

References

- Adams, G. E., Armstrong, R. C., Charlesby, A., Mucheal, B. D. and Willson, R. L. 1969. Pulse radiolysis of sulphur compounds: part III. Trans. Faraday Soc. 65: 732-742.
- Agarwal, A. and Sohal, R. S. 1994. Aging and proteolysis of oxidized proteins. Biochem. Biophys. 309: 24-28.
- Akahane, T., Chihara, S., Yoshida, Y., Tsuchiya, T., Nogchi, S., Ookami, H. and Matsumoto, J. J. 1984. Roles of constituent proteins in gel properties of cooked meat gels. Bull. Jap. Soc. Sci. Fish. 50: 1029-1033.
- Almas, K. A. 1981. Chemistry and microbiology of fish proceeding. Dept. of Biochemistry, Norwegian Inst. of Technol., Univ. of Trondheim. Norway.
- An, H., Peter, M. Y. and Seymour, T. A. 1996. Role of endogenous enzymes in surimi gelation. Trends. Food Sci. Technol. 7: 321-327.
- An, H., Weerasinghe, V., Seymour, T. A. and Morrissey, M. T. 1994. Cathepsin degradation of Pacific whiting surimi protein. J. Food Sci. 59: 1013-1017.
- Ando, H., Adachi, M., Umeda, K., Matsuura, A., Nonaka, M., Uchio, R., Tanaka, H. and Motoki, M. 1989. Purification and characteristics of a novel transglutaminases derived from microorganisms. Agric. Biol. Chem. 53: 2613-2617.
- AOAC. 1999. Official Method of Analysis, 16th ed. Association of Official Analytical Chemists. Washiton, D. C.
- Arai, K., Kawamura, K. and Hayashi, C. 1973. The relative thermostabilities of the actomyosin-ATPase from the dorsal muscles of various fish species. Bull. Jap. Soc. Sci. Fish. 39: 1077-1082.
- Araki, H. and Seki, N. 1993. Comparison of reactivity of transglutaminase to various fish actomyosins. Nippon Suisan Gakkaish. 59: 711-716.

- Asagami, T., Ogiwara, M., Wakameda, A. and Noguchi, S. 1995. Effect of microbial transglutaminase on the quality of frozen surimi made from various kinds of fish species. *Fish. Sci.* 61: 267-272.
- Ashie, I. N. A. and Lanier, T. C. 2000. Transglutaminase in seafood processing. In *Seafood Enzymes Utilization and Influence on Postharvest Seafood Quality*. (Haard, N. F. and Simpson, B. K., eds.). p. 147-166. New York. Marcel Dekker.
- Azuma, Y. and Konno, K. 1998. Freeze denaturation of carp myofibril compared with thermal denaturation. *Fish. Sci.* 64: 287-290.
- Benjakul, S. and Bauer, F. 2000. Physicochemical and enzymatic change of cod muscle protein subjected to freeze-thaw cycle. *J. Sci. Food Agric.* 80: 1143-1150.
- Benjakul, S. and Visessanguan, W. 2003. Transglutaminase-mediated setting in bigeye snapper surimi. *Food Research Int.* 36: 253-266.
- Benjakul, S. Seymour, T. S., Morrissey, M. T. and An, H. 1997. Physico-chemical changes in Pacific whiting muscle proteins during iced storage. *J. Food Sci.* 62: 729-733.
- Benjakul, S. Visessanguan, W. Riebroy, S. Ishizaki, S. and Tanaka, M. 2002. Gel-forming properties of surimi produced from bigeye snapper, *Priacanthus tayenus* and *P. macracanthus*, stored in ice. *J. Sci. Food Agric.* 82: 1442-1451.
- Benjakul, S. Visessanguan, W. and Pecharat, S. 2004. Suwari gel properties as affected by transglutaminase activator and inhibitors. *Food Chem.* 85: 91-99.
- Benjakul, S., Visessanguan, W. and Tueksaban, J. 2003. Changes in physico-chemical properties and gel-forming ability of lizardfish (*Saurida tumbil*) during post-mortem storage in ice. *Food Chem.* 80: 535-544.

