

BAB V

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Berdasarkan penelitian deasetilasi *konjac* glukomanan sebagai *gelling agents*, dapat disimpulkan bahwa :

1. Alkali yang menghasilkan derajat deasetilasi tertinggi adalah KOH.
2. Semakin tinggi temperatur dan semakin lama waktu reaksi deasetilasi, maka derajat deasetilasi akan semakin tinggi.
3. Temperatur dan waktu reaksi deasetilasi yang menghasilkan derajat deasetilasi tertinggi (80,29%) adalah 60°C dan 150 menit.
4. Semakin tinggi derajat deasetilasi, maka kelarutan menurun dan *water binding capacity*, *swelling power*, kejernihan gel meningkat.
5. Semakin tinggi temperatur dan semakin lama waktu reaksi deasetilasi, maka *gelling agents* dapat menghasilkan gel yang lebih keras, rekat, dan kaku.

5.2 Saran

Saran yang dapat diberikan untuk penelitian deasetilasi *konjac* glukomanan sebagai *gelling agents* adalah :

1. Melakukan analisis bahan baku secara terperinci untuk mengetahui kandungan dan kadar yang ada di dalam bahan baku.
2. Menggunakan *thermocouple* agar temperatur reaksi yang diukur lebih akurat.
3. Melakukan pengayakan pada bahan baku agar partikel yang digunakan berukuran lebih kecil sehingga reaksi deasetilasi dapat berjalan lebih baik.
4. Melakukan analisis tekstur gel pada produk selai komersial untuk membandingkan gel dengan *gelling agents* konjac glukomanan terdeasetilasi dengan gel pada selai komersial.

DAFTAR PUSTAKA

- Adhikari, B., T. Howes, B. R. Bhandari, dan V. Truong. 2001. "Stickiness In Foods: A Review Of Mechanisms and Test Methods." *International Journal of Food Properties*, 4:1, 1-33
- Akesowan, Adisak. 2015. "Optimization of Textural Properties of Konjac Gels Formed with κ -Carrageenan or Xanthan and Xylitol as Ingredients in Jelly Drink Processing." *Journal of Food Processing and Preservation* 39(6):1735–43.
- Al-Ghazzewi, Farage Hashmi, Sheila Khanna, Richard Frank Tester, dan John Piggott. 2007. "The potential use of hydrolysed konjac glucomannan as a prebiotic." *Journal of the Science of Food and Agriculture* 87(9):1758–66.
- Alonso-Sande, M., D. Teijeiro-Osorio, C. Remuñán-López, dan M. J. Alonso. 2009. "Glucomannan, a promising polysaccharide for biopharmaceutical purposes." *European Journal of Pharmaceutics and Biopharmaceutics* 72(2):453–62.
- Aprilia, Veriani, Agnes Murdiati, Pudji Hastuti, dan Eni Harmayani. 2017. "Carboxymethylation of glucomannan from porang tuber (*Amorphophallus oncophyllus*) and the physicochemical properties of the product." *Pakistan Journal of Nutrition* 16(11):835–42.
- Aziza, Izmy Nur, Yudhomenggolo Sastro Darmanto, dan Retno Ayu Kurniasih. 2019. "Pengaruh Gelatin dari Kulit Ikan yang Berbeda terhadap Karakteristik Fisik dan Sensori Produk Marshmallow." *Jurnal Perikanan Universitas Gadjah Mada* 21(2):73–38.
- Bewick, Sharon. 2021. *Introductory Chemistry*. United States: Libre Texts
- Bhattacharya, S., 2014. "Conventional dan Advanced Food Processing Technologies." John Wiley & Sons.
- Branen, A.L., Davidson, M.P., Salminen, S., dan Thorngate, J.H. 2002. "Food Additives." Marcel Dekker, Inc.
- Craig, S. A. S., C. C. Maningat, P. A. Seib, dan R. C. Hosney. 1989. "Starch paste clarity." *Cereal Chem* 66(3):173–82.
- Das, Amit Baran, Gagandeep Singh, Sukhcharan Singh, dan Charanjit S. Riar. 2010. "Effect of acetylation and dual modification on physico-chemical, rheological and morphological characteristics of sweet potato (*Ipomoea batatas*) starch." *Carbohydrate Polymers* 80(3):725–32.
- Du, Xuezhu, Jing Li, Jian Chen, dan Bin Li. 2012. "Effect of degree of deacetylation on physicochemical and gelation properties of konjac glucomannan." *Food Research International* 46(1):270–78.
- Faridah, Anni. 2011. "Potensi Tepung Porang Sebagai Pangan Fungsional dan Bahan Tambahan Makanan." *Prosiding Seminar Nasional Bosaris III "Create For Survival"* 22–30.
- Firmansya. 2019. "Karakteristik Tekstur Nasi Instan yang Dihasilkan dari Beragam Komposisi Air dan Suhu Pengeringan."
- Funami, Takahiro. 2011. "Next target for food hydrocolloid studies: Texture design of foods using hydrocolloid technology." *Food Hydrocolloids* 25(8):1904–14.
- Gao, Shanjun, dan Katsuyoshi Nishinari. 2004. "Effect of deacetylation rate on gelation kinetics of konjac glucomannan." *Colloids and Surfaces B: Biointerfaces* 38(3-4 SPEC. ISS.):241–49.
- Glicksman, Martin. 1982. *Food hydrocolloids, Volume 1*.
- Han, Benchao, Chi Zhang, Xue Yao, dan Xuegang Luo. 2012. "Study of konjac glucomannan esterification with dicarboxylic anhydride and effect of degree of

