marine MercuryResistant Bacteria on Polyaromatic Hydrocarbons Components of Bonny Light Crude Oil. *Journal of Advances in Biology and Biotechnology*. 7(4): 1-12.
- Ulfa, A., Suarsini, E., dan Henni, M. I. M. 2016. Isolasi dan Uji Sensitivitas Merkuri pada Bakteri dari Limbah Penambangan Emas di Sekotong Barat Kabupaten Lombok Barat: Penelitian Pendahuluan. *Jurnal Seminar Nasional*. 1391: 793-799.



Microbial degradation of petroleum hydrocarbons. *Bioresource gy*. 223: 277–28.

ia, A. F. R., dan Fernando, L. G. D. 2021. Production, rization and kinetic model of biosurfactant produced by lactic eria. *Electronic Journal of Biotechnology*. 53: 14-22.

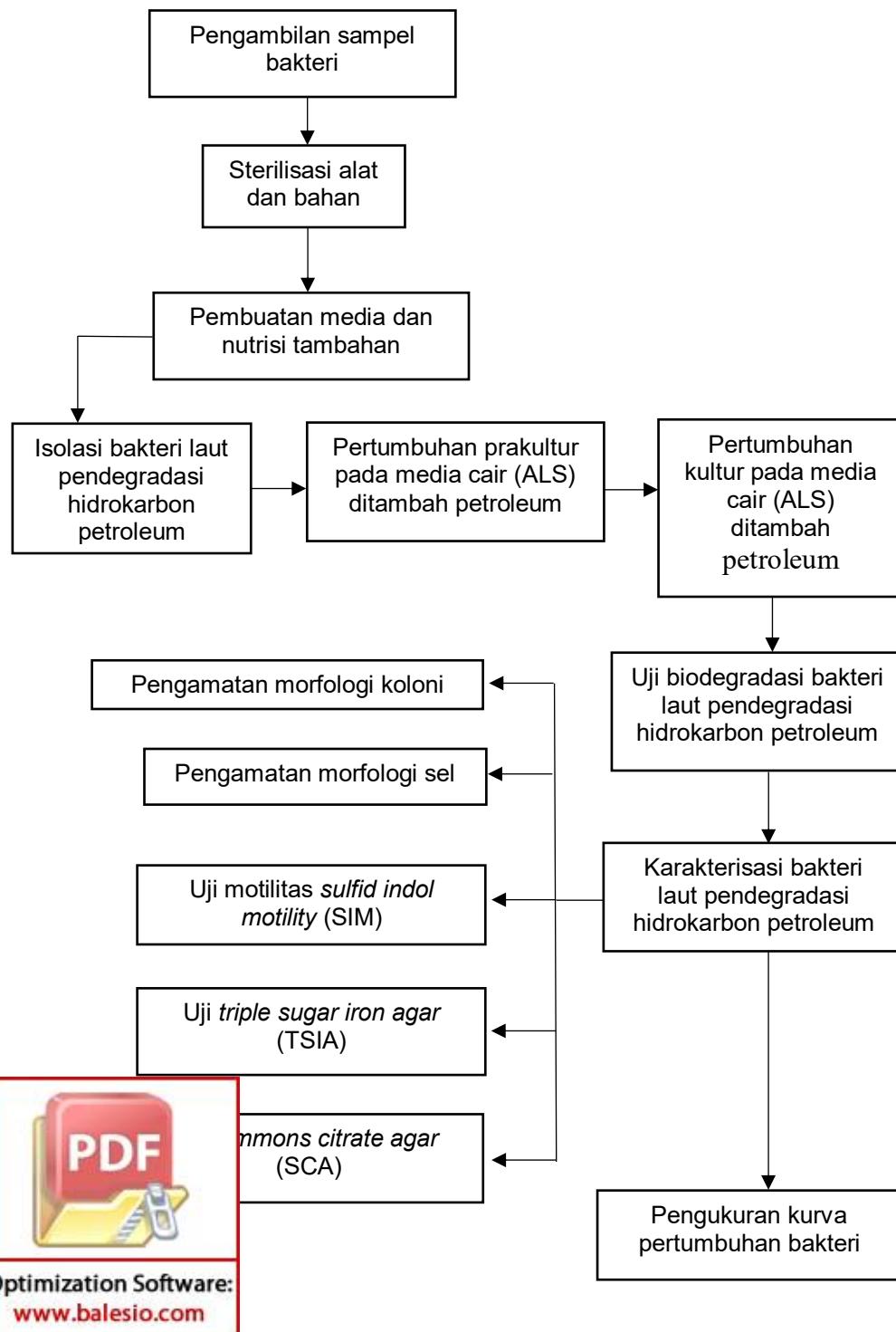
- Veerasingam, S., Venkatachalapathy, R., Sudhakar, S., Raja, P., and Rajeswari, V. 2011. Petroleum hydrocarbon concentrations in eight mollusc species along Tamilnadu coast. Bay of Bengal, India. *Journal of Environmental Sciences*. 23(7): 1129-1134.
- Vignesh, R., Arularasan, A., Gandhiraj, V., and Charu, R. D. 2016. Isolation Identification and Characterization of Potential Oil Degrading Bacteria From Oil Contaminated Sites. *International Research Journal of Engineering and Technology (IRJET)*. 3(4): 2503-2508.
- Xu, X., Wenming, L., Shuhua, T., Wei, W., Qige, Q., Pan, J., Xinmei, G., Fengjiao, L., Haiyan, L., and Hongwen, Y. 2018. Petroleum Hydrocarbon-Degradation Bacteria For The Remediation Of Oil Pollution Under Aerobic Conditions: A Perspective Analysis. *Frontiers in Microbiology*. 9: 1-11.
- Xu, M., Xinge, F., Yu, G., Liangfeng, D., Congchao, X., Wenshuang, S., Yixuan, L., Xianzheng, M., and Xinfeng, X. 2020. Characterization of a biosurfactant-producing bacteria isolated from Marine Environment: Surface activity, chemical characterization and biodegradation. *Journal of Environmental Chemical Engineering*. 8: 1-7.
- Yetti, E., Amalia, A., Nailul, L., Hans, W., Ahmad, T., and Yopi. 2016. Polycyclic aromatic hydrocarbon degrading bacteria from the Indonesian Marine Environment. *Biodiversitas*. 17(2): 857-864



