



## BAB V

### KESIMPULAN DAN SARAN

#### 5.1. Kesimpulan

1. Pembuatan pati tapioka pregelatinisasi dengan pelarut etanol berhasil dilakukan.
2. Metode pembuatan pati tapioka pregelatinisasi dengan pengolahan menggunakan alkohol dan basa lebih baik dibandingkan dengan metode *drum drying*.
3. Semakin besar konsentrasi NaOH yang digunakan maka produk pati tapioka pregelatinisasi yang dihasilkan semakin baik.
4. Temperatur optimum untuk gelatinisasi pati tapioka dengan menggunakan pelarut etanol adalah 35 °C.

#### 5.2. Saran

1. Melakukan penelitian dengan variasi pelarut yang digunakan.
2. Melakukan penelitian dengan variasi jumlah pelarut yang digunakan.
3. Mencari jumlah NaOH yang optimum untuk digunakan dalam pembuatan pati pregelatinisasi.
4. Melakukan penelitian dengan variasi NaOH antara 0,4 M – 0,6 M, dan lebih dari 0,6 M.



## DAFTAR PUSTAKA

Adedokun, M. O. & Itiola, O. A., 2010. Material properties and compaction characteristics of natural and pregelatinized forms of four starches. *Carbohydrate Polymers* 79, pp. 818-824.

Anon., 2016. [Online]  
Available at: <https://www.bps.go.id/linkTableDinamis/view/id/880>

Badan Standardisasi Nasional, 2011. *SNI 3451:2011*. Jakarta: Dokinfo BSNI.

Belitz, H. D. & Grosch, W., 1999. *Food Chemistry*. Berlin: Springer.

Bello-Pérez, L. A. et al., 2000. Preparation and Properties of Physically Modified Banana Starch Prepared by Alcoholic-Alkaline Treatment. *Starch/Stärke* 52, pp. 154-159.

BeMiller, J. & Whistler, R., 2009. *Starch: Chemistry and Technology Third Edition*. New York: Elsevier.

Bertolini, A. C., 2010. *STARCHES: Characterization, Properties, and Applications*. Boca Raton: CRC Press.

Bradbury, J. H. & Holloway, W. D., 1988. *Chemistry of Tropical Root Crops: Significance for Nutrition and Agriculture in the Pacific*. Canberra: Australian Centre for International Agricultural Research.

Chandanasree, D., Gul, D. K. & Riar, C., 2015. Effect of Hydrocolloids and Dry Heat Modification on Physicochemical, Thermal, Pasting and Morphological Characteristics of Cassava (*Manihot esculenta*) Starch. *Food Hydrocolloids*.

Chen, J. & Jane, J., 1994. Propeties of Granular Cold-Water-Soluble Starches Prepared by Alcoholic-Alkaline Treatments. *Cereal Chem.* 71, pp. 623-626.

Chi, C.-w. & Solarek, D., 2009. Modification of Starches. In: *Starch: Chemistry and Technology Third Edition*. New York: Elsevier.

Chi, C. W., 1993. United States, Patent No. 5,185,176.

Cui, S. W., 2005. *Food Carbohydrates Chemistry, Physical Properties, and Application*. Boca Raton, London, New York, Singapore: CRC Press.

Das, A. B., Singh, G., Singh, S. & Riar, C. S., 2010. Effect of Acetylation and Dual Modification on Physico-chemical, Rheological and Morphological Characteristics of Sweet Potato (*Ipomoea batatas*) Starch. *Carbohydrate Polymers* 49, pp. 725-732.

Eastman, J. E. & Moore, C. O., 1984. United States, Patent No. 4,465,702.

Elder, A. L. & Schoch, T. J., 1959. *Cereal Chem. Today*. s.l.:s.n.

Eliasson, A. C., 2000. *Starch in Food: Structure, Function and Applications..* Cambridge: CRC Press.

Fennema, O. R., Damodaran, S. & Parkin, K. L., 2008. *Fennema's: Food Chemistry Fourth Edition.* Boca Raton: CRC Press.

