

REFERENCES

- Ackers, G. K. (1967). A new calibration procedure for gel filtration columns. *Journal of Biological Chemistry*, 242, 3237–3238.
- Ammar, Y. B., Matsubara, T., Ito, K., Iizuka, M., Limpaseni, T., Pongsawasdi, P., & Minamiura, N. (2002). New action pattern of a maltose-forming α -amylase from *Streptomyces sp.* and its possible application in bakery. *Journal of Biochemistry & Molecular Biology*, 35, 568–575.
- Andrews, P. (1970). Estimation of molecular size and molecular weights of biological compounds by gel filtration. *Methods of Biochemical Analysis*, 18, 1–53.
- Anfinsen, C. B. (1973). Principles that govern the folding of protein chains. *Science*, 181, 223–230.
- Arnold, F. H., Wintrode, P. L., Miyazaki, K., & Gershenson, A. (2001). How enzymes adapt: Lessons from directed evolution. *Trends in Biochemical Sciences*, 26, 100–106.
- Babacan, S., & Rand, A. G. (2007). Characterization of honey amylase. *Journal of Food Science*, 72, 50–55.
- Balkan, B., & Ertan, F. (2005). Production and properties of α -amylase from *Penicillium chrysogenum* and its application in starch hydrolysis. *Preparative Biochemistry & Biotechnology*, 35, 169–178.
- Bernfeld, P. (1951). Enzymes of starch degradation and synthesis. *Advances in Enzymology*, 12, 379–428.
- Bessler, C., Schmitt, J., Maurer, K. H., & Schmid, R. D. (2003). Directed evolution of a bacterial α -amylase: Toward enhanced pH-performance and higher specific activity. *Protein Science*, 12, 2141–2149.
- Beswick, H. T., & Harding, J. J. (1984). Conformational changes induced in bovine lens α -crystallin by carbamylation. Relevance to cataract. *Biochemical Journal*, 223, 221–227.
- Boel, E., Brady, L., Brzozowski, A. M., Derewenda, Z., Dodson, G. G., Jensen, V. J., et al. (1990). Calcium binding in α -amylases: An X-ray diffraction study at 2.1 Å resolution of two enzymes from *Aspergillus*. *Biochemistry*, 29, 6244–6249.
- Boren, K., Anderson, P., Larsson, M., & Carlsson, U. (1999). Characterization of a molten globule state of bovine carbonic anhydrase III: Loss of asymmetrical environment of the aromatic residues has a profound effect on both the near- and far-UV CD spectrum. *Biochimica et Biophysica Acta*, 1430, 111–118.
- Buisson, G., Duiee, E., Haser, R., & Payan, F. (1987). The three-dimensional structure of porcine pancreatic α -amylase at 2.9 Å resolution. Role of calcium in structure and activity. *EMBO Journal*, 6, 3909–3916.