Optimization Software:  
[www.balesio.com](http://www.balesio.com)

## LAMPIRAN

### Lampiran 1. Alur Penelitian



**Lampiran 2. Pengambilan Sampel**

a. Titik lokasi pengambilan sampel



b. Sampel dimasukkan ke dalam botol sampel untuk dibawa ke laboratorium



**Lampiran 3. Pembuatan Media dan Nutrisi Tambahan**

- a. Disiapkan alat dan bahan yang akan digunakan



- b. Ditimbang setiap bahan yang akan digunakan

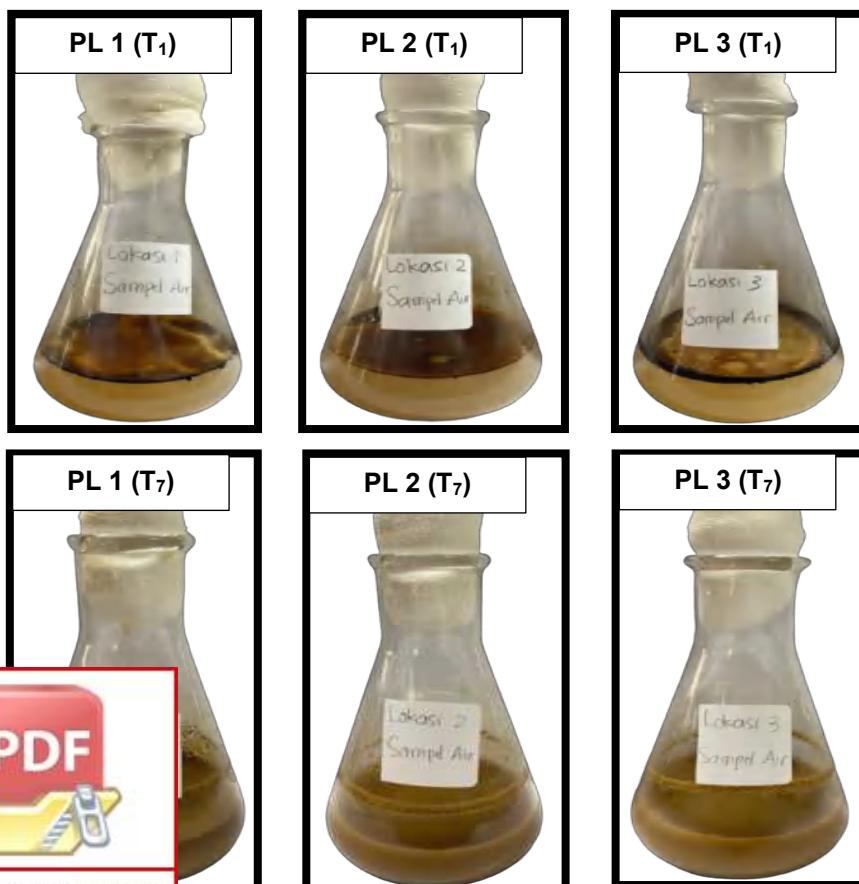


