

## **BAB V**

### **KESIMPULAN DAN SARAN**

#### **5.1. Kesimpulan**

1. Perbedaan konsentrasi ekstrak biji durian berpengaruh nyata terhadap angka lempeng total, pH dan total asam pada *yogurt*.
2. Semakin tinggi ekstrak angkak biji durian yang ditambahkan pada *yogurt*, angka lempeng total bakteri asam laktat juga semakin meningkat (8,9389-10,4034 log CFU/mL), nilai pH akan semakin menurun (4.573-4.512) dan nilai total asam laktat semakin meningkat (0,90-1,22%).

#### **5.2. Saran**

1. Perlu dilakukan uji sifat kimia (pH dan total asam) dan mikrobiologis (angka lempeng total) terhadap *yogurt* angkak biji durian selama masa penyimpanan untuk mengetahui viabilitasnya sebagai pangan probiotik.
2. *Yogurt* dengan perbedaan konsentrasi ekstrak angkak biji durian perlu dilakukan uji lanjut secara *in vivo* untuk mengetahui kemampuannya dalam menurunkan kadar kolesterol dan gula darah.

## DAFTAR PUSTAKA

- Ameen, A.M and G. Caruso. 2017. *Lactic Acid in the Food Industry*. Cham: Springer.
- Badan Standarisasi Nasional. SNI 2981:2009: *Yogurt*. [http://sisnibsn.go.id/index.php?/sni\\_main/sni/detail\\_sni/10235](http://sisnibsn.go.id/index.php?/sni_main/sni/detail_sni/10235) (22 Mei 2020).
- Beal, C dan S. Helinck. 2015. *Yogurt and Other Fermented Milk*, (dalam *Microorganism and Fermentation of Traditional Foods*, Ray, R.C and M. Didier, Eds.), New York: CRC Press.
- Brisson, G dan H. Singh. 2013. *Milk Composition, Physical and Processing Characteristics*, (dalam *Manufacturing Yogurt and Fermented Milks*, Chandan, R.C. and A. Kilara, Ed.). West Sussex: John Wiley & Sons.
- Boscoe, A. B. dan C. R. Listow. 2008. Protein Research Progress. New York: Nova Science Publisher.
- Chairote, E., C. Griangsak dan S. Lumyong. 2009. Red Yeast Rice Prepared From Thai Glutinous Rice and The Antioxidant Activities, *Chiang Mai Journal Science*. 36:42-49.
- Chairunnissa, H. R. L. Balia, A. Pratama, D. Hadiat. 2017. Karakteristik Kimia Set Yoghurt Dengan Bahan Baku Susu Tepung Dengan Penambahan Jus Bit (*Beta Vulgaris L.*), *Jurnal Ilmu Ternak*. 17 (1):35-39.
- Chandan. R.C. 2017. An Overview of *Yogurt* Production and Composition, (dalam *Yogurt in Health and Disease Prevention*, Shah, N.P, Ed.). Cambridge: Academic Press.
- Chandan, R. C. and K. R. Nauth. 2016. Yogurt (Dalam *Handbook of Animal Based Fermented Food and Beverage Technology*, Hui, Y. H. and O. Evranuz. Ed). Boca Raton: CRC Press.
- Chlebana, R.A. 2017. *The Advanced Art of Baking and Pastry*. New Jersey: John Wiley and Sons.
- Deeth, H.C dan M.J. Lewis. 2017. *High Temperature Processing of Milk and Milk Products*. West Sussex: John Wiley & Sons.
- Dhawi, F. H. S. El-Beltagi, E. Aly dan A. M. Hamed. 2020. Antioxidant, Antibacterial Activities and Mineral Content of Buffalo Yoghurt Fortified with Fenugreek and *Moringa oleifera* Seed Flours, *Foods*. 9 (1157):1-16
- Dwidjoseputro, D. 2010. *Dasar-Dasar Mikrobiologi*. Jakarta: Djambatan.
- Effendi, H. M. S. 2009. *Teknologi Pengolahan dan Pengawetan Pangan*. Bandung: Alfabeta.

