



REFERENCES

- Abedin, N. H. Z., 2016. Gelatin, in *Encyclopedia of food and health* (B. Caballero, P. M. Finglas, F. Toldra, eds.), Academic Press, Oxford, 190-195.
- Anonim, 2016. *Proteases for biocatalysis for smarter chemical synthesis*, Novozymes, Copenhagen, Denmark.
- Aewsiri, T., Benjakul, S., and Visessanguan, W., 2009. Functional properties of gelatin from cuttlefish (*Sepia pharaonis*) skin as affected by bleaching using hydrogen peroxide, *Food Chem.*, 115: 243-249.
- Aewsiri, T., Benjakul, S., Visessanguan, W., Wierenga, P. A. Gruppen, H., 2011. Improvement of foaming properties of cuttlefish skin gelatin by modification with N-Hydroxysuccinimide esters of fatty acid, *Food Hydrocolloids*, 25: 1277-1284.
- Aewsiri, T., Benjakul, S., Visessanguan, W., Wierenga, P. A. Gruppen, H., 2012. Surface activity and molecular characteristics of cuttlefish skin gelatin modified by oxidized linoleic acid, *International Journal of Biological Macromolecules*, 48: 650–660.
- Appelqvist, I. A. M., Golding, M., Vreeker, R., Zuidam, N. J., 2016. Emulsions as delivery systems in foods, in *Encapsulation and Controlled Release Technologies in Food Systems* (J. M. Lakkis, ed), Blackwell Publishing, Ames, IA, 41-81.
- Anderson, G. W., Zimmerman, J. E., and Callahan, F. M., 1964. The use of Esters of Nhydroxysuccinimide in peptide synthesis, *J. Am. Chem. Soc.*, 86: 1839-1842.
- Arntfield, S. D., 2004. Protein from oil-producing plants, in *Proteins in Food Processing* (Yada R. Y., ed.), Woodhead Publishing, Cambridge, 187-222.
- Benjakul, S., Oungbho, K., Visessanguan, W., Thiansilakul, Y., Roytrakul, S., 2009. Characteristics of gelatin from the skins of bigeye snapper (*Priacanthus tayenus* and *Priacanthus macracanthus*), *Food Chem.*, 116(2): 445-451.
- Binks, B. P., 1998. Emulsions recent advances in understanding, in *Modern Aspects of Emulsion Science* (B. P. Binks, ed), Royal Society of Chemistry, London, 1-55.
- Cabra, V., Arreguin, R., and Farres, A., 2008. Emulsifying properties of proteins, *Bol. Soc. Quim. Mex*, 2: 80-89.



- Chen, S Tang, L., Su, W., Weng, W., Osako, K, Tanaka, M., 2015. Separation and characterization of alpha-chain subunits from tilapia (*Tilapia zillii*) skin gelatin using ultrafiltration, *Food Chemistry*, 188 350–356.
- Church, F.C., Swaisgood, H.E., Porter, D.H. and Catignani, G.L., 1983. Spectrophotometric assay using o-Phthaldialdehyde for determination of proteolysis in milk and isolated milk proteins, *Journal of Dairy Science*, 6(6), 1219-1227.
- Damodaran, S., 1996. Amino acids, peptides and proteins, in *Food Chemistry* (O. R. Fennema, ed), Marcel Dekker, Inc., New York, 321-430.
- Demetriades, K., Coupland, J. N., Mc Clements, D. J., 1997. Physical Properties of whey protein stabilized emulsions as related to pH and NaCl, *Journal of Food Science* 62(2):342.
- Dickinson, E., 1988. The structure and stability of emulsions, in *Food Structure- Its Creation and Evaluation* (J. M. V. Blanshard and J. R. Mitchell, eds.), Butterworths, London, 41-57.
- Dickinson, E. and Euston, S.R., 1991. Stability of food emulsions containing both protein and polysaccharide, in *Food Polymers, Gels, Colloids* (E. Dickinson, ed.), Royal Society of Chemistry, Cambridge, 132-146.
- Dickinson, E., 2009. Hydrocolloids as emulsifiers and emulsion stabilizers, *Food Hydrocolloids*, 23: 14372-1482.
- Djagny, K. B., Wang, Z. and Xu, S., 2001. Conformational changes and some functional characteristics of gelatin esterified with fatty acid, *J. Agric. Food Chem.*, 49: 2987–2991.
- Fillery-Travis, A., Mills, ENC. and Wilde, P, 2000. Protein-lipid interactions at interfaces, *Grasas y Aceites*, 51 (1-2): 50-55.
- Giménez, B., Alemán, A., Montero, P., Gómez-Guillén, M. C., 2009. Antioxidant and functional properties of gelatin hydrolysates obtained from skin of sole and squid, *Food Chem.*, 114: 976–983.
- Grygierczyk, G., 2006. Chromatographic analysis of organic compounds on impregnated chemically bonded stationary phases Part 1, *Acta Chromatography*, 17: 302-313.
- Haug, I. J. and Draget, K. I., 2011. Gelatin in *Handbook of Food Protein* (G. O. Philips and P. A. Williams, eds), Woodhead Publishing, Cambridge, 92-105.
- Heitmann, P., 1968. A model for sulphydryl groups in Protein. Hydrophobic interactions of the side chain in micelles, *Eur. J. Biochem.*, 3: 346-350.
- Held, Paul., 2001. Total protein quantification. <https://www.biotwk.com/resources/application-notes/total-protein-quantification-using-opa/> October 2016.



