

# REFERENCES

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- Abdel-Baki, M.M.; Hussein, A.A.; Ashmawi, H.; Foda, I.O. and Aref, H. (1957).** Studies on the camel meat. 11. Some studies on the tenderization of camel meat. Faculty of Agr. No 111, pp1-15 Cairo University press.
- Akihiro, O.; Matsukura, U.; Kato, H. and Fujimaki, M. (1980).** Purification and some properties of a myofibrillar protein-degrading protease, cathepsin L., from rabbit skeletal muscle. J-Biochem. 87:1133-1143.
- Alberto, O.N.; Madrigal, S.L.; Fernandez, H.R. and Cooke, R.D. (1980).** The Storage and Drying Characteristics of Papaya (*Carica papaya* L.) Latex. J. Sci: Food Agric – 31:510-514.
- Ali, S.Y. and Evans, L. (1969).** Studies on The Cathepsins in Elastic Cartilage. Biochem. J. 112,427.
- Anne, M.D. and Zeece, M.G. (1989).** Thermal Stability of Cathepsin D. J. Food Sci. 54 (6) : 1651-1652.
- Anonymous (1960).** The science of meat and meat products. W.H. Freeman and Co. San Francisco. USA.
- Anonymous (1963).** Enzyme topics. Special products Department of Rohm and Haas Company, philadelphia.
- A.O.A.C. (1995).** "Official Methods of Analysis". Association of Official Analytical Chemists. Washington, D.C.
- Arakawa, N.; Inagak, C.; kitamura, T.; Fugiki, S. and Fujimaki, M. (1976).** Some possible evidences for an alteration in the action myosin interaction in stored muscle. Agric. Biol. Chem., 40 : 445
- Arnon, R. (1970).** Papain. Methods in Enzymology. Vol. XIX. Proteolytic Enzymes. (ed) Gertrude E. Perlmann and Laszlo Lorand. Academic Press. New york and London.
- Arteaga, G.E. and Nakai, S. (1990).** Tetrathionate protects proteolytic activity of simulated papaya latex and crude papain. J. Food Sci. 55 (6) : 1728-1731.
- Asher, I.S. and Waessner, J.F. (1972).** Multiple Forms of Cathepsin D From Bovine Uterus. J. of Biol. Chem. 247 (7) : 2069-2076.

- Baeza, G.; Correa, D. and Salas, C. (1990).** Proteolytic Enzymes in *Carica candamarcensis*. J. of the Sci. of Food Agric. 51 (1) : 1-9.
- Bahadur, K., and Sinha, R.C. (1958).** Influence of heat on the inhibition of the enzymic property of papain. Enzymologia, 20, 17-20. (C.F. C.A. 1959, 53, 22129 e).
- Balaz, J.; Slefunka, F. and Ledbecky, V. (1974).** Tenderization of hen meat by ante-mortem enzyme treatment. Hydinarsky. Premysel 16336 (C.F. FSTA 7 (1975)).
- Balls, A.K., Thompson, R.R. and Jones, W.W. (1940).** Crude papain-preparation and properties Ind. Eng. Chem., 32: 1144-1147.
- Barbara, A.B.; Klasing, K.C. and Regenstein, J.M. (1985).** Effects of antemortem injected crude papain in chicken muscle. J. of Food Sci., 50 : 1370-1374
- Barbut, S.; Arrington, L.C.; Maurer, A.J. (1984).** Optimum utilization of turkey in summer sausages. Poultry Sci., 63: 1160-1196.
- Barrett, A.J. (1967).** Lysosomal Acid Proteinase of Rabbit Liver. J. Biochem. 104: 601-608.
- Bawa, A.S.; Orr, H.L. and Usborne, W.R. (1981).** Enzymatic tenderization of spent white leghorn hens. Poultry Sci., 60 : 744-749.
- Berry, B.W.; Ray E.E. and Stuffer, D.M. (1981).** Sensory scores and shear force values for beef roasts cooked either before or after chilling. J. Food Sci., 46 : 231.
- Beuk, J. F.; Sarich, A.L.; Goesser, P.A.; and Hogan, J.M. (1959).** Tenderization of meat. Patent U.S. 2,903, 362, Sept.8 {C.F. Chem. Abst. 54, 1766 b, (1960)}.
- Bial, J.; Young, R. (1971).** The Avocado Pear. In The Biochemistry of Fruits and Their Products; Hulme, A.C., Ed.; Academic press: London, vol. 2, 2-63.
- Bodwell, C.E. and Pearson, A.M. (1964).** The activity of partially purified bovine cathepsin enzymes on various natural and synthetic substrates. J. Foods Sci. 29: 602-607.
- Bosa, J.L. and Macrae, H.F. (1969).** Hydrolytic enzymes in bovine skeletal muscle.3. Activity of some catheptic enzymes. J. of Food Sci., 31: 401-404.