- Eniza, S. 2004. *Dasar Pengolahan Susu Dan Hasil Ikutan Ternak*. Sumatera Utara: Universitas Sumatera Utara Press.
- Erkmen, O dan T.F. Bozoglu. 2016. *Food Microbiology Principles Into Practice*. London: Wiley.
- Frye, C. P. 2013. *Regulatory Requirements for Milk Production, Transportation and Processing*, (dalam *Manufacturing Yogurt and Fermented Milks*, Chandan, R.C. and A. Kilara, Eds.). West Sussex: John Wiley & Sons.
- Gawai, K.M., S.P. Mudgal dan J.B. Prajapati. 2017. Stabilizers, Colorants, and Exopolysaccharides in *Yogurt*, (dalam *Yogurt in Health and Disease Prevention*, Shah, N.P., Ed.). Cambridge: Academic Press.
- Georgetti, S. R., F. T. M. C. Vicentini, C. Y. Yokoyama, M. F. Borin, A. C. C. Spadaro, M. J. V. Fonseca. 2009. Enhanced In Vitro and In Vivo Antioxidant Activity and Mobilization of Free Phenolic Compounds of Soybean Flour Fermented With Different Beta-glucosidase-producing fungi, *Journal of Applied Microbiology*. 106 (2):459-466.
- Giavasis, I., E. Tsante, P. Goutsidis, K. Papatheodorou dan K. Petrotos. 2006. Stimulatory Effect of Novel Polyphenol-based Supplements from Olive Mill Waste On The Growth and Acid Production of Lactic Acid Bacteria, (dalam *Microbes In Applied Research: Current Advances And Challenges*, Mendez-vilas, A., Ed.). Toh Tuck Link: World Scientific Publishing.
- Harnett, J., G. Davey., A. Patrick., C. Caddick dan L. Pearce. 2011. *Streptococcus thermophilus* (dalam *Encyclopedia of Dairy Sciences*, Fuquay, J.W., P.F. Fox and P.L.H. McSweeney, Ed). Cambridge: Academic Press.
- Herawati, D. A. dan D. A. A. Wibawa. 2009. Pengaruh Konsentrasi Susu Skim dan Waktu Fermentasi Terhadap Hasil Pembuatan Soygurt, *Jurnal Ilmiah Teknik Lingkungan*. 2 (1):48-58.
- Hutkins, R. 2019. *Microbiology and Technology of Fermented Foods Second Edition*. West Sussex: John Wiley & Sons.
- Ibrahim, F dan A. C. Ouwehand. 2019. *The Genus Lactobacillus*, (dalam *Lactic acid bacteria microbiological and functional aspects*, Vinderola, G., A. C. Ouwehand, S. Salminen, and A. V. Wright, Ed.). Boca Raton: CRC Press.
- Ide, P. 2008. *Health Secret of Kefir*. Jakarta: Elex Media Kamputindo.
- Jeong, C. H., H. Ryu, T. Zhang, C. H. Lee, H. G. Seo dan S. G. Han. 2018. Green Tea Powder Supplementation Enhances Fermentation and