- Benjakul, S., Visessanguan, W. and Srivilai, C. 2001. Gel properties of bigeye snapper (*Priacanthus tayenus*) surimi as affected by setting and porcine plasma protein. *J. Food Qual.* 24: 453-471.
- Bennour, M., Marrakchi, A. E., Bouchart, N., Hamama, A. and Ousdda, M. E. 1991. Chemical and microbiological assessments of mackerel (*Scomber scombrus*) stored in ice. *J. Food Prot.* 54: 784-789-792.
- Bhoite-Solomon, V., Kessler-Icekson, G. and Shaklai, N. 1992. Peroxidative cross-linking of myosins. *Int. J. Biochem.* 26: 181-189.
- Buege, J. A. and Aust, S. D. 1978. Microsomal lipid peroxidation. *Method Enzymol.* 52: 302-304.
- Chan, J. K., Gill, T. A. and Paulson, A. T. 1992. Cross-link ability of myosin heavy chains from cod, herring and silver hake during thermal setting. *J. Food Sci.* 57: 906-912.
- Colmenero, F. J. and Borderias, A. J. 1983. A study of the effects of frozen storage of certain functional properties of meat and fish protein. *J. Food Technol.* 18: 731-737.
- Connell, J. J. 1975. Control of fish quality. Surrey: Fishing News.
- Conway, E. J. and Byme, A. 1936. An absorption apparatus for the micro-determination of certain volatile substances. I. The micro-determination of ammonia. *Biochem. J.* 27: 419-429.
- Decker, E. A., Xiong, Y. L., Calvert, J. T., Crum, A. D. and Blanchard, S. P. 1993. Chemical physical and functional properties of oxidized turkey white muscle myofibrillar proteins. *J. Agric. Food Chem.* 41: 186-189.
- Dodds, M. G., Grobe, K. J. and Stewart, P. S. 2000. Modeling biofilm antimicrobial resistance. *Biotechnol. Bioeng.* 68(4): 456-465.
- Domodaran, S. 1996. Functional properties. In *Food Proteins Properties and Characterization*. (Nakai, S. and Modler, H. W., eds.). p. 167-233. VCH Publishers. New York.

- Ellman, G. L. 1959. Tissue sulfhydryl groups. *Arch. Biochem. Biophys.* 82: 70-77.
- Fiske, C. H. and Subbarow, Y. 1925. The colorimetric determination of phosphorus. *J. Biol. Chem.* 66: 375-400.
- Foegeding, E., Lanier, T. C. and Hultin, H. O. 1996. Characteristics of edible plant tissues. In *Food Chemistry*. (Fennema, O. R., ed.). p. 943-1012. New York. Marcel Deckker.
- Folk, J. E. 1983. Mechanism and basis for specificity of transglutaminase-catalyzed α -(γ -glutamyl)lysine bond formation. *Adv. Enzymol.* 54: 9-35.
- Gordon, D. T. and Roberts, G. L. 1977. Mineral and proximate composition of pacific coast fish. *J. Agric. Food Chem.* 25: 1262-1268.
- Grabowska, J. and Sikorski, Z. E. 1976. The gel-forming capacity of fish myofibrillar proteins. *Lebensm. Wiss. U. Technol.* 9: 33-37.
- Gram, L. and Huss, H. H. 1996. Microbial spoilage of fish and fish products. *Int. J. Food Sci. Technol.* 33: 121-137.
- Greene, D. H. and Babbitt, J. 1990. Control of muscle softening and protease-parasite interactions in arrowtooth flounder (*Atheresthes stomias*). *J. Food Sci.* 55: 579-580.
- Hashimoto, A., Kobayashi, A. and Arai, A. 1982. Thermostability of fish myofibrillar Ca-ATPase and adaptation to environmental temperature. *Bull. Jap. Soc. Sci. Fish.* 48: 671-684.
- Hayakawa, S. and Nakai, S. 1985. Contribution of hydrophobicity, net charge and sulfhydryl groups to thermal properties of ovalbumin. *J. Can. Inst. Food Sci. Technol.* 18: 290-295.
- Hermansson, A. M. 1979. Aggregation and denaturation involved in gel formation. In *Functionality and Protein Structure*. (Pour-El, A., ed.). p. 82. Washington, D. C. Am. Chem. Soc.