- Bouton, P.E. and Harris, P.V. (1972).** Effects of cooking temperature and time on some mechanical properties of meat. *J. Food. Sci.*, 37: 140.
- Bouton, P.E. and Harris, P.V. (1975).** Changes in shear parameters of meat associated with structural changes produced by aging, cooking and myofibrillar concentration. *J. Food Sci.*, 40 : 1122.
- Bouton, P.E. and Harris, P.V. (1981).** Changes in the tenderness of meat cooked at 50-65 °C. *J. Food Sci.*, 46, 475.
- Brant, A.W. and Hanson, H.L. (1962).** Age, sex and genetic effects on poultry flavor. XIIth World's Poultry Congress Proceedings 409.
- Brekke, C.J. (1983).** Increased utilization of fowl meat. *Inst. Food Technol., Muscle Foods . Div. Newsletter*, 9 (2) : 1.
- Brocklehurst, K., Baines, S.B., and Kierstan, M.J.P. (1981).** Papain and other constituents of *Carica papaya* latex. Vol. 5. Ch. 5. In *Topics in Enzyme and Fermentation Biotechnology*, A. Wiseman (Ed.), p. 262. Ellis Horwood, England.
- Burrill, L.M.; Deethardt, D. and Saffle, R.L. (1962).** Two mechanical devices compared with taste-panel evaluation for measuring tenderness. *Food Tech.*, 16 : 145.
- Castro, I. (1981).** Studies on papain production. *NSDB Technology Journal*. April. June: 61.
- Caygill, J. C. (1979).** Sulphydryl plant proteases. *Enzyme Microb. Technol.* 1, 233-241.
- Charavanapavan, C. (1952).** The Tapping of papaya for papain. *The Trop. Agric.* 108 : 189-190.
- Cheetham, P.S.J. (1985).** The applications of enzymes in industry. Ch.3. In *Handbook of Enzyme Biotechnology*, 2<sup>nd</sup> ed. A. Wiseman (Ed.), P. 274. Ellis Hordwood, England.
- Cheshire, P. (1966).** Papain: trade and markets. *Trop. Prod. Inst. Report* No. G 25.
- Chungher, K.K. and Eldon, E.R. (1970).** Degradation of various meat fractions by tenderizing enzymes. *J. Food Sci.*, 35 : 563.
- Chungher, K.K.; Warner, W.O. and Rice, E.E. (1974).** Tenderization of meat with proteolytic enzymes, U.S. 3, 818, 106 (CL. 42612; A 22C), 18 Jun. 1974, Appl. 294, 25, 02 act. 1972; 11PP. (C.F. Food Sci.; Technol. Abs., 6 1474 S, 1974).

- Cohen, S.H.; Segars, R.A.; Cardello, A.; Smith, J. and Robbins, F.M. (1982).** Instrumental and sensory analysis of the action of catheptic enzymes on flaked and formed beef. *Microstructure*, (1): 99-105.
- Cooch, R.C. and Guerther, J.J. (1980).** Meat tenderizing method: united States patent 4 224349 {C.F. FSTA Vol. 13 (1981) No. 4 5,562}.
- CONAFRUT (National Fruticulture Commission, Mexico). (1973).** Obtencion Y Procesamiento de la Papaia. Serie Tecnica No. 17 Mexice.
- Cover, S.; Ritchey, S.J. and Hosteller, R.L. (1962).** Tenderness of meat. I. The Connective tissue components of tenderness. *J. Food Sci.*, 27:469.
- Cunningham, F.E. and Tiede, L.M. (1981).** Properties of selected products treated with a tenderizing marinade. *Poultry Sci.*, 60: 2475-2479.
- Davey, C.L., and Gilbert, K.V. (1969).** Studies in meat tenderness. 7. Changes in the fine structure of meat during aging. *J. Food Sci.* 34 : 69-74
- Dawson, L. E. and Wells. G.H. (1969).** Tenderness of freeze-dried chicken treated with proteolytic enzymes. *Poultry Sci.*, 25 : 64-70.
- Delaney, W. (1965).** Tenderization of fresh meats. Patent U.S. 3, 188, 213 (Cl. 99-107), June 8, 1965, Appl. Dec. 15, 1961, 2pp. [C.F. C.A. 1965, 63, 3549 g].
- Deng, J.C. and Lillard, D.A. (1973).** The effect of curing agents, pH and temperature on the activity of porcine muscle cathepsins, *J. Food Sci.*, 38., 299-302.
- Devitre, H.A. and Cunningham, F.E. (1985).** Tenderization of spent hen muscle using papain, bromelin, or ficin alone and in combination with salts. *Poultry Sci.*, 64: 1476-1483.
- Dhawaliker, H.S. and Pandit, M.W. (1982).** Stability studies on papain under varying time and temperature of storage. *Research and Industry*. 27 : 22-26.
- Dordevic, V.; Pirjavec, D.; Mavarcic, Z. and Savic, S. (1984).** Use of domestic enzyme preparations as beef tenderizers during culinary processing. *Technologija Mesa* 25 (5) 156-159. {C.F. FSTA 17, 10 S, 153 (1985)}.