- esterification on water absorbency.” *Key Engineering Materials* 501:42–46.
- Haryani, Kristinah, Suharto Suharto, Suryanto Suryanto, Sarana Sarana, dan Teguh Budi Santosa. 2016. “Pemutihan Tepung Porang (*Amorphophallus Onchophyllus*) Menggunakan Natrium Metabisulfit Dan Vitamin C.” Seminar Nasional Terapan Riset Inovatif Semarang , 15 – 16 Oktober 2016 Jurusan Teknik Kimia , F . T . Universitas Diponegoro 01:15–16
- Haryanti, Pepita, Retno Setyawati, dan Rumpoko Wicaksono. 2014. “Effect of temperature and time of heating of starch and butanol concentration on the physicochemical.” *Agritech* 34(3):308–15.
- Herranz, Beatriz, Clara A. Tovar, Beatriz Solo-de-Zaldívar, dan A. Javier Borderias. 2012. “Effect of alkalis on konjac glucomannan gels for use as potential gelling agents in restructured seafood products.” *Food Hydrocolloids* 27(1):145–53.
- Hongbo, Tang, Wang Lan, Li Yanping, dan Dong Siqing. 2019. “Effect of acidolysis and oxidation on structure and properties of konjac glucomannan.” *International Journal of Biological Macromolecules* 130:378–87.
- Imeson, Alan. 2009. *Thickening and Gelling Agents for Food*.
- Indiarto, R., B. Nurhadi, dan E. Subroto. 2012. “Kajian Karakteristik Tekstur dan Organoleptik Daging Ayam Asap Berbasis Teknologi Asap Cair Tempurung Kelapa.” *Jurnal Teknologi Hasil Pertanian*, 5(2), pp. 106–116.
- Ji, Lei, Yong Xue, Dandan Feng, Zhaojie Li, dan Changhu Xue. 2017. “Morphology and gelation properties of konjac glucomannan: Effect of microwave processing.” *International Journal of Food Properties* 20(12):3023–32.
- Karseno, Erminawati, Tri Yanto, R. Setyowati, dan P. Haryanti. 2018. “Effect of pH and temperature on browning intensity of coconut sugar and its antioxidant activity.” *Food Research* 2(1):32–38.
- Kaya, A.W., Ani Suryani, Joko Santoso, Meika Syahbana Rsuli. 2014. “Karakteristik Dan Struktur Mikro Gel Campuran (Characteristic and Microstructure of Mixed Gel of Semirefined)” *Kimia dan Kemasan* 37 (Glicksman 1983):19–28.
- Kementerian Pertanian Republik Indonesia. 2019. “Kementan pacu ekspor produk olahan” diakses melalui <https://www.pertanian.go.id/> pada 13 Maret 2021, 11:38.
- Kementerian Pertanian Republik Indonesia. 2019. “Porang: Tanaman asli Indonesia yang menjajikan” diakses melalui <https://www.litbang.pertanian.go.id/> pada 13 Maret 2021, 11:32.
- Kohyama, K., & Nishinari, K. 1990. “Dependence of the specific volume of konjac glucomannan on pH.” Oxford: IRL Press
- Laufenberg, G., dan N. Schulze. 2009. "A modular strategy for processing of fruit and vegetable wastes into value-added products." Vol. 2. Woodhead Publishing Limited.
- Li, Jing, Ting Ye, Xiaofang Wu, Jian Chen, Shishuai Wang, Liufeng Lin, dan Bin Li. 2014. “Preparation and characterization of heterogeneous deacetylated konjac glucomannan.” *Food Hydrocolloids* 40:9–15.
- Li, Long, Hui Ruan, Liu Liu Ma, Wei Wang, Ping Zhou, dan Guo Qing He. 2009. “Study on swelling model and thermodynamic structure of native konjac glucomannan.” *Journal of Zhejiang University: Science B* 10(4):273–79.
- Maekaji, K. 1978. “Determination of acidic component of konjac mannan. ” *Agric. Biol. Chem.* 42: 177–178.
- Meyers, R. R. 1960. The physical stability of dispersions basic considerations, *Advan. Chem. Ser.*, 25
- Moore, E. Charlotte. 1970. "Ionization Potentials and Ionization Limits Derived from The Analyses of Optical Spectra." Washington DC: National Bureau of Standards