- Chiang, J. P., Alter, J. E., & Elkhart, M. S. (1979). Purification and characterization of a thermostable α -amylase from *Bacillus licheniformis*. *Starch-Stärke*, 31, 86–92.
- Chiti, F., Stefani, M., Taddei, N., Ramponi, G., & Dobson, C. M. (2003). Rationalization of the effects of mutations on peptide and protein aggregation rates. *Nature*, 424, 805–808.
- Cupo, P., El-Deiry, W., Whitney, P. L., Awad, W. M., Jr. (1980). Stabilization of proteins by guanidination. *Journal of Biological Chemistry*, 255, 10828–10833.
- Damodara Rao, M., Purnima, A., Ramesh, D. V., & Ayyana, C. (2002). Purification of α -amylase from *Bacillus licheniformis* by chromatofocusing and gel filtration chromatography. *World Journal of Microbiology & Biotechnology*, 18, 547–550.
- Darnis, S., Juge, N., Guo, X. J., Marchis-Mouren, G., Puigserver, A., & Chaix, J. C. (1999). Molecular cloning and primary structure analysis of porcine pancreatic α -amylase. *Biochimica et Biophysica Acta*, 1430, 281–289.
- Declerck, N., Joyet, P., Gaillardin, C., & Masson, J. M. (1990). Use of amber suppressors to investigate the thermostability of *Bacillus licheniformis* α -amylase. *Journal of Biological Chemistry*, 265, 15481–15488.
- Declerck, N., Joyet, P., Trosset, J. Y., Garnier, J., & Gaillardin, C., (1995). Hyperthermostable mutants of *Bacillus licheniformis* α -amylase: Multiple amino acid replacements and molecular modelling. *Protein Engineering*, 8, 1029–1037.
- Declerck, N., Machius, M., Joyet, P., Wiegand, G., Huber, R., & Gaillardin, C. (2002). Engineering the thermostability of *Bacillus licheniformis* α -amylase. *Biologia Bratislava*, 57, 203–211.
- Derham, B. K., & Harding, J. J. (2002). Effects of modifications of α -crystallin on its chaperone and other properties. *Biochemical Journal*, 364, 711–717.
- Duy, C., & Fitter, J. (2005). Thermostability of irreversible unfolding α -amylases analyzed by unfolding kinetics. *Journal of Biological Chemistry*, 280, 37360–37365.
- Duy, C., & Fitter, J. (2006). How aggregation and conformational scrambling of unfolded states govern fluorescence emission spectra. *Biophysical Journal*, 90, 3704–3711.
- Du, Z., & Wang, X. (2003). Effects of zinc on the activity and conformational changes of arginine kinase and its intermediate. *Journal of Biochemistry & Molecular Biology*, 36, 359–366.
- Egas, M. C., da Costa, M. S., Cowan, D. A., & Pires, E. M. (1998). Extracellular α -amylase from *Thermus filiformis* Ork A2: Purification and biochemical characterization. *Extremophiles*, 2, 23–32.
- Esteve-Romero, J. S., Bossi, A., & Righetti, P. G. (1996). Purification of thermamylase in multicompartament electrolyzers with isoelectric membranes: The problem of protein solubility. *Electrophoresis*, 17, 1242–1247.

- Feller, G., d' Amico, D., & Gerday, C. (1999). Thermodynamic stability of a cold-active α -amylase from the Antarctic bacterium *Alteromonas haloplanctis*. *Biochemistry*, 38, 4613–4619.
- Fitter, J. (2005). Structural and dynamical features contributing to thermostability in α -amylases. *Cellular & Molecular Life Sciences*, 62, 1925–1937.
- Fitter, J., & Haber-Pohlmeier, S. (2004). Structural stability and unfolding properties of thermostable bacterial α -amylases: A comparative study of homologous enzymes. *Biochemistry*, 43, 9589–9599.
- Fitter, J., Herrmann, R., Dencher, N. A., Blume, A., & Hauss, T. (2001). Activity and stability of a thermostable α -amylase compared to its mesophilic homologue: Mechanisms of thermal adaptation. *Biochemistry*, 40, 10723–10731.
- Freer, S. N. (1993). Purification and characterization of the extracellular α -amylase from *Streptococcus bovis* JB1. *Applied & Environmental Microbiology*, 59, 1398–1402.
- Fukada, H., Takahashi, K., & Sturtevant, J. M. (1987). Differential scanning calorimetric study of thermal unfolding of taka-amylase A from *Aspergillus oryzae*. *Biochemistry*, 26, 4063–4068.
- Griffin, S., Higgins, C. L., Soulimane, T., & Wittung-Stafshede, P. (2003). High thermal and chemical stability of *Thermus thermophilus* seven-iron ferredoxin. Linear clusters form at high pH on polypeptide unfolding. *European Journal of Biochemistry*, 270, 4736–4743.
- Habeeb, A. F. S. A. (1966). Determination of free amino groups in proteins by trinitrobenzenesulfonic acid. *Analytical Biochemistry*, 14, 328–336.
- Habeeb, A. F. S. A. (1967). Quantification of conformational changes on chemical modification of proteins: Use of succinylated proteins as model. *Archives of Biochemistry & Biophysics*, 121, 652–664.
- Haddaoui, E. A., Leloup, L., Petit-Glatron, M. F., & Chambert, R. (1997). Characterization of a stable intermediate trapped during reversible refolding of *Bacillus subtilis* α -amylase. *European Journal of Biochemistry*, 249, 505–509.
- Hamilton, L. M., Kelly, C. T., & Fogarty, W. M. (1999a). Purification and properties of the raw starch-degrading α -amylase of *Bacillus* sp. IMD 434. *Biotechnology Letters*, 21, 111–115.
- Hamilton, L. M., Kelly, C. T., & Fogarty, W. M. (1999b). Production and properties of the raw starch-digesting α -amylase of *Bacillus* sp. IMD 435. *Process Biochemistry*, 35, 27–31.
- Hmidet, N., Bayoudh, A., Berrin, J. G., Kanoun, S., Juge, N., & Nasri, M. (2008). Purification and biochemical characterization of a novel α -amylase from *Bacillus licheniformis* NH1: Cloning, nucleotide sequence and expression of *amyN* gene in *Escherichia coli*. *Process Biochemistry*, 43, 499–510.