- Draper, A.M. and Zeece, M.G. (1989).** Thermal stability of cathepsin D.J. of Food Sci. 54 (6): 1651-1652.
- Earl, R. T. and Waladt, L.M. (1974).** Meat tenderization U.S. 3, 798, 334 (CL. 428-58; A 22 C), 19 Mar. 1974, Appl. 210, 553, 21 Dec. 1971. (C.F. Food Sci., Technol. Abs., 161 s, 1974).
- El-Gharbawi, M.I. and Whitaker, J.R. (1963).** Factors affecting enzymatic solubilization of beef proteins. J. Food Sci., 28: 168-172.
- El-Gharbawi, M.I. and Dugan, L.R. (1965).** Stability of nitrogenous compounds and lipids during storage of freeze-drying of raw beef. J. Food Sci., 30 : 817.
- Elias, R.; Toldra, F. and Flores, J. (1991a).** Problems: Associated with The Assay of Cathepsin D in Meat and Meat Products. Food Chemistry 40: 87-91.
- Elias,; Toldra, F. and Flores, J. (1991b).** Aminopeptidase Interference in The Assay of Muscle Cathepsin H. J. Sci. Food Agric. 54: 651-653.
- Elias, R.; Toldra, F. and Flores, J. (1991c).** Assay of Cathepsin D Activity in Fresh Pork Muscle and Dry-Cured Ham Meat Science 29 : 287-293.
- El-Samahy, S.K. and Shehata, M.M. (1977).** Studies on camel meat tenderization. Annals of Agricultural Sci., Moshtohor, 8 : 105-117.
- El-Sanafiri, N.Y. (1974).** Technological studies on tenderization and packaging of meat M. Sci., Thesis, Faculty of Agr., Ain Shams Univ.
- Englund, P.T., king, T.P, Craig, L.C and Walti, A. (1968).** Studies on Ficin. I. Its Isolation and Characterization. J. Biochemistry, 7 (1) : 163-174.
- Farr, A.J. and May, K.N. (1970).** The effect of polyphosphates and sodium chloride on cooking yields and oxidative stability of chicken. Poultry Sci. 49: 268-275.
- Federal Register (1980).** Rules and Regulations. Vol. 45, No. 174.
- Fidel, T.; Rico, E. and Flores, J. (1993).** Cathepsin B, D, H and L Activities in The Processing of Dry-Cured Ham. J. Sci. Food Agric-62: 157-161.

- Frederick. C.P.; JR., and Bailey, M.E. (1967).** Physicochemical properties of bovine muscle particulate cathepsin. *J. Agric. Food Chem.* 15 (1) : 88 – 94.
- Frohberg, N.R. (1963).** Effect of age on collagen, elastin and mucoprotein content of chicken muscles. M.S. Thesis, Iowa state University of Science and Technology, Ames, Iowa.
- Fruton, J.S. and Bergmann, M. (1940).** The activation of papain. *J. Biol. Chem.*, 133 : 153.
- Fruton. J.S., Irving, Jr., G.W. and Bergmann, M. (1941).** On the proteolytic enzyme of animal tissues. III. The proteolytic enzyme of beef spleen, beef kidney and swine kidney. Classification of cathepsins. *J. Biol. Chem.* 141, 763.
- Fukal, L.; Kas, J.; Sova, Z. and Rouch, P. (1986).** Inactivation of ficin proteolytic activity in the presence of ascorbic acid and  $\text{Cu}^{2+}$  - ions. *J. of Food Biochemistry* 10 (3) : 185-196.
- Fukushima, K.; Goh, H.G. and Sakae, S. (1971).** Purification and properties of a proteolytic enzyme, cathepsin D, from chicken muscle,. *Agr. Biol, Chem.*, Vol. 35, No. 10: 1495-1502.
- Gassman, B.; Przybilski, H. and Zalin, L. (1976).** On the effect of enzymic meat tenderizers. *Nahrung*, 19 (9-10), 1005-1011. (C.F. Chem. Abs., 84, 178422m, 1976).
- Gerald, R. and Leland, A.U. (1966).** Proteolytic enzymes. A. summary of the uses of proteases in Foods . *Enzymes in Food Processing.* Academic Press New york and London.
- Goll, D. E.; Bray, R.W. and Hoekstra, W.G. (1963).** Age associated changes in muscle composition. The isolation and properties of a collagenous residue from bovine muscle. *J. Food Sci.*, 28 : 503.
- Gomori, G. (1955).** Preparation of buffers for use in enzyme studies. *Methods In Enzymology.* L.S.P. Colowick and N.O.. kaplan, ed. Academic press, Inc., New york, P. 138.
- Greenberg, D.M. (1955).** Plant proteolytic enzymes . *Methods in Enzymol.* 2: 54-64. Academic Press Inc., Publishers, New york.
- Gustavo, B.; Duberlis, C. and Carlos, S. (1990).** Proteolytic Enzymes in *Carica candamarcensis*. *J. Sci. Food Agric.* 51 : 1-9.