- Hofmann, K. and Hamm, R. 1978. Sulphydryl and disulfide groups in meats. *Adv. Food Res.* 24: 1-11.
- Hsieh, J. F., Tsai, G. J. and Jiang, S. T. 2002. Microbial transglutaminase and recombinant cystatin effects on improving the quality of mackerel surimi. *J. Food Sci.* 67: 3120-3125.
- Huss, H. H. 1995. Quality and quality changes in fresh fish. FAO fisheries technical paper on. 348.
- Hwang, K. T. and Regenstein, J. M. 1995. Hydrolysis and oxidation of mackerel (*Scomber scombrus*) mince lipids with NaOCl and NaF treatments. *J. Aquat. Food Prod. Technol.* 4 (4): 19-30.
- Ikura, K., Kometani, T., Yoshikawa, M., Sasaki, R. and Chiba, H. 1980. Crosslinking of casein components by transglutaminase. *Agric. Biol. Chem.* 44: 1567-1573.
- Irwin, J. A., Ostdal, H. and Davies, M. J. 1999. Myoglobin-induced oxidative damage: evidence for radical transfer from oxidized myoglobin to other proteins and antioxidants. *Arch. Biochem. Biophys.* 362: 94-104.
- Itoh, Y., Yoshinaka, Y. and Ikeda, S. 1980. Effect of cysteine and cystine on the gel formation of fish meat by heating. *Nippon Suisan Gakkaishi*. 45: 341-345.
- Itoh, Y., Yoshinaka, Y. and Ikeda, S. 1979. Effect of sulphydryl reagents on the gel formation of carp actomyosin by heating. *Nippon Suisan Gakkaishi*. 45: 1023-1025.
- Jiang, S. T., Leu, S. Z. and Tsai, G. J. 1998. Cross-linking of mackerel surimi actomyosin by microbial transglutaminase and ultraviolet irradiation. *J. Agric. Food Chem.* 46: 5278-5282.
- Jiang, S. T., Hsieh, J. F., Ho, M. L. and Chung, Y. C. 2000. Microbial transglutaminase affects gel properties of golden threadfin-bream and pollock surimi. *J. Food Sci.* 65: 694-699.

- Jo, C. and Ahn, D. U. 2000. Volatiles and oxidative changes in irradiated pork sausage with different fatty acid composition and tocopherol content. *J. Food Sci.* 65: 270-275.
- Johns, A. M., Birkinshaw, L. H. and Ledward, D. A. 1989. Catalysts of lipid oxidation in meat products. *Meat Sci.* 25: 209-220.
- Kamath, G. G. 1990. Investigation of physico-chemical basis for the unique "setting" phenomenon of Alaska pollack and Atlantic croaker surimi. Ph. D. dissertation. North Carolina State University.
- Kamin-Belsky, N., Brillon, A. A., Arav, R. and Shaklai, N. 1996. Degradation of myosin by enzymes of the digestive system: comparison between native and oxidatively cross-linked protein. *J. Agric. Food Chem.* 44: 1641-1646.
- Kato, A., Wada, T., Kobayashi, K., Seguro, K. and Motoki, M. 1991. Ovomucin food protein conjugates prepared through the transglutaminase reaction. *Agric. Biol. Chem.* 55: 1027-1033.
- Kirshke, H. and Barrett, A. J. 1987. Chemistry of lysosomal proteases in lysosomes. *In Their Role in Protein Breakdown.* (Glaumann, H. and Ballard, F. J., eds.). p. 193-238. Academic press.
- Kishi, H., Nozawam H., and Seki, N. 1991. Reactivity of muscle transglutaminase on carp myofibrils and myosin B. *Nippon Suisan Gakkaishi.* 57: 1203-1210.
- Kumazawa, Y., Numazawa, T., Seguro, K. and Motoki, M. 1995. Suppressin of surimi gel setting by transglutaminase inhibitors. *J. Food Sci.* 60: 715-717.
- Kumuzawa, Y., Seguro, K., Takamura, M. and Motoki, M. 1993. Formation of $\epsilon(\gamma\text{-glutamyl})$ lysine cross-link in cured horse mackerel meat induced by drying. *J. Food Sci.* 58: 1062-1064,1083.
- Kurokawa, T. 1979. Kamaboko-forming ability of frozen and iced stored lizardfish. *Bull. Jap. Soc. Sci. Fish.* 45: 1551-1555.