French, D., 1984. Organization of starch granules. In: *Starch: Chemistry and Technology, 2nd ed..* New York: Academic Press, p. 183.

Geankolis, C. J., 1993. *Transport Processes and Separation Process Principles (Includes Unit Operations) (Fourth Edition).* Upper Saddle River: Prentice Hall.

Germino, n.d. United States, Patent No. 3,583,874.

Haghayegh, G. & Schoenlechner, R., 2011. Physically modified starches: A review. *Journal of Food, Agriculture & Environment Vol.9 , Volume 9*, pp. 27-29.

Halley, P. J. & Averous, L., 2014. *Starch Polymers From Genetic Engineering to Green Applications.* California: Elsevier.

Hedayati, S. et al., 2016. Effects of NaCl and CaCl<sub>2</sub> on physicochemical properties of pregelatinized and granular cold-water swelling corn starches. *Food Chemistry 213*, pp. 602-608.

Hoover, R., 2001. Composition, molecular structure, and physicochemical properties of tuber and root starches: a review. *Carbohydrate Polymers 45*, pp. 253-267.

Hui, Y. H., 2006. *Handbook of Food Science, Technology, and Engineering Volume I.* USA: CRC Press.

Istanti, I., 2005. Pengaruh Lama Penyimpanan Terhadap Karakteristik Kerupuk Ikan Sapu-Sapu. *Bogor: Institut Pertanian Bogor .*

Jane, J.-l. & Seib, P. A., 1991. United States, Patent No. 5,057,157.

Jufri, A. F., 2011. Penanganan Penyimpanan Kentang Bibit (*Solanum tuberosum L.*) Di Hikmah Farm, Pangalengan, Bandung, Jawa Barat. *Bogor Agricultucal University.*

Kaur, A., Singh, N., Ezekiel, R. & Guraya, H. S., 2007. Physicochemical, Thermal and Pasting Properties of Starches Separated from Different Potato Cultivars Grow at Different Locations. *Food Chemistry 101*, pp. 643-651.

Li, J. & Corke, H., 1999. Physicochemical Properties of Normal and Waxy Job's Tears (*Coix lachryma-jabi L.*) Starch. *Cereal Chem. 60*, pp. 413-416.

Lim, H., BeMiller, J. & Lim, S., 2006. Physical modification of waxy maize starch by dry heating with ionic gums. *Journal of Applied Glycoscience ,* pp. 281-286.

Li, W. et al., 2014. Physically modified common buckwheat starch and their physicochemical and structural properties. *Food Hydrocolloids 52*, pp. 237-244.