- Gutmann, H and Fruton, J.S. (1948).** On the proteolytic enzymes of animal tissue. VIII. An intracellular enzyme related to chymotrypsin. *J. Biol. Chem.* 174, 851.
- Haiaam, M.M. El-Beksh. (1994).** Quality Parameters of tenderized poultry meat and their products. M.Sc. Thesis, Faculty of Agriculture, Ain Shams University.
- Hale, K.K.; Cohn, D.D. and Stubblefield, J.D. (1977).** Effects of finishing diet and cure procedures on quality of smoked poultry. *Poultry Sci.* 56: 211-217.
- Hansen, L.J. (1972).** Development of Armour tenderometer for tenderness evaluation of beef carcasses. *J. Texture Studies* 3 : 146.
- Herring, H.K.; Cassens, R.G. and Brisky, E. J. (1967).** Factors affecting collagen solubility in bovine muscles. *J. Food Sci.*, 32:534.
- Herring, H.K. (1976).** Evaluation of beef texture-objective methods for food evaluation. Proceeding of a Symposium, p. 7, National Academy of Science, Washington, D.C.
- Hill, F. (1966).** The solubility of intramuscular collagen in meat animals of various ages. *J. Food Sci.*, 31: 161.
- Hinnergardt, L.C. and Tuomy, J.M. (1970).** A penetrometer test to measure meat tenderness. *J. Food Sci.*, 35:312.
- Hinkel, K. and Ivy, A. (1951).** The effect of the temperature of drying papaya latex on the initial activity and stability of papain. *Ann. N.Y. Acad. Sci.* 54, 245-254.
- Hosny, H.H.M. (1982).** Studies on tenderization of meat by enzymes. M. Sci. Thesis, Faculty of Agriculture Cairo University.
- Huang, F.; Dethmers, A.E., and Robertson, J.W. (1977).** A rheological method evaluating the textural qualities of cooked mutton. *J. Food Sci.*, 42:721.
- Huang, C.C. (1990).** Effect of proteolytic enzyme on the functional properties of spent hen meat. *J. of the Chinese Society of Animal Sci.*, 19 (1/2) 65-71.
- Huffman, D.L; Palmer, A.Z.; Corpenner, J.W and Hentger, J.F. (1967).** Effect of antemortem injection of sodium chloride, papain and papain derivatives on tenderness of beef. *J. Anim. Sci.*, 26, 285.



- Hulsen, W. (1954).** The action of thiourea on the proteolysis of casein by papain. *Bol. Soc. Quim – Peru.* 20, 185-188. [C.F. CA. 1955, 49, 9055g].
- Hunt, M.C. and Hedrick, H.B. (1977).** Chemical, Physical and sensory characteristics of bovine muscle from four quality groups. *J. Food Sci.* 42, 716.
- Hwang, K. and Ivy, A. (1951).** A review of the literature on the potential therapeutic significance of papain. *Ann. N.Y. Acad. Sci.* 54:161-207.
- Iodice, A.A.; Leong, V. and Weinstock, I.M. (1966).** Separation of Cathepsin A and D of Skeletal Muscle. *Arch. of Bioch. and Bioph.* 117: 477-486.
- Jack, F.B.; Alfred, L.S.; Paul, A.G. and John, N.H. (1959).** Tenderization of meat. *U.S.Z.*, 903, 362, Sept. 8 (C.F. Chem. Abst., 54, 1766 b, 1960).
- James, J. M.; Changaris, D.G.; and Levy, R.S. (1992).** Purification, subunit structure and inhibition profile of cathepsin A. *J. of Chromatography*, 627: 153-162.
- John, R.W. (1957).** Properties of the proteolytic enzymes of commercial ficin. *Food Res.* Vol 22: 483-493.
- Kang, C.K. and Rice, E.E. (1970).** Degradation of various meat fraction by tenderizing enzymes. *J. Food Sci.*, 35 : 563.
- Kathryn. A. C. and Grosjean, O.K.K. (1971).** Lysosomal Cathepsins of Chicken Skeletal Muscle: Distribution and Properties. *J. Agric. Food Chem.*, 19 (1): 108-111.
- Kazuo, F.; Goh, H.G. and Sakae, S. (1971).** Purification and Properties of a Proteolytic Enzymes, Cathepsin D, from Chicken Muscle. *Agr. Biol. Chem.*, Vol. 35 (10): 1495-1502.
- Khan, A.W. (1962).** Extraction and fraction of proteins in fresh chicken muscle. *J. of Food Sci.*, 27: 430-434.
- Kim, K. S.; Cheong, S.K. and Lee, K.W. (1982).** Studies on tenderization of meat by use of proteolytic enzyme. 11. Separation of proteolytic enzyme from the latex of plant. *Res. Rept. ORD 24 (L,V) : 35-38.*
- Kimmel, J.R. and Smith, E.L. (1954).** Crystalline papain. 1. Preparation, specificity, and activation. *J. Biol. Chem.*, 207, 515.