- Moreno, Helena M., Beatriz Herranz, A. Javier Borderías, dan Clara A. Tovar. 2016. "Effect of high pressure treatment on the structural, mechanical and rheological properties of glucomannan gels." *Food Hydrocolloids* 60:437–44.
- Nurmala, Ayang Novera, Eko Budi Susatyo, dan Fransisca Widhi Mahatmanti. 2018. "Indonesian Journal of Chemical Science Sintesis Kitosan dari Cangkang Rajungan Terkomposit Lilin Lebah dan Aplikasinya sebagai Edible Coating pada Buah Stroberi." *J. Chem. Sci* 7(3).
- Oakenfull, D dan Glicksman, M. 1987: Gelling agents, C R C Critical Reviews in Food Science and Nutrition, 26:1, 1-25
- Ouyang, Dongmei, Jie Deng, Kai Zhou, Yuxuan Liang, Yongchun Chen, Da Wang, Jing Zhong, Yuanming Sun, dan Meiying Li. 2020. "The effect of deacetylation degree of konjac glucomannan on microbial metabolites and gut microbiota in vitro fermentation." *Journal of Functional Foods* 66(October 2019):103796.
- Pasaribu, Shafira Ruwaidah. 2019. "Pengaruh Perbandingan Tepung Umbi Porang dengan Tepung Ubi Jalar Oranye dan Jumlah Kuning Telur Terhadap Mutu Emulsi Salad Dressing." Universitas Sumatera Utara.
- Putri, Gavinda Shailla Nidya, Bhakti Etza Setiani, dan Antonius Hintono. 2017. "Karakteristik Selai Wortel (*Daucus carota* L) Dengan Penambahan Pektin." *Jurnal Aplikasi Teknologi Pangan* 6(4):156–60.
- Purdiyanti, Inur Tivani. 2019. "Pembuatan dan Uji Sifat Fisik Gel Antinyeri Kombinasi Minyak Atsiri Bunga Cengkeh (*Syzygium aromaticum*(L.) dan Sereh (*Cymbopogon nardus* L. Rendle)." *Jurnal Ilmiah Manuntung* 5(1):38–41.
- Rachmawati, Widia, Dosen Pembimbing Ii, Program Magister, Departemen Kimia, dan Fakultas Ilmu Alam. 2018. "Konjac Glucomannan -Agar-Gliserin Biopolimer Hard Capsule Sebagai Konjac Glucomannan-Agar-Gliserin Biopolimer of Hard Capsule for."
- Rahayuningdyah, Dewi Wuragil, Diana Lyrawati, dan Ferri Widodo. 2020. "Pengembangan Formula Hidrogel Balutan Luka Menggunakan Kombinasi Polimer Galaktomanan dan PVP." *Pharmaceutical Journal of Indonesia* 005(02):117–22.
- Rahim, Abdul, Syahraeni Kadir, dan Jusman. 2017. "The influence degree of substitution on the physicochemical properties of acetylated arenga starches." *International Food Research Journal* 24(1):102–7.
- Rahmawati, Suci, Dessy Utari, Novita Herdiana, dan Lola Inke. 2021. "Pengaruh Penambahan Tepung Porang Pada Proses Pembuatan Mi Ikan Patin Sebagai Gelling Agent." 2(2):70–78.
- Saha, Dipjyoti, dan Suvendu Bhattacharya. 2010. "Hydrocolloids as thickening and gelling agents in food: A critical review." *Journal of Food Science and Technology* 47(6):587–97.
- Samantha, Kezia, Thomas Indarto Putut Suseno, dan Adrianus Rulianto Utomo. 2019. "Pengaruh Konsentrasi Karaginan Terhadap Karakteristik Fisikokimia Dan Organoleptik Selai Murbei (*Morus Nigra* L.) Lembaran." *Jurnal Teknologi Pangan dan Gizi* 18(2):119–25.
- Solo-de-Zaldívar, B., C. A. Tovar, A. J. Borderías, dan B. Herranz. 2014. "Effect of deacetylation on the glucomannan gelation process for making restructured seafood products." *Food Hydrocolloids* 35:59–68.
- Tatirat, Orawan, dan Sanguansri Charoenrein. 2011. "Physicochemical properties of konjac glucomannan extracted from konjac flour by a simple centrifugation process." *LWT - Food Science and Technology* 44(10):2059–63.
- Thomas, W. R. 1997. "Konjac gum." London: Blackie Academic & Professional