- Holm, L., Koivula, A. K., Lehtovaara, P. M., Hemminki, A., & Knowles, J. K. C. (1990). Random mutagenesis used to probe the structure and function of *Bacillus stearothermophilus* α -amylase. *Protein Engineering*, 3, 181–191.
- Isom, D. G., Castañeda, C. A., Cannon, B. R., Velu, P. D., & García-Moreno, E. B. (2010). Charges in the hydrophobic interior of proteins. *Proceedings of the National Academy of Sciences of the United States of America*, 107, 16096–16100.
- Janeček, S., & Baláž, S. (1992). α -Amylases and approaches leading to their enhanced stability. *FEBS Letter*, 304, 1–3.
- Jensen, M. T., Gottschalk, T. E., & Svensson, B. (2003). Differences in conformational stability of barley α -amylase isozymes 1 and 2. Role of charged groups and isozyme 2 specific salt-bridges. *Journal of Cereal Science*, 38, 289–300.
- Jespersen, H. M., MacGregor, E. A., Sierks, M. R. & Svensson, B. (1991). Comparison of the domain-level organization of starch hydrolases and related enzymes. *Biochemical Journal*, 280, 51–55.
- Juncosa, M., Pons, J., Dot, T., Querol, E., & Planas, A. (1994). Identification of active site carboxylic residues in *Bacillus licheniformis* 1,3-1,4-beta-D-glucan 4-glucanohydrolase by site-directed mutagenesis. *Journal of Biological Chemistry*, 269, 14530–14535.
- Kabsch, W. & Sander, C. (1983). Dictionary of secondary structures: Pattern recognition of hydrogen-bonded and geometrical features. *Biopolymers*, 22, 2577–2637.
- Kadziola, A., Abe, J. –I., Svensson, B., & Haser, R. (1994). Crystal structure of barley α -amylase. *Journal of Molecular Biology*, 239, 104–121.
- Kaneko, T., Ohno, T., & Ohisa, N. (2005). Purification and characterization of a thermostable raw starch digesting amylase from a *Streptomyces* sp. isolated in a milling factory. *Bioscience, Biotechnology, & Biochemistry*, 69, 1073–1081.
- Khajeh, K., Naderi-Manesh, H., Ranjbar, B., Moosavi-Movahedi, A. A. & Nemat-Gorgani, M. (2001a). Chemical modification of lysine residues in *Bacillus* α -amylases: Effect on activity and stability. *Enzyme & Microbial Technology*, 28, 543–549.
- Khajeh, K., Ranjbar, B., Naderi-Manesh, H., Habibi, A. E., & Nemat-Gorgani, M. (2001b). Chemical modification of bacterial α -amylases: Changes in tertiary structures and the effect of additional calcium. *Biochimica et Biophysica Acta*, 1548, 229–237.
- Khan, M. M., & Tayyab, S. (2001). Understanding the role of internal lysine residues of serum albumins in conformational stability and bilirubin binding. *Biochimica et Biophysica Acta*, 1545, 263–277.
- Kimmel, J. R. (1967). Guanidination of proteins. *Methods in Enzymology*, 11, 584–589.
- Kiran, K. K., & Chandra, T. S. (2008). Production of surfactant and detergent-stable, halophilic and alkalitolerant α -amylase by a moderately halophilic *Bacillus* sp. strain TSCVKK. *Applied Microbiology & Biotechnology*, 77, 1023–1031.