- Kimmel, J. R. and Smith, E.L. (1957).** The Properties of Papain. *Advances in Enzymol.* 19 : 268-334. Inter Science Publishers, Inc. New York.
- Kimmel, J.R. and Smith, E.L. (1958).** Crystalline Papain and benzoyl-L-arginin amide. *Biochem. Preparations.* 6: 61-67. John Wiley & Sons, Inc. New York.
- Klose, A.A.; Campbell, A.A. and Hanson, H.S. (1963).** Influence of polyphosphates in chilling water on quality of poultry meat. *Poultry Sci.*, 42: 743-749.
- Komarik, S.L. (1964).** Tenderizing meat. Patent U.S. 3, 147, 123, Sept. 1, 1964, Appl. July 6, 1962, 5 PP. (C.F. Chem. Abs., 61, 12555 d, 1964).
- Kondaiah, N. and Panda, B. (1987).** Physico. chemical and functional properties of spent hen components. *J. Food Sci., and Tech.* 24: 267-269.
- Koohmaraie, M.; Seideman, S.C.; Schollmeyer, J.E.; Dutson, T.R. and Babiker, A.S. (1988).** Factors Associated with The Tenderness of Three Bovine Muscles. *J. of Food Sci.* 53 (2): 407-410.
- K'osev, D.D.; Lalov, M.M. and Donchev, S.A., (1971).** Effect of trypsin on the aging of refrigerated beef. *Plavdiv*, 18 (pt. 3), 33-39. (C.F. Chem. Abs. 79, 114009 W. 1973).
- Kramer, D. E., and Whitaker, J.R. (1964).** Properties of the proteolytic enzymes from the latex of *Ficus carica* var kadota. *J. Biol. Chem.* 239, (7) : 2178-2183.
- krishnamurty, G.V., Bhatia, B.S., Lal, G. and Subramanyan, V. (1960).** Pilot plant studies on the preparation of crude papain from raw papaya. *J. Sci. Food Agric.* 11: 433.
- Landes, D. R. (1972).** The effects of polyphosphates on several organoleptic physical and chemical properties of stored precooked frozen chickens. *Poultry Sci.*, 51 : 641-649.
- Lawrie, R.A., (1974).** *Meat Science*, 2<sup>nd</sup> ed. Pergamon press, P : 41.
- Lee, Y.B. (1983).** A modified sample preparation method for measuring meat tenderness by the kramer shear Press. *J. Food Sci.*, 48 ; 304.
- L'Hirondelle, P.J. and Martin, A.H. (1975).** Evaluation of methods of assessing tenderness of raw and cooked beef muscle. *Can. J. Anim. Sci.*, 55 : 519.

- Liener, I.E. and Friedenson, B. (1970).** Ficin. Proteolytic Enzymes Methods in Enzymology, Vol. XIX. (Ed.) Gertrude E. Perlman and Laszlo Lorand. Academic press New york.
- Lineweaver, H. and Schwimmer, S. (1941).** Some Properties of crystalline papain: Stability toward heat, pH; optimum with casein as substrate. *Enzymologia*, 10 : 81.
- Lowry, O.H. Gilligam, D.R. and Katevsky, E.M. (1941).** The determination of collagen and elastin in tissues with results obtained in various normal tissues from different species. *J. Biol. Chem.* 139, 795.
- Luis, M. S.; Alberto, O.N.; Rodney, D.C. and Rodrigo, F.H. (1980).** The Dependence of Crude Papain Yields on Different Collection "Tapping" Procedures for Papaya Latex. *J. Sci. Food Agric.* 31 : 279-285.
- Lyndon, B.K. (1986).** Effect of Pressure-Heat Treatments on Cathepsin B<sub>1</sub> Activity. *J. Food Sci.* 51(3) 663-664 & 667.
- Macfarlane, P.G. and Marer, J.M. (1966).** An apparatus for determining the tenderness of meat. *Food Technol.* 21 : 89.
- Madeleine, C. and Tang, J. (1976).** Purification and Properties of Cathepsin D. From Porcine Spleen. *J. of Biol. Chem.* 251 (15): 4528-4536.
- Maeda. E.E. (1984).** A study of the action of bovine cathepsin D on intramuscular connective tissue. Dissertation Abst. International, B; 44 (11) 3346 : Order no. DA 8403203; 149 PP.
- Manzo, E.Y. and Whitaker, J.R. (1962).** Ficin – catalyzed hydrolysis of elastin. *Archives of Biochemistry and Biophysics.* 97 : 122-127.
- Marilyn, J. M and Carol, K. (1994).** Evaluation of Physical, Chemical, and Sensory Properties of Pawpaw Fruit (*A simina triloba*) as Indicators of Ripeness-*J. Agric. Food Chem.* 42 : 968-974.
- Mast, M.G.; Jordan, H.C. and Macneil, J.H. (1981).** The effect of partial and complete caponization on growth rate, yield and selected physical and sensory attributes of cockerels. *Poultry Sci.*
- May, K. N; Helmer, R.L. and Saffle, R.L. (1962).** Effect of phosphate treatment on carcass weight changes and organoleptic quality of cut-up chicken. *Poultry Sci.* 41 : 1665. (Abstr.)