- Antioxidant Activity of Set-type Yogurt, *Food Science and Biotechnology*. 27 (5):1419-1427.
- Kawuri, R. 2013. Red Mold Rice (Angkak) Sebagai Makanan Terfermentasi Dari China: Suatu Kajian Pustaka, *Jurnal Biologi*. 17 (1):24-28.
- Lee, B.H., Hsu, W.H., Liao, T.H. dan Pan, T.M. (2011). The *Monascus* Metabolite Monascin Against TNF- $\alpha$ - Induced Insulin Resistance Via Suppressing PPAR- $\gamma$  Phosphorylation in C2C12 Myotubes, *Food and Chemical Toxicology*. 49 (10):2609–2617.
- Lin, C. F. dan H. Iizuka. 2003. Production of Extracellular Pigment by A Mutant of *Monascus kaoliang* sp. Nov., *Applied Environment Microbiology*. 43 (3):671-676.
- Ma, J., Y. Li, Q. Ye, J. Li, Y. Hua, D. Ju dan D. Zhang. 2000. Constituents of Red Yeast Rice, A Traditional Chinese Food and Medicinie, *Journal Agriculture Food Chemistry*. 48 (11):5220-5225.
- Malik, A., Z. Erginkaya.,S. Ahmad dan H. Erten.2014. *Food Processing: Strategies for Quality Assessment*. New York: Springer.
- Mann, B., S. Athira, R. Sharma dan R. Bajaj 2017. *Bioactive Peptides in Yogurt*, (dalam *Yogurt in Health and Disease Prevention*, Shah, N.P, Ed.). Cambridge: Academic Press.
- Manan, M. A., R. Mohamad dan A. Ariff. 2017. The Morphology and Structure of Red Pigment Producing Fungus: *Monascus Purpureus*, *Journal of Microbiology and Experimentation*. 5 (1):1-6.
- Mellisa. 2006. Pengaruh Konsentrasi Asam Malat-Tartarat dan Lama Penyimpanan Terhadap Mutu Tablet Effervescent Mix (Yoghurt Bubuk, Sari Markisa dan Sunkis), *Skripsi-S1*, Fakultas Pertanian Universitas Sumatra Utara.
- Natania, M. Susanto dan A. H. Cahyana. 2019. Pengaruh Fermentasi Bakteri asam Laktat Terhadap Aktivitas Antioksidan dan Kadar Antosianin Buah Duwet, *Jurnal Sains dan Teknologi*. 3 (2):17-26.
- Nugerahani, I., A.M. Sutedja, I. Srianta, R.M. Widharna dan Y. Marsono. 2017. In Vivo Evaluation of *Monascus*-Fermented Durian Seed for Antidiabetic and Antihypercholesterol Agent, *Food Research*. 1 (3):83-88.
- Oeitanto, A., I. Nugerahani dan N. Kusumawati. 2013. Pembuatan Yoghurt Murbei Hitam (*Morus nigra L.*): Proporsi Sari Buah dan Susu Sapi Terhadap Komponen Bioaktif dan Viabilitas Bakteri Asam Laktat Selama Penyimpanan, *Jurnal Teknologi Pangan dan Gizi*. 12 (2):87-94.

- O'Rell, K dan R.C. Chandan. 2013. *Yogurt: Fruit Preparations and Flavoring Material*, (dalam *Manufacturing Yogurt and Fermented Milks*, Chandan, R.C. and A. Kilara, Ed.). United Kingdom: John Wiley & Sons.
- Oliver, S. P., B. E. Gillespie, M. J. Lewis, S. J. Ivey, R. A. Almeida, D. A. Luther, D. L. Johnson, K. C. Lamar, H. D. Moorehead, H. H. Dowlen. 2001. Efficacy of A New Premilking Teat Disinfectant Containing A Phenolic Combination for The Prevention of Mastitis, *Journal Dairy Science*. 84 (6):1545-1249.
- Panda, B. P., S. Javed dan M. Ali. 2010. Production of Angkak Through Co-culture of *Monascus purpureus* and *Monascus ruber*, *Brazilian Journal of Microbiology*. 41:757-764.
- Patakova, P. 2013. Monascus Secondary Metabolites: Production and Biological Activity, *Journal of Industrial Microbiology and Biotechnology*. 40 :169-181.
- Patel, S. 2016. Functional Food Red Yeast Rice (RYR) for Metabolic Syndrome Amelioration: A Review On Pros and Cons, *World Journal Microbiol Biotechnol*. 32 (87):1-12
- Pattanagul, P., R. Pinthong, A. Phianmongkhon, dan N. Leksawasdi. 2007. Review of Angkak Production (*Monascus purpureus*), *Chiang Mai Journal Science*. 34 (3):319-328.
- Permana, R.D., S. Marzuki dan D.Tisnadjaja. 2004. Analisis Kualitas Produk Fermentasi Beras (Red Fermentation Rice) dengan *Monascus purpureus* 3090. *J. Biodiversitas* 5 (1):7-12.
- Pimentel, T.C., A.E.C. Antunes., P.B. Zacarchenco., M.A.S. Cortez., C.S.B. Bogsan., M.N. Oliviera., E.A. Esmerino., M.C. Silva dan A.G. Cruz. 2017. Brazilian *Yogurt-Like Products* (dalam *Yogurt in Health and Disease Prevention*, Shah, N.P, Ed.) Cambridge: Academic Press.
- Pitt, J. I. dan A. D. Hocking. 2009. *Fungi and Food Spoilage*. New York: Springer.
- Poltronieri, P. 2017. *Microbiology in Diary Processing: Challenges and Opportunities*. United Kingdom: John Willey & Sons.
- Purnama, A., R. Malaka dan A. Ako. 2011, Pengaruh Penambahan Minyak Ikan dan Minyak Biji Bunga Matahari Dalam *Yogurt Susu Skim* Terhadap Level Kolestrol Hewan Coba Mencit (*Mus musculus*), *Jurnal Ilmu dan Teknologi Peternakan*. 1 (3):159-166.
- Purwandani, L., F. Imelda dan L. Darus. 2018. Aktivitas Prebiotik Polisakarida Larut Air Biji Durian In Vitro pada *Lactobacillus plantarum*, *Lactobacillus acidophilus* dan *Bifidobacterium longum*, *FoodTech Jurnal Teknologi Pangan*. 1 (1):14-24