- Kizaki, M., Ikeda, Y., Simon, K. J., Nanjo, M., & Koeffler, H. P. (1993). Effect of 1,25-dihydroxyvitamin D3 and its analogs on human immunodeficiency virus infection in monocytes/macrophages. *Leukemia*, 7, 1525–1530.
- Klein, C. & Schulz, G. E. (1991). Structure of cyclodextrin glycosyltransferase refined at 2.0 Å resolution. *Journal of Molecular Biology*, 217, 737–750.
- Klotz, I. M. (1967). Succinylation. *Methods in Enzymology*, 11, 576–580.
- Krishnan, T., & Chandra, A. K. (1983). Purification and characterization of α -amylase from *Bacillus licheniformis* CUMC305. *Applied & Environmental Microbiology*, 46, 430–437.
- Kruger, J. E., & Lineback, D. R. (1987). Carbohydrate degrading enzymes in cereals. In J. E. Kruger, D. R. Lineback & C. E. Stautter (Eds.), *Enzymes and their role in the cereal technology* (pp 117–139). St. Paul. Minnesota, USA: AACC.
- Kumar, Y., Muzammil, S., & Tayyab, S. (2005). Influence of fluoro, chloro and alkyl alcohols on the folding pathway of human serum albumin. *Journal of Biochemistry*, 138, 335–341.
- Kumari, A., Rosenkranz, T., Kayastha, A. M., & Fitter, J. (2010). The effect of calcium binding on the unfolding barrier: A kinetic study on homologous α -amylases. *Biophysical Chemistry*, 151, 54–60.
- Laemmli, U. K. (1970). Cleavage of structural proteins during the assembly of the head of bacteriophage T4. *Nature*, 227, 680–685.
- Lai, Z., McCulloch, J., Lashuel, H. A., & Kelly, J. W. (1997). Guanidine hydrochloride-induced denaturation and refolding of transthyretin exhibits a marked hysteresis: Equilibria with high kinetic barriers. *Biochemistry*, 36, 10230–10239.
- Lakowicz, J. R. (2006). Fluorophores. In 3rd Ed., *Principles of fluorescence spectroscopy* (pp.63). New York: Springer Science.
- Laurent, T. C., & Killander, J. (1964). A theory of gel-filtration and its experimental verification. *Journal of Chromatography A*, 14, 317–330.
- Lin, L., Chyau, C., & Hsu, W. H. (1998). Production and properties of a raw starch-degrading amylase from thermophilic and alkaliphilic *Bacillus sp.* TS-23. *Biotechnology & Applied Biochemistry*, 28, 61–68.
- Lowry, O. H., Rosebrough, N. J., Farr, A. L., & Randall, R. J. (1951). Protein measurement with the Folin phenol reagent. *Journal of Biological Chemistry*, 193, 265–275.
- Luke, K. A., Higgins, C. L., & Wittung-Stafshede, P. (2007). Thermodynamic stability and folding of proteins from hyperthermophilic organisms. *FEBS Journal*, 274, 4023–4033.