- McCready, S.T. and Cunningham, F.E. (1970).** Salt soluble proteins of poultry meat. *Poultry Sci.* 50 : 243-248.
- Miller, M.F.; Davis, G.W.; Seideman, S.C.; Ramsey, C.B. and Rolan, T.L. (1988).** Effects of papain, ficin and spleen enzymes on textural, visual, cooking and sensory properties of beef bullock restructured steaks. *J. Food Quality* 11, 321-330.
- Miyada, D.S. and Tappel, A.L. (1956).** The hydrolysis of beef proteins by various proteolytic enzymes. *Food Res.* 21 : 217.
- Mladenova, V. (1969).** The E-30 Bulgarian enzyme preparation produced by the Plovdiv Food Technology Faculty. *Khanitelna - Promishlenost*, 18 (10): 9 - 11.
- Moller, A.J. (1981).** Analysis of Warner- Bratzler shear pattern with regard to myofibrillar and connective tissue components of tenderness. *Meat Sci.*, 5 (4): 247.
- Moller, A.J; Bouton; P.E.; Harris, P.V. and Jones, P.N. (1982).** A Comparison between two different shear systems used measuring meat tenderness. *J. Food Sci.*, 47: 1354.
- Monk, J.A.; Mountney, G.J. and Prudent, I. (1964).** Effect of phosphate treatment and cooking methods on moisture losses of poultry meat. *Food Technol.* 18 : 226-229.
- Mycek, M.J. (1970).** Cathepsin. "Methods in Enzymology", Perlmann, E. and Lorand, L. (Ed.). Vol. XIX. 19: 312. Academic press, New York.
- Nakamura, R.; Sekoguchi, S. and Sato, Y. (1975).** The contribution of intramuscular collagen to the tenderness of meat from chickens with different ages. *Poultry Sci.*, 54:1604-1612.
- Nakao, T. (1952).** Ficin. IV. Studies on ficin components. *Acta Schol. Med.*, Univ. Kyoto, 30, 117; (C.F. Chem. Abst., 47: 10568a).
- Okerman, H.W.; Pierson, C.J. and Hodges, R.R. (1981).** Design and evaluation of a modified shear head for the Warner-Bratzler shear to evaluate tenderness of cooked ground beef patties. *J. Food Sci.*, 46 : 1948.
- Okitani, A.; Matsukura, U.; Watanabe, M.; Otsuka, Y.; Katoh H. and Fujimaki, M; (1978).** Separation and some properties of cathepsin B and cathepsin B-Like protease from rabbit skeletal muscle. Fifth International Congress of Food Sci. & Tech. Sep. 17-22.

- Ortiz, A., Madrigal, L., Fernandez, R., and Cooke, R. (1980).** The storage and drying characteristics of papaya (*Carica Papaya* L.) latex. *J. Sci. Food Agric.* 31 : 510.
- Ota, S.; Moore, S. and Stein, W.H. (1964).** Preparation and chemical properties of purified stem and fruit bromelins. *Biochem.* 3(2) 180-185.
- Palmer, H.H.; Klose, A.A.; Smith, S. and Cambell, A.A. (1965).** Evaluations of toughness differences on chickens in terms of consumer reaction. *J. Food Sci.*, 30 : 898.
- Park, K.H.; Kim, Z-U.; Shin, J.D. and Noh, B.S. (1979).** Thermal inactivation of crude papain and papaya peroxidase. *Korean J. of Food Sci. & Tech.*, 11 (3) 171-175.
- Parrish, F.C.; Coll, D.E.; Newcomb, W.J.; Delumen, Bio.; Chaudhry, H.M. and Kline, E.A. (1969).** Molecular properties of post-mortem muscle changes in NPN and free amino acids of bovine muscle. *J. Food Sci.*, 34, 196.
- Palladino, D.K. and Ball Jr., H.R. (1979).** Effect of selected inorganic salts on certain tenderness characteristics of spent hen muscle. *J. Food Sci.* 44 : 322-337.
- Pearson, A. N. (1963).** Objective and subjective measurements for meat tenderness. *Proceedings of Meat Tenderness Symposium.* Campbell Soup. Company, Printed in the USA., P. 135.
- Peterson, D.W.; Simone, M.; Lilyblade, A.L.; and Martin, R. (1959).** Some factors affecting yield and acceptability of chicken muscle. *Food Technol.* 13 : 204.
- Peterson, D.W. (1977).** Effect of polyphosphates on tenderness of hot cut chicken, breast meat. *J. Food Sci.*, 42 : 100-101.
- Poulter, H.N. and Caygill, C.J. (1985).** Production and utilization of papain a proteolytic enzyme from *Carica papaya* L. *Tropical Sci.* 25 : 123.
- Purchas, R. W. (1973).** Some aspects of raw meat tenderness. A study of some factors affecting its change with cooking and a new means of measurement. *J. Food Sci.*, 38, 556.
- Puski, G. (1975).** Modification of functional properties of soy proteins by proteolytic enzyme treatment. *Cereal Chem.*, 33 : 438.