- Puspitadewi, S.R.D. I. Srianta dan N. Kusumawati. 2016. Pola Produksi Pigmen *Monascus* Oleh *Monascus sp.* kjr 2 Pada Media Biji Durian Varietas Petruk Melalui Fermentasi Padat, *Journal of Food Technology and Nutrition*. Vol 15 (1):36-42
- Ramayulis, R. 2008. *Menu dan Resep Untuk Penderita Kolesterol*. Jakarta: Penebar Plus.
- Romulo, A., Suliantri, dan N. S. Palupi. 2017. Application of Angkak (*Red Yeast Rice*) Extract as Natural Red Colorant in Making of Low Fat Fruity Probiotic *Yoghurt*. *Journal of EC Nutrition*. 203-209.
- Sawitri, E.M, A. Manab, dan T. W. L. Palupi. 2008. Kajian Penambahan Gelatin Terhadap Keasaman, pH, Daya Ikat Air dan Sineresis *Yogurt*, *Jurnal Ilmu dan Teknologi Hasil Ternak*. 3(1):35-42.
- Science Photo Library. 2020a. *Streptococcus thermophilus* in *yogurt*. <https://www.sciencephoto.com/media/13030/view> (18 Oktober 2020).
- Science Photo Library. 2020b. *Lactobacillus Bacteria*, SEM. <https://www.sciencephoto.com/media/589999/view> (18 Oktober 2020).
- Science Photo Library. 2020c. *Lactobacillus acidophilus*, SEM. <https://www.sciencephoto.com/media/873997/view> (23 Januari 2020).
- Seenivasan, A., J. S. Eswari, P. Sankar, S. N. Gummadi, T. Panda dan Ch. Venkateswarlu. 2020. Metabolic Pathway Analysis and Dynamic Macroscopic Model Development for Lovastatin Production by *Monascus purpureus* Using Metabolic Footprinting Concept, *Biochemical Engineering Journal*. 154 :1-12.
- Seveline. 2005. Pengembangan Produk Probiotik dari Isolat Klinis Bakteri Asam Laktat dengan Menggunakan Teknik Pengeringan Semprot dan Pengeringan Beku, *Thesis*, Sekolah Pascasarjana Institut Pertanian Bogor, Bogor.
- Shah, N. P. 2017. *Yogurt In Health and Disease Prevention*. Cambridge: Academic Press.
- Sieuwerts, S., F. A. M. de Bok dan J. Hugenholtz. 2008. Unraveling Microbial Interactions in Food Fermentations: from Classical to Genomics Approaches, *Applied and Environmental Microbiology*. 74 (16):4997-5007.
- Srianta, I., B. Hendrawan, N. Kusumawati, dan P. J. Blanc. 2012. Study on Durian Seed as New Substrat for Angkak Production. *International Food Research Journal*. 19(3): 941-945.
- Srianta, I., I. Nugerahani, N. Kusumawati, E. Suryatanijaya, C. Subianto, S. Tewfik dan I. Tewfik. 2014. Therapeutic Antioxidant Activity of