- MacGregor, E. A., & Svensson, B. (1989). A super-secondary structure predicted to be common to several alpha-1,4-D-glucan-cleaving enzymes. *Biochemical Journal*, 259, 145–152.
- Machius, M., Declerck, N., Huber, R., & Wiegand, G. (1998). Activation of *Bacillus licheniformis* α -amylase through a disorder \rightarrow order transition of the substrate-binding site mediated by a calcium-sodium-calcium metal triad. *Structure*, 6, 281–292.
- Machius, M., Declerck, N., Huber, R., & Wiegand, G. (2003). Kinetic stabilization of *Bacillus licheniformis* α -amylase through introduction of hydrophobic residues at the surface. *Journal of Biological Chemistry*, 278, 11546–11553.
- Machius, M., Wiegand, G., & Huber, R. (1995). Crystal structure of calcium-depleted *Bacillus licheniformis* α -amylase at 2.2 Å resolution. *Journal of Molecular Biology*, 246, 545–559.
- Matsuura, Y., Kusunoki, M., Harada, W., & Kakudo, M. (1984). Structure and possible catalytic residues of TAKA-amylase A. *Journal of Biochemistry*, 95, 697–702.
- Miller, S., Janin, J., Lesk, A. M., & Chothia, C. (1987). Interior and surface of monomeric proteins. *Journal of Molecular Biology*, 196, 641–656.
- Mita, K., Ichimura, S., Zama, M., & Hamana, K. (1981). Kinetics of chemical modification of arginine and lysine residues in calf thymus histone H1. *Biopolymers*, 20, 1103–1112.
- Morita, H., Matsunaga, M., Mizuno, K., & Fujio, Y. (1998). A comparison of raw starch-digesting glucoamylase production in liquid and solid cultures of *Rhizopus* strains. *Journal of General & Applied Microbiology*, 44, 211–216.
- Motono, C., Oshima, T., & Yamagishi, A. (2001). High thermal stability of 3-isopropylmalate dehydrogenase from *Thermus thermophilus* resulting from low $\Delta\Delta C_p$ of unfolding. *Protein Engineering*, 14, 961–966.
- Muzammil, S., Kumar, Y., & Tayyab, S. (2000). Anion-induced stabilization of human serum albumin prevents the formation of intermediate during urea denaturation. *Proteins: Structure, Function & Genetics*, 40, 29–38.
- Nagarajan, D. R., Rajagopalan, G., & Krishnan, C. (2006). Purification and characterization of a maltooligosaccharide-forming α -amylase from a new *Bacillus subtilis* KCC103. *Applied Microbiology & Biotechnology*, 73, 591–597.
- Najafi, M. F., & Deobagkar, D. (2005). Purification and characterization of an extracellular α -amylase from *Bacillus subtilis* AX 20. *Protein Expression & Purification*, 41, 349–354.
- Naoe, K., Noda, K., Kawagoe, M., & Imai, M. (2004). Higher order structure of proteins solubilized in AOT reverse micelles. *Colloid Surfaces B: Biointerfaces*, 38, 179–185.
- Nazmi, A. R., Reinisch, T., & Hinz, H. -J. (2006). Ca-binding to *Bacillus licheniformis* α -amylase (BLA). *Archives of Biochemistry & Biophysics*, 453, 18–25.