- Rao, N.K. and Panda, B. (1984a).** Chemical mechanical and sensory evaluation of tenderized spent hen meat. *Indian J. of Poultry Sci.*, 19 (1): 24 – 28.
- Rao, N.K. and panda, B. (1984b).** Use of salt and polyphosphate with proteolytic enzyme tenderization of spent hen meat. *Indian J. Poultry Sci.*, 19 (2): 116-117.
- Rowe, R. W.D. (1974).** Collagen fibers arrangement in intramuscular connective tissue. Changes associated with muscle shortening and their possible relevance or raw meat toughness measurements. *Food Tech.*, 9, 501.
- Sato, Y., Watanabe, K. and Asai, A. (1967).** Tenderization of meat by *Aspergillus protease*. *Nippon Shokuhin Kogyo Gakkaishi*. 14 : 235-240.
- Schoberl, A., and Fischer, M. (1939).** Sulfur content and activation of papain *Biochem. Z.* 302, 310-311 [C.F. C.A. 1940, 34, 32882].
- Seemann, G. (1984).** The influence of methods of measurements on the results of tenderness tests. *Fleischwirts Chraft* 64 (1) 106, 105-110.
- Seemanthani, B. and Balakrishnan, R. (1964).** Preliminary studies on the influences of stage of fruit maturity, seasonal conditions, rainfall and temperature on the yield of papain from the fruits of papaya (*Carica papaya* Linn). *The Madras Agric. J.* 51:81.
- Segars, R.A.; Hamel, R.G.; Kapsalis, J.G. and Kluter, R.A. (1975).** A punch and die test cell for determining the textural qualities of meat. *J. Texture Studies* 6: 211.
- Sgarbieri, V.C. Gupte, S.M., Kramer, D.E., and Whitaker, J.R. (1964).** Ficus enzymes. I. Separation of the proteolytic enzymes of *Ficus carica* and *Ficus glabrata* latex. *J. Biol. Chem.* 239 (7): 2170-2177
- Shults, G.W. and Wierbicki, E. (1973).** Effects of sodium chloride and condensed phosphates on the water holding capacity, pH and swelling of chicken muscle. *J. Food Sci.* 38 : 991-994.
- Silberstein, O.O. (1966).** Tenderizing meat. Patent. U.S. 3, 276, 379 (CL. 99-107, Oct. 4, 1966 Jan. 9, 1963 and June 18, 1964, 3pp). (C.F. Chem. Abs., 65- 19231 e, 1966).

- Simpson, M.D. and Goodwin, T.L. (1974).** Comparison between shear values and taste panel scores for predicting tenderness of broilers. *Poultry Sci.*, 53 : 204.
- Sinha, R.C. and Bahadur, K. (1958).** Fractionation and crystallization of commercial papain. *Enzymologia*. 19, 323-6. [C.F. C.A. 1959, 53, 22129 c].
- Sizer, I.W. (1943).** Effects of temperature on enzymic kinetics. *Adv. Enzymol.*, 3, 35.
- Skelton, G.S. (1968).** Papaya proteinases. 11. Effect of ascorbic acid on proteolytic activity. *Enzymologia*. 35 : 275-278.
- Smith, G.S. and Carpenter, Z.L. (1973).** Mechanical measurements of meat tenderness using the nip tenderometer. *J. Texture Studies* 4 : 196.
- Sosebee, M. E.; May, K.N. and Schmittle, S.C. (1963).** The histological effects of proteolytic enzyme addition on freeze-dehydrated chicken meat. *Poultry. Sci.*, 43 : 553-559.
- Solov'ev, V.I. and Gashimova, L.G. (1970).** Effect of papain on the organoleptic and physicochemical properties of buffalo meat. *Prikl. Biochim. Microbial*, 6 (2), 190-195. (C.F. Food Sci., Tech. Abs., 4, 1112s, 1972).
- Spencer, j.v, and smith, l.e. (1962).** The effect of chilling chicken fryers in a solution of polyphosphate up on moisture uptake, microbial spoilage, tenderness, juiciness and flavor. *Poultry Sci.*, 41 : 1685 (abst.).
- Spencer, J.V.; George, M.H.; Hall, K.N. and Rasplicka, L.D. (1963).** Effect of chilling turkey carcasses in polyphosphate solutions. *Poultry Sci.*, 42 : 1310-1311. (Abst.).
- Stadelman, W.J. and Wise, R.G. (1960).** Tenderness of poultry meat. Effect of anesthesia, cooking and irradiation. *Food Technol.* 15. 292.
- Stadelman, W.J. (1963).** Relation of age, breed, sex and practices on poultry meat tenderness. *Proc. Meat Tenderness Symposium*. Campbell Soup Company 183.
- Strandine, E.J. and Koonz, C.H. (1963).** Effect of antemortem enzyme application on the tenderness of turkeys. *Poultry Sci.*, 42 : 1310-1311. (Abst.).