- Kurth, L. and Rogers, P. J. 1984. Transglutaminase catalyzed cross-linking of myosin to soya protein casein, and gluten. *J. Food Sci.* 49: 573-589.
- Laemmli, U. K. 1970. Cleavage of structural proteins during assembly of head of bacteriophage T4. *Nature*. 227: 680-685.
- Lanier, T. C. 2000. Surimi gelation chemistry. In *Surimi and Surimi Seafood*. (Park, J. W., ed.). p. 237-265. New York. Marcel Dekker.
- Lanier, T. C. and Kang, I. S. 2000. Plasma as a source of functional food additives. (*Food System Functionality: Physicochemical and Biological) Aspects*. Vol II. New York. Technomics.
- Lawrence, R., Comsolacion, F. and Jelen, P. 1986. Formation of structured protein foods by freeze texturization. *Food Technol.* 40(4): 77-82.
- Leaf, A. and Weber, P. C. 1988. Cardiovascular effects of n-3 fatty acids. *J. Med.* 318: 549-557.
- Lee, C. M. 1986. Surimi manufacturing and fabrication of surimi-based products. *Food Technol.* 40(30): 115-124.
- Lee, C. M. 1990. Countercurrent and continuous washing systems. In *Engineered Seafood Including Surimi*. (Martin, R. E. and Collette, R. L., eds.). Park Ridge, NJ: Noyes Data Corp.
- Lee, H. G., Lanier, T. C., Hamann, D. D. and Knopp, J. A. 1997. Transglutaminase effect on low temperature gelation of fish protein sols. *J. Food Sci.* 62: 20-24.
- Lee, J. J., Chen, H. C. and Jiang, S. T. 1993. Control of muscle softening and proteases identified as cathepsins L and L-like (58 kDa) proteinase from mackerel (*scomber australasicus*). *Biosci. Biotechnol. Biochem.* 57: 1470-1476.
- Lee, N. G., Lee, C. M., Chung, K. H. and Lavery, S. A. 1992. Sodium ascorbate affects surimi gel forming properties. *J. Food Sci.* 57: 1343-1347.

- Lee, N. G. and Park, J. W. 1998. Calcium compounds to improve gel functionality of Pacific whiting and Alaska pollock surimi. *J. Food Sci.* 63: 969-974.
- Levine, R. L. 1989. Proteolysis induced by metal-catalyzed oxidation. *Cell. Biol. Rev.* 21: 347- 360.
- Li-Chen, E., Nakai, S. and Wood, D. F. 1985. Relationship between functional (fat-binding, emulsifying) and physicochemical properties of muscle proteins. Effect of heating, freezing, pH and species. *J. Food Sci.* 50: 1034-1040.
- Li, S. J. and King, A. J. 1996. Lipid oxidation and myosin denaturation in dark chicken meat. *J. Agric. Food Chem.* 44: 3080-3084.
- Lin, D. and Morrissey, M. T. 1995. Northern squawfish (*Ptychocheilus oregonensis*) for surimi production. *J. Food Sci.* 60: 1245-1247.
- Lin, T. M. and Park, J. W. 1996. Protein solubility in Pacific whiting by proteolysis during storage. *J. Food Sci.* 61: 536-539.
- Lin, T. M. and Park, J. W. 1997. Effective washing conditions reduce water usage for surimi processing. *J. Aquat. Food Prod. Tecnol.* 6(2): 65-79.
- Liu, G. and Xiong, Y. I. 2000. Electrophoretic pattern, thermal denaturation on *in vitro* digestibility of oxidized myosin. *J. Agric. Food Chem.* 48: 624-630.
- Liu, Y. M., Lin, T. S. and Lanier, T. C. 1983. Thermal denaturation and aggregation of actomyosin from Atlantic croaker. *J. Food Sci.* 47: 1916-1920.
- Lowry, O. H., Rosebrough, N. J., Farr, A. L. and Randall, R. J. 1951. Protein measurement with Folin phenol reagent. *J. Biol. Chem.* 193: 256-275.
- Mackie, I. M. 1994. Fish protein. In *New and Developing Sources of Food Proteins*. (Hudson, B. F. J., ed.). p. 95-143. London. Chapman and Hall.