- Nazmi, A. R., Reinisch, T., & Hinz, H. -J. (2008). Calorimetric studies on renaturation by CaCl₂ addition of metal-free α -amylase from *Bacillus licheniformis* (BLA). *Journal of Thermal Analysis Calorimetry*, 91, 141–149.
- Nielsen, A. D., Fuglsang, C. C., & Westh, P. (2003). Effect of calcium ions on the irreversible denaturation of a recombinant *Bacillus halmapalus* α -amylase: A calorimetric investigation. *Biochemical Journal*, 373, 337–343.
- Nozaki Y. (1972). The preparation of guanidine hydrochloride. *Methods in Enzymology*, 26, 43–50.
- Okolo, B. N., Ire, F. S., Ezeogu, L., Anyanwu, C. U., & Odibo, F. J. C. (2000). Purification and some properties of a novel raw starch-digesting amylase. *Journal of the Science of Food & Agriculture*, 81, 329–336.
- Pace, C. N., Grimsley, G. R., & Scholtz, J. M. (2009). Protein ionizable groups: pK values and their contribution to protein stability and solubility. *Journal of Biological Chemistry*, 284, 13285–13289.
- Pace, C. N., Shirley, B. A., & Thomson, J. A. (1989). Measuring the conformational stability of a protein. In T. E. Creighton (Ed.), *Protein structure: A practical approach* (pp.311–330). New York: Oxford University Press.
- Pandey, A., Nigam, P., Soccol, C. R., Soccol, V. T., Singh, D., & Mohan, R. (2000). Advances in microbial amylases. *Biotechnology & Applied Biochemistry*, 31, 135–152.
- Paquet, V., Croux, C., Goma, G., Soucaille, P. (1991). Purification and characterization of the extracellular α -amylase from *Clostridium acetobutylicum* ATCC 824. *Applied & Environmental Microbiology*, 57, 212–218.
- Pfueller, S. L. & Elliot, W. H. (1969). The extracellular α -amylase of *Bacillus stearothermophilus*. *Journal of Biological Chemistry*, 244, 48–54.
- Qian, M., Haser, R., & Payan, F. (1993). Structure and molecular model refinement of pig pancreatic α -amylase at 2.1 Å resolution. *Journal of Molecular Biology*, 231, 758–799.
- Qin, W., Smith, J. B., & Smith, D. L. (1992). Rates of carbamylation of specific lysyl residues in bovine α -crystallins. *Journal of Biological Chemistry*, 267, 26128–26133.
- Richardson, J. S. (1981). The anatomy and taxonomy of protein structure. *Advances in Protein Chemistry*, 34, 167–339.
- Saito, N. (1973). A thermophilic extracellular α -amylase from *Bacillus licheniformis*. *Archives of Biochemistry & Biophysics*, 155, 290–298.
- Serrano, L., Horovitz, A., Avron, B., Bycroft, M., & Fersht, A. R. (1990). Estimating the contribution of engineered surface electrostatic interactions to protein stability by using double-mutant cycles. *Biochemistry*, 29, 9343–9352.

- Shareghi, B., Arabi, M., & Zargham, M. (2007). Denaturation of *Bacillus amyloliquefaciens* α -amylase with urea. *Pakistan Journal of Biological Sciences*, 10, 3154–3157.
- Shaw, B. F., Schneider, G. F., Bilgicer, B., Kaufman, G. K., Neveu, J. M., Lane, W. S., Whitelegge, J. P., & Whitesides, G. M. (2008). Lysine acetylation can generate highly charged enzymes with increased resistance toward irreversible inactivation. *Protein Science*, 17, 1446–1455.
- Shibuya, H., Abe, M., Sekiguchi, T., & Nosoh, Y. (1982). Effect of guanidination on subunit interactions in hybrid isozymes from pig lactate dehydrogenase. *Biochimica et Biophysica Acta*, 708, 300–304.
- Shiraki, K., Nishikori, S., Fujiwara, S., Hashimoto, H., Kai, Y., Takagi, M., et al. (2004). Comparative analyses of the conformational stability of a hyperthermophilic protein and its mesophilic counterpart. *European Journal of Biochemistry*, 268, 4144–4150.
- Shokri, M. M., Khajeh, K., Alikhajeh, J., Asoodeh, A., Ranjbar, B., Hosseinkhani, S., & Sadeghi, M. (2006). Comparison of the molten globule states of thermophilic and mesophilic α -amylases. *Biophysical Chemistry*, 122, 58–65.
- Singh, K., & Bhakuni, V. (2008). *Toxoplasma gondii* ferredoxin-NADP⁺ reductase: Role of ionic interactions in stabilization of native conformation and structural cooperativity. *Proteins: Structure, Function & Bioinformatics*, 71, 1879–1888.
- Singh, K., & Bhakuni, V. (2009). Guanidine hydrochloride- and urea-induced unfolding of *Toxoplasma gondii* ferredoxin-NADP⁺ reductase: Stabilization of a functionally inactive holo-intermediate. *Journal of Biochemistry*, 145, 721–731.
- Spero, L., Jacoby, H. M., Dalidowicz, J. E, & Silverman, S. J. (1971). Guanidination and nitroguanidination of *Staphylococcal* Enterotoxin B. *Biochimica et Biophysica Acta*, 251, 345–356.
- Stark, G. R. (1967). Modification of proteins with cyanate. *Methods in Enzymology*, 11, 590–594.
- Strucksberg, K. H., Rosenkranz, T., & Fitter, J. (2007). Reversible and irreversible unfolding of multi-domain proteins. *Biochimica et Biophysica Acta*, 1774, 1591–1603.
- Sun, H., Zhao, P., Ge, X., Xia, Y., Hao, Z., Liu, J., & Peng, M. (2010). Recent advances in microbial raw starch degrading enzymes. *Applied Biochemistry & Biotechnology*, 160, 988–1003.
- Svensson, M., Fast, J., Mossberg, A., Düringer, C., Gustafsson, L., Hallgren, D., et al. (2003). α -Lactalbumin unfolding is not sufficient to cause apoptosis, but is required for the conversion to HAMLET (human α -lactalbumin made lethal to tumor cells). *Protein Science*, 12, 2794–2804.
- Tanaka, A., & Hoshino, E. (2002). Calcium-binding parameter of *Bacillus amyloliquefaciens* α -amylase determined by inactivation kinetics. *Biochemical Journal*, 364, 635–639.