- Stubblefield, J.D. and Hale Jr, K.K. (1977).** Curing procedure for smoked chicken. *Poultry Sci.*, 56 : 1135-1139.
- Sumner, J. B. and Myrback, K. (1951).** The enzymes, chemistry and mechanism of action. 1 : 853- 857. Academic Press, Inc., New york.
- Szczesniak, A.S. and Torgeson, K.W. (1965).** Methods of meat texture measurements viewed from the background of factors affecting tenderness. *Adv. Food Res.*, 14 : 33.
- Tappel, A.L.; Miyada, D.S.; Sterling, C. and Maler, V.P. (1956).** Meat tenderization 11. Factors affecting the tenderization of beef by papain. *Food Res.*, 21 : 375-383.
- Tayeau, F.; Marquevielle, J.; and Regnier, S.M. (1954).** Action of ninhydrin on thiol groups. (11) Application to the study of proteases. *Bull. Soc. Pharm. Bordeaux*. 29 : 239-244. [C.F.C.A. 1956, 50, 6530 e.]
- Walter, C. and Frieden, E. (1963).** The prevalence and significance of the product inhibition of enzymes. In "Advances in Enzymology", ed. Nord, F.F. Vol. 25, P. 167. Interscience pub., New york.
- Wang, H. and Maynard, N. (1955).** Studies on enzymatic tenderization of meat. 1. Basic technique and histological observation of enzymatic action. *Food Res.*, 21 : 375-383.
- Wang, H.; Weir, C.E.; Birkner, M.L. and Giner, B. (1958).** Studies on enzymatic tenderization of meat. 111. Histological and panel analysis of enzyme preparations from three distinct sources. *Food Res.*, 23 : 423.
- Warren, S.J. (1992).** Meat pre-tenderization. Uk Patent Application GB 2246 501 A. {C.F FSTA Vol. 24 (1992) 65, 181}.
- Warner, K.R. (1928).** Progress report of the mechanical test for tenderness of meat. *Proc. Am. Soc. Animal Production*.
- Weiner, S.; Mangel, M.; Maharg, L. and Kelley, G.C. (1957).** Effectiveness of commercial papain in meat tenderization. *Food Technol.* 12 : 248-252.
- Whitaker, J.R. (1957a).** Assay and properties of commercial ficin. *Food Res.*, 22 : 468-478.
- Whitaker, J.R. (1957b).** Properties of the proteolytic enzymes of commercial ficin. *Food Res.*, 22 : 483-493.



- Wierbicki, E.; Cohill, V.R., and Deatheroge, F.E. (1957).** Effect of added sodium chloride, potassium chloride, magnesium chloride and citric acid on meat shrinkage at 70°C and of added sodium chloride on drip losses after freezing and thawing. *Food Tech.* 11 : 47-76.
- Winnick, T., Davis, A.R. and Greenberg, D.M. (1940).** Physicochemical properties of the proteolytic enzymes from the latex of the milk weed, *Asclepias speciosa* Torr-Some comparison with other protease. *J. Gen. Physiol.*, 23, 275, 289, 301.
- Wood, D. and Richards, J.F. (1974).** Isometric tension studies of chicken pectoralis major muscle. *J. Food Sci.* 39 : 525 – 529.
- Yakobashvili, R.A.; Idashkina, T.V. and Fishman, G.M. (1969).** Production of fig Juice with the aid of enzyme preparation. *Konservnaya. i. Ovoshchesushilnaya- Promyshlennost*; 11 : 38-40.
- Yasuda, Y.; Takahashi, N. and Myurachi, T. (1970).** The composition and structure of carbohydrate moiety of stem bromelin. *Biochemistry*, 9, 25.
- Yatco. Manzo, E. and Whitaker, J.R. (1962).** Ficin catalyzed hydrolysis of elastin. *Arch. Biochem. Biophys.* 97, 122.
- Youn., J. E.; Oh, S.H. and Hwang, C.S. (1973).** Beef aging by addition of proteolytic enzymes. I. Changes of free amino acid in beef after papain addition. *Han guk sikip'um Kwahakhoechi.* 5 (2), 71. (C.F. Chem. Abs. 79, 40949 d, 1973).
- Youn, J.F. and yong, R. (1974).** Studies on the aging beef by adding proteolytic enzyme. IV. Studies on the tenderization of beef by papain treatment. *Korean J. Food Sci. and Tech.* 6:163.
- Zeece, M.G. (1986).** The Effect of calcium activated protease and cathepsin D on bovine muscle myofibrils under varying conditions of pH and temperature. *Dissertation Abstracts International*, B45 (7) 1986 : Order no. DA 8423690, 263 pp. (1985).
- Zickler, F.; Leuchtenberger, A.; Taeufel, A.; Kupke, C. and Ruttloff, H. (1978).** Meat and meat product tenderizing using microbial proteases. *Ger. (East)* 130, 405 (CL. A 2311/31), 29 Mar, 1978 *Appl.* 196, 390, 29 May, 1972, 6 pp. (C.F. Chem. Abs., 91, 1862 zt, 1979).