

บรรณานุกรม

- Anderson, A.J., and Dawes, E.A. (1990) Occurrence, metabolism, metabolic role and industrial uses of bacterial polyhydroxyalkanoates. *Microbiology Review*. 54:450-472.
- Amor, S.R., Rayment, T., and Sanders, J.K.M. (1991) Poly(3-hydroxybutyrate) *in vivo*: NMR and X-ray characterization of the elastomeric state. *Macromolecules*. 24:4583-4588.
- Arun, A., Arthi, R., Shanmugabalaji, V., Eyini, M. (2009) Microbial production of poly- β -hydroxybutyrate by marine microbes isolated from various marine environments. *Bioresource Technology*. 100:2320-2323.
- Azehar, A.L., Raouf, Tanisamdin. (2003) Surface properties and microporosity of hydroxybutyrate under SEM. *Analytical Microscience*. 3:221-225.
- Burns, K.L., Oldham, C.D., Thompson, J.R., Lubarsky, M. and May, S.W. (2007) Analysis of the *in vitro* biocatalytic production of poly-(β)-hydroxybutyric acid. *Enzyme and Microbial Technology*. 41: 591-599.
- Byrom, D. (1987) Polymer Synthesis by Microorganisms: Technology and Economics. *TIBTECH*. 5:246-250.
- Chen, G.Q., Zhang, G., Park, S.J., Lee, S.Y. (2001) Industrial scale production of poly(3-hydroxybutyrate-co-3-hydroxyhexanoate). *Applied Microbiology and Biotechnology*. 57: 50-55.
- Chien, C.C., Chen, C.C., Choi, M.H., Kung, S.S., Wei, Y.H. (2007) Production of poly- β -hydroxybutyrate (PHB) by *Vibrio spp.* isolated from marine environment. *Journal of Biotechnology*. 132:259-263.
- Choi, J., Lee, S.Y. (1999) Efficient and economical recovery of poly(3-hydroxybutyrate) from recombinant *Escherichia coli* by simple digestion with chemicals. *Biotechnology and Bioengineering*. 62: 546-553.

- Defoirdt, T., Halet, D., Vervaeren, H., Boon, N., Van De Wiele, T., Sorgeloos, P., Bossier, P. and Verstraete, W. (2006) The bacterial storage compound poly- β -hydroxybutyrate protects *Artemia* from pathogenic *Vibrio campbellii*. *Environment Microbiology*, 9, 445-452.
- Doi, Y. (1990) *Microbial Polyester*, Japan: VCH Publishers, Incorporated. 135:266.
- Doi, Y. (1995) Microbial synthesis, physical properties and biodegradability of polyhydroxyalkanoates. *Macromolecules Symptomatology*. 98:585-599.
- Eagon, R.G. (1962) *Pseudomonas natriegens*, a marine bacterium with a generation time of less than 10 min. *Journal of Bacteriology*. 83: 736-737.
- Farmer III, J.J., Hickman-Brenner, F.W. (1992) The genera *Vibrio* and *Photobacterium*. In: Balows, A., Trüper, H.G., Dworkin, M., Harder, W., Schleifer, K.-H. (Eds.), *The Prokaryotes*. Springer-Verlag Inc., New York. pp. 2952-3011.
- Fusun, T., Zeynep, F. (2000) Biosynthesis of PHB and its copolymer and their use in control drug release. *Journal of Medical Science*. 30:535-541.
- Hankermeyer, C.R., Jieerde, R.S. (1998) Polyhydroxybutyrate plastic and degraded by Microorganism. *Applied and Environmental Microbiology*. 64:2859-2863.
- Khanna, S., Srivastava, A.K. (2005) Statistical media optimization studies for growth and PHB production by *Ralstonia eutropha*. *Process Biochemistry*. 40: 2173-2182.
- Koller, M., Bona, R., Braunnegg, G., Hermann, C., Horvat, P., and Kroutil, M. (2005) Production of polyhydroxyalkanoates from agricultural waste and surplus materials. *Biomacromolecules*, 6: 561-565.
- Kulpreecha, S., Boonruangthavorn, A., Meksiriporn, B. and Thongchul, N. 2009. Inexpensive fed-batch cultivation for high poly(3-hydroxybutyrate) production by a new isolate of *Bacillus megaterium*. *J. Biosci. Bioeng.* 107: 240-245.
- Lee, H.K., Chun, J., Moon, E.Y., Ko, S.H., Lee, D.S., Lee, H.S., Bae, K.S. (2001) *Hahella chejuensis* gen. nov., sp. Nov., an extracellular-polysaccharide-producing marine bacterium. *International Journal of Systematic and Evolutionary Microbiology*. 51: 661-666.
- Lee, S.Y. (1996a) Bacterial polyhydroxyalkanoates. *Biotechnology. Bioengineering*. 49: 1-14.