- Margolin, A. B. 1997. Control of microorganism in source water and drinking water. In *Manual of Environmental Microbiology*. (Hurst, C. J., Knudsen, G. R., McInerney, M. J., Stetzenbach, L. D. and Walter, M. V., eds.). p. 195-202. American society for microbiology. Washington, D. C.
- Martinaud, A., Mercier, Y., Narinova, P., Tassy, C., Gatellier, P. and Renerre, M. 1997. Comparison of oxidative processes on myofibrillar proteins from beef during maturation and by different model oxidation systems. *J. Agric. Food Chem.* 45: 2481-2487.
- Matsumoto, J. J. 1979. Denaturation of fish muscle proteins during frozen storage. In *Protein at low Temperatures*. (Fennema, O., ed.). p. 206. ACS. Adv. In Chem. Series. Washington, D. C. ACS.
- Mazorra-Manzano, M. A., Pacheco-Aguilar, R., Diaz-Rojas, E. I. and Lugo-Sanchez, M. E. 2000. Postmortem changes in black skipjack muscle during storage in ice. *J. Food Sci.* 65: 774-779.
- Marrakchi, E., Bennour, A. M., Bouuchriti, N., Hamama, A. and Tagadait, H. 1990. Sensory, chemical and microbiological assessments of Moroccan sardines (*Sardina pilchardus*) stored in ice. *J. Food Prot.* 53: 600-605.
- Morawetz, H. 1972. Conformational transitions in macromolecules. *Adv. Protein Chem.* 26: 243-248.
- Morrissey, M. T., Wu, J. W., Lin, D. and An, H. 1993. Proteinase inhibitor effects on torsion measurements and autolysis of Pacific whiting surimi. *J. Food Sci.* 58: 1050-1054.
- Morrissey, M. T. and Tan, S. M. 2000. World resources for surimi. In *Surimi and Surimi Seafood*. (Park, J. W., ed.). p. 1-22. New York. Marcel Dekker.
- Motoki, M. and Nio, N. 1983. Crosslinking between different food proteins by transglutaminase. *J. Food Sci.* 48: 561-566.

- Namulema, A., Muyonga, J. H. and Kaaya, A. N. 1999. Quality deterioration in frozen Nile perch (*Lates niloticus*) stored at -13 and -27°C. Food Res. Int. 32: 151-156.
- Nicolas, J., Gustafsson, S. and Drapron, R. 1980. Lebensm. Wiss. Technol. 13: 308-313.
- Nishimura, K., Goto, M. and Mano, J. 1996. Participation or the superoxide radical in the beneficial effect of ascorbic acid on heat-induced fish meat gel (kamaboko). Biosci. Biotechnol. Biochem. 60: 1966-1970.
- Niwa, E. 1992. Measurement of surimi composition and functional properties. In Surimi Technology. (Lanier, T. G. and Lee, C. M., eds.). p. 389-427. New York. Marcel Dekker.
- Niwa, E. and Nakayama, M. 1961. Effects of oxidants on jelly strength of kamaboko. Nippon Suisan Gakkaishi. 27: 203-208.
- Niwa, E., Nakayama, T. and Hamada, I. 1981. Effect of acylation for setting of muscle protein. Agric. Biol. Chem. 46: 341-344.
- Nowsad, A. A., Kanoh, H. and Niwa, E. 1994. Setting of transglutaminase-free actomyosin paste prepared from Alaska pollack surimi. Fish. Sci. 60: 295-297.
- Nozawa, H., Mamagoshi, S. and Seki, N. 1997. Partial purification and characterization of six tranglutaminase was inactivated. Comp. Biochem. Physiol. 118: 313-317.
- Papadopoulos, V., Chouliara, I., Badeka, A., Savvaidis, I. N. and Kontominas, M. G. 2003. Effect of gutting on microbiological, chemical, and sensory properties of aquacultured sea bass (*Dicentrarchus labrax*) stored in ice. Food Micro. 20: 411-420.
- Park, J. W. 2000. Ingredient technology and formulation development. In Surimi and Surimi Seafood. (Park, J. W., ed.). p. 343-392. New York. Marcel Dekker.