- Jellouli, K., Balti, R., Bougatef, A., Hmidet, N. and Barkia, A., 2011. Chemical composition and characteristics of skin gelatin from grey triggerfish (*Balistes capriscus*), *Food Science and Technology*, 44: 1965–1970.
- Joullié, M. M. and Lassen, K. M., 2010. Evolution of amide bond formation, *ARKIVOC* (viii): 189-250.
- Jungermann, E, Gerecht, JF, Krems, I.J., 1956. The preparation of long chain N-acylamino acids, *J. Am. Chem. Soc.*, 78(1):172–174.
- Karsa, D. R., 2006. What are Surfactants, in *Chemistry and Technology of Surfactants* (R.J. Farn, ed.), Blackwell Publishing Ltd., Oxford, 1-13.
- Keenan, T. R., 1997. Gelatin, in *Handbook of Biodegradable Polymers* (A. J. Domb, J. Kost, D. Wiseman, eds), Hardwood Academic Publishers, Amsterdam, 307-317.
- Kumigai, H., 2012. Chemical and Enzymatic Protein Modifications and Functionality Enhancement, in *Food Proteins and Peptides: Chemistry, Functionality, Interactions, and Commercialization* (N. S. Hettiarachchy, K. Sato, M. R. Marshall, A. Kannan, eds.), CRC Press, Boca Raton, FL, 165-198.
- Kusumaningrum, I., 2011. Optimasi ekstraksi dan karakterisasi gelatin ikan tenggiri (*Scomberomorus commersoni*) segar dan kering, *Master Thesis*, Fakultas Teknologi Pertanian UGM, Yogyakarta.
- Lapidot, Y., Rappaport, S., and Wolman, Y., 1967. Use of esters of N-hydroxysuccinimide in the synthesis of N-acylamino acids, *Journal of Lipid Res.*, 8: 142-145.
- Lauer, B. H., and B. E. Baker, 1977. Amino acid composition of casein isolated from the milks of different species, *Can. J. Zool.*, 55: 231-236.
- Leclerc, J., Benoiton, L., 1968. On the selectivity of acylation of unprotected diamino acids, *Can. J. Chem.* 46, 1047-1051.
- Lin, L.H., Chen, K. M., 2006. Preparation and surface activity of gelatin derivative surfactants, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 272: 8–14.
- Lin, L. H., Chen, K. M., Liu, H. J., Chu, H. C., Kuo, T. C., Hwang, M. C., Wang, C. F., 2012. Preparation and surface activities of modified gelatin–glucose conjugates, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 408: 97–10.
- Lundblad, R. L., 2012. *Chemical modification of biological polymers*, CRC Press, Boca Raton.
- Ma, C-Y., Wood, D. F., 1987. Functional Properties of oat proteins modified by acylation, trypsin hydrolysis or linoleate treatment, *J. Am. Chem. Soc.*, 64 12: 1726-1731.



- Magdassi, S., Toledano, O., and Zakay-Rones, Z., 1996. Solubilization in colloidal immunoclusters, *Journal of Colloid and Interface Science*, 184: 360-364.
- Mahmood, K., Muhammad, L., Ariffin, F., Razak, H. K., Sulaiman, S., 2016. Review of fish gelatin extraction, properties and packaging applications, *Food Science and Quality Management*, 56: 47-59.
- Matemu, A., Kayahara, H., Murasawa, H., Katayama, S., and Nakamura, S., 2011. Improved emulsifying properties of soy proteins by acylation with saturated fatty acids, *Food Chem.*, 124 (2): 596–602.
- Matemu, A., Kayahara, H., Murasawa, H., Katayama, S., and Nakamura, S., 2012. Improving Surface Functional Properties of Tofu Whey-Derived Peptides by Chemical Modification with Fatty Acids, *J. Food Sci.*, 77(4) :333-338.
- McClements, D. J., 2016. *Food Emulsions Principles, Practices, and Techniques*, CRC Press Taylor & Francis Group, New York.
- Monahan, F. J., McClements, D. J., & German, J. B., 1996. Disulfide-mediated polymerization reactions and physical properties of heated WPI-stabilized emulsions, *Journal of Food Science*, 61(3), 504-509.
- Montalbetti, C. A. G. N. and Falque, V., 2005. Amide bond formation and peptide coupling, *Tetrahedron*, 61: 10827–10852.
- Osen, M.J. and Kunjappu, J.T., 2012. Surfactants and Interfacial Phenomena, John Wiley & Sons Ltd., New York.
- Paquet, A., 1975. Succinimidyl esters of fatty acids for amino acid acylation, *Can. J. Chem.*, 54: 733-737.
- Pearce, K. N., and Kinsella, J. E., 1978. Emulsifying properties of proteins: evaluation of a turbidimetric technique, *J. Agric. Food Chem.*, 26: 716-723.
- Petersen, B. R., 1981. The Impact of the Enzymic Hydrolysis Process on Recovery and Use of Proteins in *Enzymes and Food Processing* (G. G. Birch, N. Blakebrough, and K. J. Parker, eds.), Applied Science, London, 149-176.
- Pletnev, M. Y., 2001. Chemistry of Surfactants, in *Surfactants: Chemistry, Interfacial Properties, Applications* (D. Möbius, R. Miller, V.B. Fainerman, eds.), Elsevier, Amsterdam, 1-83.
- Prasertsan, P., Jitbunjerdkul, S. Trairatananukoon, Prachumratna, T., 2003. Production of Enzyme and Protein Hydrolysate from Fish Processing Waste, in *New Horizons in Biotechnology* (A. Pandey, S. Roussos, C. Augur, C. R. Soccol eds.), Kluwer Academic Publishers, 63-71.
- Robinson, H. W. and Hodgen, C. H., 1940. The biuret reaction in the determination of serum protein. 1. A study of the conditions necessary for