- Lee, S.Y. (1996b) Plastic bacterial Process and prospects for polyhydroxyalkanoate production in bacteria. *Trends Biotechnology*. 14: 431-438.
- Lillo, J.G., and Valera, R.F. (1990) Effects of culture conditions on poly- β -hydroxybutyric acid production by *Haloferax mediterranei*. *Applied Environmental Microbiology*, 56: 2157-2521.
- Mahishi, L.H., Tripathi, G., and Rawal, S.K. (2003) Poly(3-hydroxybutyrate) (PHB) synthesis by recombinant *Escherichia coli* harbouring *Streptomyces aureofaciens* PHB biosynthesis genes: effect of various carbon and nitrogen sources. *Microbiology Reviews*, 158:19–27.
- Pablo, I.N., Pettinari, M.J., Galvagno, M.A., and Méndez, B.S. (2008) Poly(3-hydroxybutyrate) synthesis from glycerol by a recombinant *Escherichia coli* arcA mutant in fed-batch microaerobic cultures. *Applied Microbiology Biotechnology*, 77: 1337–1343.
- Pandian, S.R., Deepak, V., Kalishwaralal, K., Rameshkumar, N., Jeyaraj, M., and Gurunathan, S. (2010) Optimization and fed-batch production of PHB utilizing dairy waste and sea water as nutrient sources by *Bacillus megaterium* SRKP-3. *Bioresource Technology*, 101: 705–711.
- Patnaik, P.R. (2006) Dispersion optimization to enhance PHB production in fed-batch cultures of *Ralstonia eutropha*. *Bioresource Technology*. 97:1994–2001.
- Poirier, Y., Nawrath, C., Somerville, C. (1995) Production of polyhydroxyalkanoates, a family of biodegradable plastics and elastomers, in bacteria and plants. *Biotechnology*. 13:142-150.
- Quillaguamán, J., Delgado, O., Mattiasson, B., and Hatti-Kaul, R. (2006) Poly(β -hydroxybutyrate) production by a moderate halophile, *Halomonas boliviensis* LC1. *Enzyme and Microbial Technology*, 38: 148–154.
- Reddy, C.S., Ghai, R., Rashmi, Kalia, V.C. (2003) Polyhydroxyalkanoates: an overview. *Bioresource Technology*. 87: 137–146.
- Rohini, D., Phadnis, S., and Rawal, S.K. (2006) Synthesis and characterization of poly- β -hydroxybutyrate from *Bacillus thuringiensis* R1. *Indian Journal of Biotechnology*, 5: 276-283.
- Shen, L., Haufe, J., and Patel, M.K. (2009) Product overview and market projection of emerging biobased plastics PRO-BIP 2009: Final report. Utrecht University. Commissioned by European Polysaccharide Network of Excellence (EPNOE) and European Bioplastics, p. 243.

- Sudesh, K., Abe H., Doi, Y. (2000) Synthesis, Structure and properties of polyhydroxyalkanoates; biological polyesters. *Prog. Polym. Sci.* 25:1503–1555.
- Sun, W., Cao, J.G., Teng, K., Meighen, E.A. (1994) Biosynthesis of poly-3-hydroxybutyrate in the luminescent bacterium, *Vibrio harveyi*, and regulation by the lux autoinducer *N*-(3-hydroxybutanoyl)homoserine lactone. *Journal of Biology Chemistry.* 269:20785–20790.
- Taran, M. (2011) Utilization of petrochemical wastewater for the production of poly(3-hydroxybutyrate) by *Haloarcula* sp. IRU1. *Journal of Hazardous Materials*, 188: 26–28.
- Weiner, R.M. (1997) Biopolymers from marine prokaryotes. *Trends Biotechnology.* 15:390–394.
- Wieczorek, R., Pries, A., Steinbüchel, A., and Mayer, F. (1995) Analysis of a 24-kilodalton protein associated with the polyhydroxyalkanoic acid granules in *Alcaligenes eutrophus*. *Journal of Bacteriology.* 177:2425-2435.

ภาคผนวก

อาหารเลี้ยงเชื้อ

Marine basal medium (Chien *et al.*, 2007) ใน 1 ลิตร มีองค์ประกอบดังนี้

Sea salts	28	กรัม
Tryptone	2.5	กรัม
Yeast extract	1	กรัม
Glycerol	3	% (v/v)
Agar*	15	กรัม

ในการเตรียมอาหารสูตรนี้ต้องทำการปรับ pH ให้เท่ากับ 7.0 ก่อนทำการฆ่าเชื้อด้วยความร้อนจากไอน้ำที่ความดัน 1.5 บาร์ อุณหภูมิ 121 °C เป็นเวลา 15 นาที

* เติมในกรณีที่ต้องการเตรียมเป็นอาหารแข็ง (MB agar plate และ MB agar slant)