- Park, J. W. and Morrissey, M. T. 2000. Manufacturing of surimi from light muscle fish. In *Surimi and Surimi Seafood*. (Park, J. W., ed.). p. 23-58. New York. Marcel Dekker.
- Pigott, G. M. 1986. Surimi: the "high tech" raw materials from minced fish flesh. *Food Rev. Int.* 2: 213-246.
- Poli, B. M., Parisi, G., Zampacavallo, G., Mecatti, M., Lupi, P., Gualtieri, M. and Franci, O. 2001. Quality outline of European sea bass (*Dicentrarchus labrax*) reared in Italy: shelf life, edible yield, nutritional and dietetic traits. *Aquaculture*. 202: 303-315.
- Pomeranz, Y. 1991. Proteins: General. In *Functional Properties of Food Components*. (Pomeranz, Y., ed.). p. 147-189. Academic Press. Sandigo.
- Ramirez, J. A., Rodriguez-Sosa, R., Morales, O. G. and Vazquez, M. 2000. Surimi gels from striped mullet (*Mugil cephalus*) employing microbial transglutaminase. *Food Chem.* 70: 443-449.
- Ramirez, J. A., Rodriguez-Sosa, R., Morales, O. G. and Vazquez, M. 2003. Preparation of surimi gels from striped mullet (*Mugil cephalus*) using an optimal level of calcium chloride. *Food Chem.* 82: 417-423.
- Regenstein, J. E., Jauregui, C. A. and Baker, R. C. 1983. The effect of pH, polyphosphates and different salts on water retention properties of ground trout muscle. *J. Food Biochem.* 8: 123-131.
- Robinson, H. W. and Hodgen, C. G. 1940. The biuret reaction in the determination of serum protein. I. A study of condition necessary for the production of the stable color which bears a quantitative relationship to the protein concentration. *J. Biol. Chem.* 135: 707-725.
- Rossoni, E. M. M. and Gaylared, C. C. 2000. Comparison of sodium hypochlorite and peracetic acid as sanitising agents for stainless steel food processing surfaced using epifluorescence microscopy. *Int. J. Food Microbiol.* 61: 81-85.

- Roura, S. J., Saavedra, J. P., Truco, R. E. and Crupkin, M. 1992. Conformational changes in actomyosin from post-spawned hake stored on ice. *J. Food Sci.* 57: 1109-1111.
- Saeki, H., Iseya, Z., Sugiura, S. and Seki, N. 1995. Gel forming characteristics of frozen surimi from chum salmon in the presence of protease inhibitors. *J. Food Sci.* 60: 917-928.
- Saez, G., Thornalley, P. J., Hill, H. A. O., Hems, R. and Bannister, J. V. 1982. The production of free radicals during the autoxidation of cysteine and their effect on isolated rat hepatocytes. *Biochem. Biophys. Acta.* 719: 24-31.
- Sakamoto, H., Kumazawa, Y., Toiguchi, S., Seuguro, K., Soeda, T. and Motoki, M. 1995. Gel strength enhancement by addition of microbial transglutaminase during onshore surimi manufacture. *J. Food Sci.* 60: 416-419.
- Samejima, K., Ishioroshi, M. and Yasui, T. 1981. Relative roles of the head and tail portions of the molecule in heat induced gelation of myosin. *J. Food Sci.* 46: 1412-1418.
- Seguro, K., Kymazawa, Y., Ohtsuka, T., Toiguchi, S. and Motoki, M. 1995. Microbial transglutaminase and ϵ -(γ -glutamyl)lysine cross-link effects on elastic properties of kamaboko gels. *J. Food Sci.* 60: 305-311.
- Seki, N., Nakahara, C., Takeda, H., Maruyama, N. and Nozawa, H. 1998. Dimerization site of carp myosin heavy chains by the endogenous transglutaminase. *Fish. Sci.* 64: 314-319.
- Seki, N., Uno, H., Lee, N. H., Kimura, I., Toyoda, K., Fujita, T. and Arai, K. 1990. Transglutaminase activity in Alaska pollack muscle and surimi and its reaction with myosin B. *Nippon Suisan Gakkaishi.* 56: 125-132.
- Seymour, T. A., Morrissey, M. T., Gustin, M. Y. and An, H. 1994. Purification and characterization of Pacific whiting proteases. *J. Agric. Food Chem.* 42: 2421-2427.