- c. Dilarutkan ke dalam akuades kemudian disterilkan dengan menggunakan autoklaf



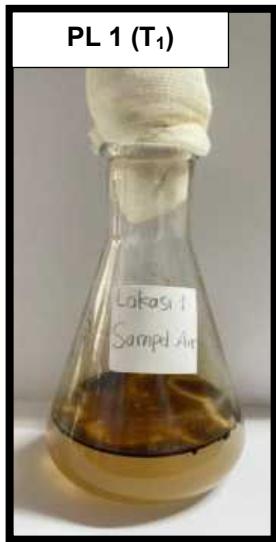
**Lampiran 4.** Isolasi bakteri laut pendegradasi hidrokarbon petroleum

- a. Pertumbuhan prakultur pada media cair (ALS) ditambah petroleum selama 7x24 jam



Optimization Software:  
[www.balesio.com](http://www.balesio.com)

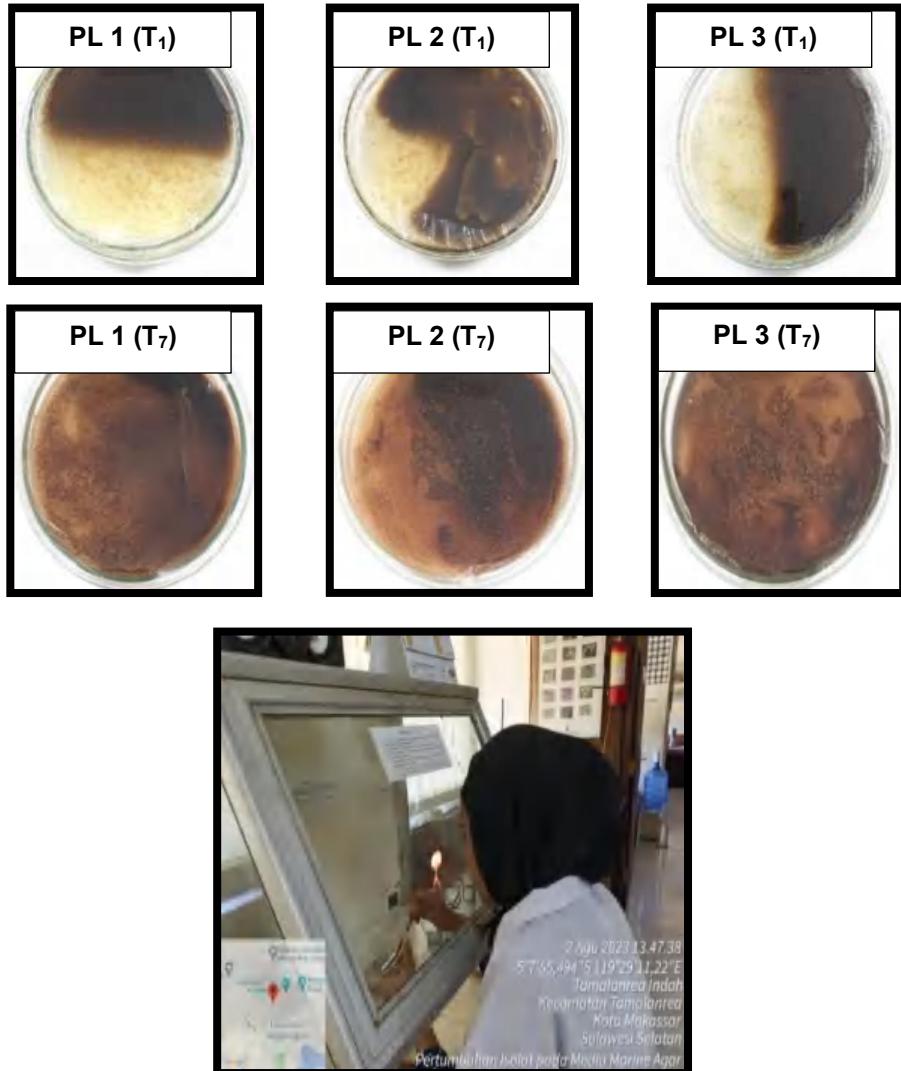
- b. Pertumbuhan kultur pada media cair (ALS) ditambah petroleum selama 7x24 jam