- Tayyab, S., Haq, S. K., Sabeeha, Aziz, M. A., Khan, M. M., & Muzammil, S. (1999). Effect of lysine modification on the conformation and indomethacin binding properties of human serum albumin. *International Journal of Biological Macromolecules*, 26, 173–180.
- Tayyab, S., Qamar, S., & Islam, M. (1991). Size exclusion chromatography and size exclusion HPLC of proteins. *Biochemical Education*, 19, 149–152.
- Teotia, S., & Gupta, M. N. (2001). Purification of α -amylases using magnetic alginate beads. *Applied Biochemistry & Biotechnology*, 90, 211–220.
- Tripathi, P., Hofmann, H., Kayastha, A. M., Ulbrich-Hofmann, R. (2008). Conformational stability and integrity of α -amylase from mung beans: Evidence of kinetic intermediate in GdmCl-induced unfolding. *Biophysical Chemistry*, 137, 95–99.
- Tomazic, S. J., & Klibanov, A. M. (1988). Why is one *Bacillus* α -amylase more resistant against irreversible thermoinactivation than another?. *Journal of Biological Chemistry*, 263, 3092–3096.
- Uma Maheswar Rao, J. L., & Satyanarayana, T. (2007). Purification and characterization of a hyperthermostable and high maltogenic α -amylase of an extreme thermophile *Geobacillus thermoleovorans*. *Applied Biochemistry & Biotechnology*, 142, 179–193.
- Usha, R., & Ramasami, T. (2008). Stability of collagen with polyols against guanidine denaturation. *Colloids and Surfaces B: Biointerfaces*, 61, 39–42.
- Vallee, B. L., Stein, E. A., Summerwell, W. N., & Fisher, E. H. (1959). Metal content of α -amylases of various origins. *Journal of Biological Chemistry*, 234, 2901–2929.
- Varavinita, S., Chaokasema, N., & Shobsngobb, S. (2002). Immobilization of a thermostable α -amylase. *Science Asia*, 28, 247–251.
- Vieille, C., & Zeikus, G. J. (2001). Hyperthermophilic enzymes: Sources, uses and molecular mechanisms for thermostability. *Microbiology & Molecular Biology Reviews*, 65, 1–43.
- Vihinen, M., & Mäntsälä, P. (1989). Microbial amylolytic enzymes. *Critical Reviews in Biochemistry & Molecular Biology*, 24, 329–418.
- Violet, M., & Meunier, J. –C. (1989). Kinetic studies of the irreversible thermal inactivation of *Bacillus licheniformis* α -amylase. *Biochemical Journal*, 263, 665–670.
- Wanderley, K. J., Toress, F. A., Moraes, L. M., & Ulhoa, C. J. (2004). Biochemical characterization of α -amylase from the yeast *Cryptococcus flavus*. *FEMS Microbiology Letters*, 231, 165–169.
- Warren, J. R., & Gordon, J. A. (1966). On the refractive indices of aqueous solutions of urea. *Journal of Physical Chemistry*, 70, 297–300.
- Weber, G. (1960). Fluorescence-polarization spectrum and electronic-energy transfer in proteins. *Biochemical Journal*, 75, 345–352.