- Shann, T. J., Shou, Z. L. and Gou, J. T. 1998. Cross-linking of mackerel surimi actomyosin by microbial transglutaminase and ultraviolet irradiation. *J. Agric. Food Chem.* 46: 5278-5282.
- Sidwell, V. D. 1981. Chemical and nutritional composition of fish, whales, crustaceans, mollusks, and their products. NOAA Technical Memorandum NMFS F/SEC-11. Washington, D. C: US Department of Commerce.
- Sista, R. V., Erickson, M. C. and Shewfelt, R. L. 2000. Lipid oxidation in a chicken muscle model system: oxidative response of lipid classes to iron ascorbate or methemoglobin catalysis. *J. Agric. Food Chem.* 48: 1421-1426.
- Smith, D. M. 1987. Functional and biochemical changes in deboned turkey due to frozen storage and lipid oxidation. *J. Food Sci.* 52: 22-27.
- Smith, M. S. 1988. Meat proteins: functional properties in comminuted meat products. *Food Technol.* 21(3): 116-121.
- Somppongse, W., Itoh, Y. and Obatake, A. 1996. Role of SH_a in the polymerization of myosin heavy chain during ice storage of carp myosin. *Fish. Sci.* 62: 110-113.
- Srinivasan, S. and Hultin, H. O. 1997. Chemical, physical, and functional properties of cod proteins modified by a nonenzymic free-radical-generationg system. *J. Agric. Food chem.* 45: 310-320.
- Srinivasan, S. and Xiong, Y. I. 1996. Gelation of beef heart surimi as affected by antioxidants. *J. Food Sci.* 61: 707-711.
- Stadtman, E. R. 1990. Covalent modification reactions are marking steps in protein turnover. *Biochem.* 29: 6323-6331.
- Stadtman, E. R. and Berlett, B. S. 1997. Reactive oxygen-mediated protein oxidation in aging and disease. *Chem. Res. Toxicol.* 10: 485-494.
- Steel, R. G. D. and Torrie, J. H. 1980. Principles and Procedures of Statistics: A biometrical Approach., 2nd ed. p. 862. McGraw-Hill. New York.

- Suzuki, T. 1981. Fish and krill protein. Applied science publishers. Barking.
- Suyama, M. and Eguchi, H. 1992. Fish and shellfish flavor manufacturing and composition profile. In *Surimi Technology*. (Lanier, T. G. and Lee, C. M., eds.). p. 303-334. New York. Marcel Dekker.
- Takeda, H. and Seki, N. 1996. Enzyme-catalyzed cross-linking and degradation of myosin heavy chain in walleye pollack sirimi paste during setting. *Fish. Sci.* 62: 462-467.
- Tanabe, M. and Saeki, H. 2001. Effect of Maillard reaction with glucose and ribose on solubility at low ionic strength and filament-forming ability of fish myosin. *J. Agric. Food Chem.* 49: 3403-3407.
- Thannhauser, T. W., Konishi, Y. and Scheraga, H. A. 1987. Analysis for disulfide bonds in peptides and proteins. *Method Enzymol.* 143: 155-161.
- Toyohara, H., Kinoshita, M., Kimura, I., Satake, M. and Sakaguchi, M. 1993. Cathepsin L-like protease in Pacific hake muscle infected by myxosporidian parasitesin. *Nippon Suisan Gakkaishi*. 59: 1101-1106.
- Tsai, G. J., Lin, S. M. and Jiang, S. T. 1996. Transglutaminase from *Streptoverticillum ladakanum* and application to minced fish product. *J. Food Sci.* 61: 1234-1238.
- Tsuchiya, T. and Matsumoto, J. T. 1975. Isolation, purification and structure of carp myosin, HMM and LMM. *Nippon Suisan Gakkaishi*. 41: 1319-1326.
- Tsukamasa, Y. and Shimizu, Y. 1990. Setting properties of sardine and Pacific mackerel meat. *Nippon Suisan Gakkaishi*. 56: 1105-1112.
- Tsukamasa, Y., Sato, K., Shimizu, Y., Imai, C., Sugiyama, M., Minegishi, Y. and Kaqabata, M. 1993. ϵ -(γ -glutamyl)lysine crosslink formation in sardine myofibril sol during setting at 25°C. *J. Food Sci.* 59: 785-787.