the production of the stable color which bears a quantitative relationship to the protein concentration, *J. Biol. Chem.*, 135: 707-725.

Sahin, S. and Sumnu, S.G., 2006. *Physical Properties of Foods*, Springer, New York.

Schrieber, R. and Gareis, H., 2007. *Gelatine Handbook Theory and Industrial Practice*, WILEY-VCH Verlag GmbH & Co., Weinheim.

Schwenke, K. D., Knopfe, C., Seifert, A., Gornitz, E., and Ziwer, D., 2011. Acetylation of faba bean legumin: Conformational changes and aggregation, *J. Sci. Fd. Agric.*, 81 (1): 126-134.

Shimada, A., Yazwa, E. Arai, S., 1982. Preparations of proteinaceous surfactants by enzymatic modification and evaluation of their functional properties in a concentrated emulsion system, *Agr. Biol. Chem.*, 46 (1), 173-182.

Sliwiok, J., and Macioszczyk, A., 1997. The Application of chromatographic visualization test to determination of hydrophobic properties of aliphatic compounds, *Microchemical journal*, 23: 121-124.

Smith G.D. and Barden R. E., 1975. Some physico-chemical properties of aqueous solutions of N alpha-acyl-l-histidine, *Chem. Phys. Lipids.*, 14(1):1-14.

Stein, W. H. and Moore, S., 1949. Amino acid composition of -lactoglobulin and bovine serum albumin, *J. Biol. Chem.*, 178:79-91.

Sukhor, N., 2013. Gelatin Extraction from Silver Catfish (*Pangasius Sutchi*) skin and determination of Its functional properties, *Bachelor Thesis*, Faculty of Applied Science UTM, Selangor.

Sunday, A. G., Ifeanyi, O. E., Benedict L, E. O., 2014. Isolation and comparism of fatty acid and acylglycerol contents in local hybrid coconuts (*Cocos Nucifera*), *World Journal of Pharmacy and Pharmaceutical Sciences*, 3 (4): 113-132.

Surh J., Gu, Y. S., Decker, E. A. and McClements, D. J., 2005. Influence of environmental stresses on stability of o/w emulsions containing cationic droplets stabilized by SDS-fish gelatin, *J. Agric. Food Chem.*, 53 (10): 4236-4244.

Surh, J., Decker, E. A., and McClements, J. D., 2006. Properties and stability of oil-in-water emulsions stabilized by fish gelatin, *Journal of Food Hydrocolloids*, 20: 596–606.

Tadros, T. F., 2013. Emulsion formation, stability, and rheology, in *Emulsion Formation and Stability* (T. F. Tadros, ed), Wiley-VCH Verlag GmbH&Co, Weinheim, 1-75.



- Tavano, O. L., 2017. Proteases, in *Microbial Enzyme Technology in Food Applications* (R. C. Ray and C, M, Rosell, eds.), CRC Press, Boca Raton, FL, 162-179.
- Toledano, O and Magdassi, S., 1997. Formation of surface active gelatin by covalent attachment of hydrophobic chains, *Journal of Colloid and Interface Science*, 193: 172–177.
- Walstra, P. and Smulders, P.E.A., 1998. Emulsion formation, in *Modern Aspects of Emulsion Science* (B. P. Binks, ed.), Royal Society of Chemistry, Cambridge, 56-99.
- Wanasundara, Shahidi F., 1997. Functional properties of acylated flax protein isolates, *J. Agric. Food Chem.*, 45(7):2431–2441.
- Wierenga, P. A., Meinders, M. B. J., Egmond, M. R., Voragen, F. A. G. J. and de Jongh, H. H. J., 2003. Protein exposed hydrophobicity reduces the kinetic barrier for adsorption of ovalbumin to the air-water interface, *Langmuir*, 19 (21): 8964-8970.