Wiegand, G., Epp, O., & Huber, R. (1995). The crystal structure of porcine pancreatic α -amylase in complex with the microbial inhibitor Tendamistat. *Journal of Molecular Biology*, 247, 99–110.

Zheng, H., Bian, L., Dong, F., & Zheng, X. (2009). Unfolding of *Bacillus amyloliquefaciens* α -amylase induced by guanidine hydrochloride. *Acta Chimica Sinica*, 67, 786–794.

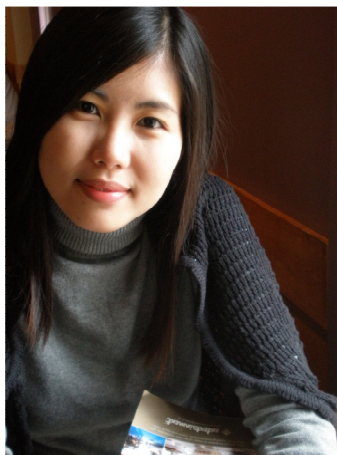
LIST OF PUBLICATIONS / PRESENTATIONS

1. **Cheau Yuaan Tan**, Raja Noor Zaliha binti Raja Abdul Rahman, Habsah Abdul Kadir and Saad Tayyab (2011) Conformational destabilization of *Bacillus licheniformis* α -amylase induced by lysine modification and calcium depletion. *Acta Biochimica Polonica* – Communicated
2. **Cheau Yuaan Tan**, Raja Noor Zaliha binti Raja Abdul Rahman, Habsah Abdul Kadir and Saad Tayyab (2010) Calcium-induced stabilization of α -amylase against guanidine hydrochloride denaturation. *African Journal of Biotechnology*, **9**, 7934–7941.
3. **Tan Cheau Yuaan**, Habsah Abd. Kadir, Raja Noor Zaliha Raja Abd. Rahman and Saad Tayyab (2010) Destabilization of *Bacillus licheniformis* α -amylase induced by disruption of salt bridges through lysine modification. Proceedings of the 35th Annual Conference of the Malaysian Society for Biochemistry and Molecular Biology co-organized by CARIF held at Selangor, Malaysia on July 27–28, 2010. Abstract No. 68, pp. 116.
4. **Tan Cheau Yuaan**, Habsah Abdul Kadir and Saad Tayyab (2009) Guanidine hydrochloride denaturation of α -amylase: Effect of calcium on its stability. Proceedings of the 34th Annual Conference of the MSBMB in conjunction with the 3rd ASEAN Biochemistry Conference held at Kuala Lumpur, Malaysia on October 7–8, 2009. Abstract No. 7, pp. 61.
5. **Tan Cheau Yuaan**, Habsah Abdul Kadir and Saad Tayyab (2009) Different buffer compositions affect guanidine hydrochloride denaturation of α -amylase. Proceedings of the 34th Annual Conference of the MSBMB in conjunction with the 3rd ASEAN Biochemistry Conference held at Kuala Lumpur, Malaysia on October 7–8, 2009. Abstract No. 8, pp. 62.

BIOGRAPHY

The whole of science is nothing more than a refinement of everyday thinking

- Albert Einstein



Tan Cheau Yuaan was born in Penang, Malaysia on September 26, 1985. She received her pre-university education from Penang Free School, Penang in 2003-2004. She then enrolled in the programme of Bachelor of Science in Biochemistry at University of Malaya in the year 2005 and obtained her B.Sc. (With distinction) degree in Biochemistry in the year 2008. She received the Amersham Biosciences Best Thesis Award in the year 2008 based on her undergraduate project. She was a Research Assistant for a few months under Fundamental Research Grant Scheme (FP081/2007C) supported by Ministry of Higher Education, Malaysia sanctioned to her supervisor. She has been a recipient of University Fellowship from University of Malaya for the period, 2008–2010. She has also been the recipient of University of Malaya Postgraduate Research Grant from 2009–2010.