- Vojdani, F. 1996. Solubility. In *Methods of Testing Protein Functionality*. (Hall, G. M., ed.). p. 11-60. New York. Blackie Academic and Professional.
- Xiong, Y. L. and Brekke, C. J. 1989. Changes in protein solubility and gelation properties of chicken myofibrils during storage. *J. Food Sci.* 54: 1141-1146.
- Xiong, Y. L. and Decker, E. A. 1995. Alterations of muscle protein functionality by oxidative and antioxidative processed. *J. Muscle Foods*. 6: 139-160.
- Xiong, Y. L., Decker, E. A., Robe, G. H. and Moody, W. G. 1993. Gelation of crude myofibrillar protein isolated from beef heart under antioxidative conditions. *J. Food Sci.* 58: 1241-1244.
- Xiong, Y. L. 1997. Structure-function relationships of muscle protein. In *Food Protein and their Applications*. (Damodaran, S. and Paraf, A., eds.). p. 341-392. New York. Marcel Dekker.
- Xiong, Y. L., Lou, X., Wang, C., Moody, W. G. and Harmon, R. J. 2000. Protein extraction from chicken myofibrils irrigated with various polyphosphate and NaCl solutions. *J. Food Sci.* 65: 69-100.
- Wan, J., Kimura, I., Satake, M. and Seki, N. 1995. Causes of inferior gel-forming ability of salmon surimi paste. *Fish. Sci.* 61: 711-715.
- Wan, L., Xiong, Y. L. and Decker, E. A. 1993. Inhibition of oxidation during washing improves the functionality of bovine cardiac myofibrillar protein. *J. Agric. Food chem.* 41: 2267-2271.
- Wang, B. and Xiong, Y. L. 1998. Functional stability of antioxidant-washed, cryoprotectant-treated beef heart surimi during frozen storage. *J. Food Sci.* 63: 293-298.
- Wang, B., Xiong, Y. L. and Srinivasan, S. 1997. Chemical stability of antioxidant-washed beef heart surimi during frozen storage. *J. Food Sci.* 62: 939-945,991.

- Wasson, D., Babbitt, J. K. and French, J. S. 1992. Characterization of a Heat-stable protease from arrowtooth flounder; *Atheresthes stomias*. J. Aquat. Food Prod. Technol. 1(3/4): 67-182.
- Wicker, L., Lanier, T. C., Hamann, D. D. and Akahane, T. 1986. Thermal transitions in myosin- ANS fluorescence and gel rigidity. J. Food Sci. 51: 1540-1543.
- Yamamoto, Y., Okubo, T., Hatayama, S., Naito, M. and Ebisu, T. 1991. Frozen surimi producy and process for preparing. US Patent. 5,028,444.
- Yamashita, K., Arai, K. and Nishita, K. 1978. Thermo-stabilites of synthetic actomyosins in various combinations of myosin and actin from scallop and rabbit muscles. Bull. Jap. Soc. Sci. Fish. 44: 485-489.
- Yamashita, M. and Konagaya, S. 1990. High activities of cathepsins B, D, H and L in the white muscle of chum salmon in spawning migration. Comp. Biochem. Physiol. 95: 149-152.
- Yokozeki, M. 1959. Measurement of oxidation-reduction potential on fish-jelly products. Nippon Suisan Gakkaishi. 24: 765-769.
- Yoshinaka, R., Shiraishi, M. and Ikeda, S. 1972. Effect of ascorbic acid on the gel formation of fish meat. Bull. Jap. Soc. Sci. Fish. 38: 511-515.