- Udarno, L. 2020. "Porang (*Amorphophallus muelleri*) dan Cara Budidaya." *Warta: Badan Penelitian dan Pengembangan Pertanian*. 26(1):1-6
- Verawati, Besti, Nopri Yanto, dan Widawati. 2021. "Pembuatan dan Uji Mutu Tepung Porang." Universitas Pahlawan Tuanki Tambusai.
- Wang, Meng, Weitao He, Xiaojuan Jin, dan Xianliang Song. 2015. "Oxidized Konjac Glucomannan as a Paper Strength Agent." *BioResources* 10(4):8089–97.
- Wardhani, D. H., H. Cahyono, M. F. H. Dwinanda, P. R. Nabila, N. Aryanti, dan D. R. Pangestuti. 2019. "Effect of KOH as Deacetylation Agent on Physicochemical Properties of Glucomannan." *Journal of Physics: Conference Series* 1295(1).
- Wardhani, Dyah Hesti, Fatoni Nugroho, Nita Aryanti, dan Aji Prasetyaningrum. 2018. "Simultaneous effect of temperature and time of deacetylation on physicochemical properties of glucomannan." *ASEAN Journal of Chemical Engineering* 18(1):1–8.
- Wardhani, Dyah Hesti, Dewi Puspitosari, Mochammad A. Ashidiq, Nita Aryanti, dan Aji Prasetyaningrum. 2017. "Effect of deacetylation on functional properties of glucomannan." *AIP Conference Proceedings* 1855.
- Wenling, Cao, Duohui Jing, Jiamou Li, Yandao Gong, Nanming Zhao, dan Xiufang Zhang. 2005. "Effects of the degree of deacetylation on the physicochemical properties and Schwann cell affinity of chitosan films." *Journal of Biomaterials Applications* 20(2):157–77.
- Wei, Yu, Yuanlan Wang, dan Xinjian He. 2012. "Gel properties of κ -Carrageenan-Konjac gum mixed gel and their influence factors." *Advanced Materials Research* 396–398:1389–93.
- Wijaya, Ferry, Andhi Fahrurroji, dan Hafrizal Riza. 2019. "Formulasi dan Evaluasi Mikroemulgel Hesperidin dengan Campuran Asam Oleat, Tween 80, Propilen Glikol, dan Air." *Technical Acoustics* 26(2):4–7.
- Williams, Peter A. 2007. "Gelling Agents." *Handbook of Industrial Water Soluble Polymers* 73–97.
- Xiao, Man, Shuhong Dai, Le Wang, Xuewen Ni, Wenli Yan, Yapeng Fang, Harold Corke, dan Fatang Jiang. 2015. "Carboxymethyl modification of konjac glucomannan affects water binding properties." *Carbohydrate Polymers* 130:1–8.
- Xu, Wei, Sujuan Wang, Ting Ye, Weiping Jin, Jinjin Liu, Jieqiong Lei, Bin Li, dan Chao Wang. 2014. "A simple and feasible approach to purify konjac glucomannan from konjac flour - Temperature effect." *Food Chemistry* 158:171–76.
- Yanuriati, Anny, Djagal Wiseso Marseno, Rochmadi, dan Eni Harmayani. 2017. "Characteristics of glucomannan isolated from fresh tuber of Porang (*Amorphophallus muelleri* Blume)." *Carbohydrate Polymers* 156(April 2020):56–63.
- Yoshimura, M., M. A. K. Williams, T. J. Foster, dan I. T. Norton. n.d. "Gelation Behaviour of Konjac Glucomannan with Different." *Time* 59(2001):38–50.
- Yuan, Li, Jiamei Yu, Jianlou Mu, Tong Shi, Quancai Sun, Wengang Jin, dan Ruichang Gao. 2019. "Effects of deacetylation of konjac glucomannan on the physico-chemical properties of surimi gels from silver carp (*Hypophthalmichthys molitrix*)." *RSC Advances* 9(34):19828–36.
- Zhang, Chi, Benchao Han, Xue Yao, Lei Pang, dan Xuegang Luo. 2013. "Synthesis of konjac glucomannan phthalate as a new biosorbent for copper ion removal." *Journal of Polymer Research* 20(1).
- Zhang, Cui, Ji Da Chen, dan Feng Qing Yang. 2014. "Konjac glucomannan, a promising polysaccharide for OCDDS." *Carbohydrate Polymers* 104(1):175–81.
- Zhang, Ling, Lirong Zeng, Xuan Wang, Juncheng He, dan Qiong Wang. 2020. "The influence of Konjac glucomannan on the functional and structural properties of wheat

starch.” *Food Science and Nutrition* 8(6):2959–67.

Zhou, Yun, Runsheng Jiang, Wade S. Perkins, dan Yongqiang Cheng. 2018. “Morphology evolution and gelation mechanism of alkali induced konjac glucomannan hydrogel.” *Food Chemistry* 269:80–88.