- Monascus-Fermented Durian Seed: A Potential Functional Food Ingredient, *Journal Food, Nutrition and Public Health.* 7 (1):53-59.
- Srianta, I., S. Ristiarini, I. Nugerahani, S. K. Sen, B. B. Zhang, G. R. Xu dan P. J. Blanc. 2014. Recent Research and Development of *Monascus* Fermentation Products, *International Food Research Journal.* 21 (1):1-12
- Srianta, I., Y. Novita dan N. Kusumawati. 2012. Production of Monascus Pigments on Durian Seed: Effect of Supplementation of Carbon Source, *Journal of Pure and Applied Microbiology.* 6 (1): 3-4.
- Surajudin, F. R. Kusuma dan D. Purnomo. 2005. Yoghurt; Susu Fermentasi Yang Menyehatkan. Surabaya: Agromedia.
- Susanti dan R. Mardianingrum. 2020. Aktivitas Antibakteri Ekstrak Metanol Umbi Gadung (*Dioscorea hispida* Dennst.) Terhadap Bakteri Penyebab Jerawat *Propionibacterium acnes*, *Jurnal Farmagazine.* 7 (1):13-17.
- Susanto, Y., I. Nugerahani, dan N. Kusumawati. 2014. Pengaruh Variasi Proporsi Sari Bit Merah dan Susu UHT Terhadap Sifat Fisikokimia, Mikrobiologis dan Sensoris Yoghurt. *Jurnal Teknologi Pangan dan Gizi.* 13(1):1-6.
- Talbot, S. M. dan K. Hughes. 2007. *The Health Professional's Guide to Dietary Supplement.* London: Lippincot Williams & Wilkins.
- Tamime, A.Y. and R.K. Robinson. 2007. *Yoghurt Science and Technology Third Edition.* United Kingdom: Woodhead Publishing Limited.
- Tamine, A.Y., M. Saarela, M. Wszolek, H. Ghoddousi, D.M. Linares, and N.P. Shah. 2018. Production and Maintaining Viability of Probiotic Micro-organism in Diary Product (Dalam *Probiotic Dairy Products*, Tamine, A. Y and L. V. Thomas. Ed). United Kingdom: Wiley Blackwell.
- Terpou, A., A. Papadaki, I. K. Lappa, V. Kachrimanidou, L. A. Bosnea dan N. Kopsahelis. 2019. Probiotics in Food Systems: Significance and Emerging Strategies Towards Improved Viability and Delivery of Enhanced Beneficial Value, *Nutrients.* 11 (7):1-32.
- Vasiljevic, T, and N.P. Shah. 2017. Cultured Milk and Yogurt (Dalam *Dairy Processing & Quality Assurance*, Chandan, R.C., A. Kilara, and N.P. Shah, Eds). West Sussex: Wiley Blackwell.
- Vedamuthu, E.R. 2006. Starter Cultures for Yogurt and Fermented Milks (Dalam *Manufacturing Yogurt and Fermented Milks*, Chandan, R.C., C.H. White, A. Kilara and Y.H. Hui, Eds). Oxford: Blackwell Publishing.

- Vénica, C. I., M. C. Perotti dan C. V. Bergamini. Organic Acids Profiles in Lactose-Hydrolyzed Yogurt With Different Matrix Composition, *Dairy Science and Technology*. 94 (6).
- Widagdha, S. dan F.C.Nisa. 2015. Pengaruh Penambahan Sari Anggur (*Vitis vinifera L.*) dan Lama Fermentasi terhadap Karakteristik Fisiko Kimia Yoghurt, *Jurnal Pangan dan Agroindustri*. 3(1): 248-258.
- Winarno, F.G dan I. E. Fernandez. 2007. *Susu dan Produk Fermentasinya*. Bogor: M-BrioPress.
- Wiyoto, H., M. A. M. Andriani dan N. H. R. Parnanto. 2011. Kajian Aktivitas Antioksidan dan Kadar Antikolesterol pada Angkak dengan Variasi Jenis Substrat (Beras, Jagung, dan Gapelek), *Biofarmasi*. 9 (2):38-44.
- Yildiz, F. 2016. *Development and Manufacture of Yogurt and Others Functional Diary Products*. BocaRaton: CRC Press.
- Yuliana, A dan F. Apriyani. 2018. Isolasi Zat Warna Baru *Monascus purpureus* Dari Hasil Fermentasi Padat Dengan Beras Sebagai Substrat, *Journal of Pharmacopolium*. 1 (1):13-22.