- Majzoobi, M., Kaveh, Z. & Farahnaky, A., 2015. Effect of acetic acid on physical properties of pregelatinized wheat and corn starch gels. *Food Chemistry* 196.
- Mason, W. R., 2009. Starch Use in Foods. In: *Starch: Chemistry and Technology Third Edition*. New York: Elsevier, pp. 746-767.
- Mishra, S. & Rai, T., 2006. Morphology and Functional Properties of Corn, and Tapioca Starches. *Food Hydrocolloids* 81, pp. 557-566.
- Mitchell, W. A. & Seidel, W. C., 1981. United States, Patent No. 4,260,642.
- Niken, A., Adepristian, D. & Sumarno, S., 2013. Isolasi Amilosa dan Amilopektin dari Pati Kentang. *Diponegoro University Institutional Repository*.
- Nurdin, S. U. A. S. & R. S., 2008. Karakteristik Fungsional Polisakarida Pembentuk Gel Daun Cincau Hijau (Premna oblongifolia Merr.). *Jurnal Teknologi dan Industri Hasil Pertanian*, pp. 4-9.
- Oosten, B. J., 1982. Tentative hypothesis to explain how electrolytes affect the gelatinization temperature of starches in water. *Starch/ Starke* 34, p. 233.
- Pontoh, J. & Low, N. H., 2012. Partial Characterization of the Physicochemical Properties of Six Indonesia Palma Starches. *B. Palma*, pp. 46-53.
- Pratiwi, M. A., 2008. Pemanfaatan Tepung Hotong (Setaria italica (L) Beauv.) dan Pati Sagu dalam Pembuatan Cookies. *Bogor Agricultural University*.
- Rahman, A. M., 2007. Mempelajari Karakteristik Kimia Dan Fisik Tepung Tapioka Dan Mocal (Modified Cassava Flour) Sebagai Penyalut Kacang Pada Produk Kacang Salut.
- Rai, S. M. T., 2006. Morphology and Functional Properties of Corn, and Tapioca Starches. *Food Hydrocolloids*, pp. 557-566.
- Rajagopalan, S. & Seib, P. A., 1992. Granular Cold-water-soluble Starches Prepared at Atmospheric Pressure. *Journal of Cereal Science* , pp. 13-28.
- Rowe, R. C., Sheskey, P. J. & Weller, P. J., 2003. *Handbook of Pharmaceutical Excipients Fourth Edition*. London: The Pharmaceutical Press.
- Schwartz, D. & Whistler, R. L., n.d. History and Future of Starch. In: s.l.:s.n.
- Shrestha, A. K. & Halley, P. J., n.d. Starch Modification to Develop Novel Starch-Biopolymer Blends: State of Art and Perspectives. In: s.l.:s.n.
- Singh, N. et al., 2006. Relationship Between Physicochemical, Morphological, Thermal, Rheological Properties of Rice Starches. *Food Hydrocolloids*, pp. 532-542.
- Srichuwong, S. et al., 2012. Freeze-thaw Stability of Starches from Different Botanical Sources: Correlation with Structural Features. *Carbohydrate Polymers* 196, pp. 1275-1279.

- Stahl, J. et al., 2007. Physicochemical Properties of Pinhao (*Araucaria angustifolia*, Bert, O. Ktze) Starch Phosphates. *Carbohydrate Polymers* 60, pp. 1206-1214.
- Stephen, A. M., Phillips, G. O. & William, P. A., 2006. *Food Polysaccharides and Their Application*. Boca Raton: CRC Taylor & Francis.
- Suarni, I. U., Firmansyah & Aqil, M., 2013. Keragaman Mutu Pati Beberapa Varietas Jagung. *Penelitian Pertanian Tanaman Pangan*.
- Suortti, T., Gorenstein, M. & Roger, P., 1998. *J. Chromatogr. A* 828, p. 515–521.
- Tako, M., Tamaki, Y., Teruya, T. & Takeda, Y., 2014. The Principles of Starch Gelatinization and Retrogradation.
- Tester, R. K. J. & Xin, Q., 2004. *Structure of Amylose and Amylopectin*. s.l.:s.n.
- Tester, R. & Morrison, W., 1990. Swelling and gelatinization of cereal starches. I. Effects of amylopectin, amylose and lipids. *Cereal Chemistry* 61, pp. 551-557.
- Truong, V. D. & Avula, R. Y., 2010. Sweet Potato Purees and Powders for Functional Food Ingredients. *Nova Science Publishers, Inc*, pp. 117-161.
- Tziotis, A. et al., 2004. Structural Properties od Starch Fractions Isolated From Normal and Mutant Corn Genotypes Using Different Methods. *Cereal Chemistry* 89, pp. 611-620.
- V., S.-k. & M., S., 2006. *Carbohydrate Polymer* 51, pp. 371-380.
- Wurzburg, O. B., 1986. *Modified Starches: Properties and Uses*. Boca Raton: CRC Press.
- Yuliasih, L., 2008. Fraksinasi dan Asetilasi Pati Sagu Serta Aplikasi Produknya Sebagai Bahan Campuran Plastik Sintetik (Disertasi). *Institut Pertanian Bogor*.
- Yusuf, H., Radjaram, A. & Setyawan, D., 2008. Modifikasi Pati Singkong Sebagai Bahan Pembawa Cetak Langsung. *J. Penelit. Med. Eksaka*, pp. 31-47.