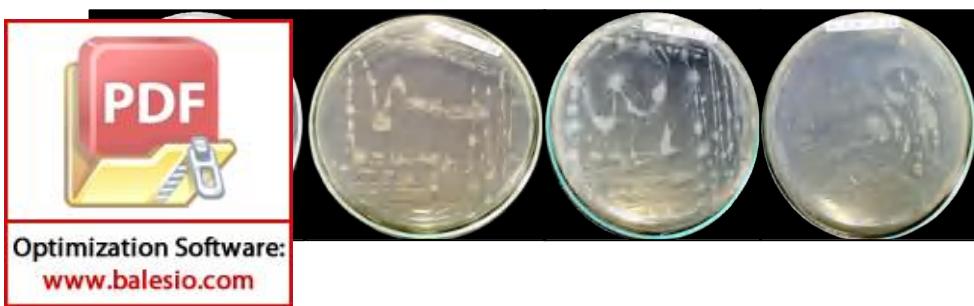
Optimization Software:  
[www.balesio.com](http://www.balesio.com)

**Lampiran 5.** Uji biodegradasi bakteri laut pendegradasi hidrokarbon petroleum

- a. Bakteri ditumbuhkan pada media MA ditambah petroleum

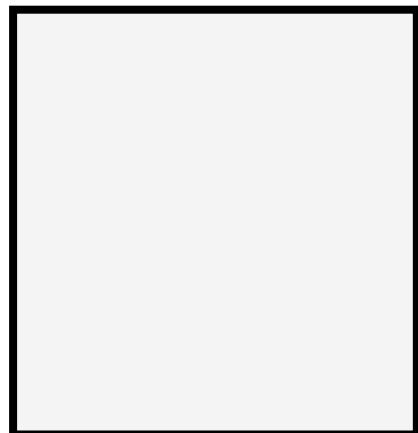


- b. Pemurnian bakteri pada media MA tanpa petroleum





Lampiran 6. Karakterisasi bakteri laut pendegradasi hidrokarbon petroleum



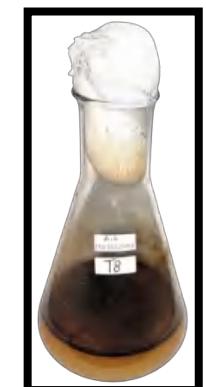
Optimization Software:  
[www.balesio.com](http://www.balesio.com)

**Lampiran 7.** Pengukuran kurva pertumbuhan bakteri

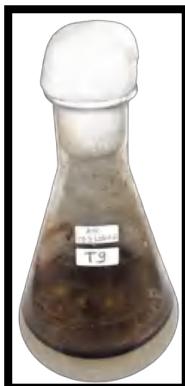
Optimization Software:  
[www.balesio.com](http://www.balesio.com)



Optimization Software:  
[www.balesio.com](http://www.balesio.com)



Optimization Software:  
[www.balesio.com](http://www.balesio.com)



Optimization Software:  
[www.balesio.com](http://www.balesio.com)



Optimization Software:  
[www.balesio.com](http://www.balesio.com)