

## 6. REFERENCES

- Aksoy, S.; Tunturky, H. and Hasirci, N. (1998). Stability of alpha-amylase immobilized on poly (methyl methacrylate-acrylic acid) microspheres. *J. Biotech.*, 60: 1-2, 37-46.
- Arica, M.Y.; Alaeddinoglu, N.G. and Hasirci, V. (1998). Immobilization of glucoamylase onto activated pHEMA/ EGDAM microspheres: Properties and application to a packed-bed reactor. *Enzyme and Microb. Technol.*, 22: 152-157.
- Attia, R.M. and Ali, A.A. (1974). Rapid colorimetric method for the microdetermination of amyloglucosidase. 11, *Bd.129*, 5, 231-232.
- Bahar, T. and Celebi, S.S. (1998): Characterization of glucoamylase immobilized on magnetic poly (styrene) particles. *Enzyme and Microb. Technol.*, 23: 301-304.
- Bayramoglu, G.; Yilmaz and Arica, M.Y. (2004). Immobilization of a thermostable alpha-amylase onto reactive membranes: kinetics characterization and application to continuous starch hydrolysis. *Food Chem.*, 84(4): 591-599.
- Cabral, J.M.S.; Novais, M.; Cardoso, J.P. and Kenned, J.F. (1986). Design of immobilized glucoamylase reactors using a simple kinetic model for the hydrolysis of starch. *Chem. Tech. Biotech.*, 36: 247-254.

- Chase, H.A.; Yuhui, Y. and Yang, Y.H. (1998). Immobilization of enzymes on poly (vinylalchol)-coated perfluorocarbon supports: Comparison of techniques for the immobilization of trypsin and alpha-amylase on poly (vinyl alcohol)-coated solid and liquid perfluorocarbons. *Biotech. and Applied Biochem.*, 27(3): 205-216.
- Chen, J.C.; Yiming, S.; Chen, J.P.; Sun, Y.M. and Chu, D.H. (1998). Immobilization of alpha-amylase to a composite temperature-sensitive membranes for starch hydrolysis. *Biotech. Progress*, 14(3): 473-478.
- Conlon, H.D. and Walt, D.R. (1986). Immobilization of enzymes in polymer supports. *J. Chem. Education*, 63: 368-370.
- Deleyn, F. and Stauffs, R. (1990). Immobilized beta-amylase in the production of maltose syrups. *Starch Starke*, 42(4): 158-160.
- Dey, G.; Singh, B. and Banerjee, R. (2003). Immobilization of alpha-amylase produced by *Bacillus circulans* GRS313. *Brazilian Archives of Biology and Technol.*, 46(2): 167-176.
- Do, D.D. and Hossain, M.M. (1987): A new method to determine active enzyme distribution, effective diffusivity, rate constant for main reaction and rate constant for deactivation. *Biotech. and Bioeng.*, 29: 235-245.
- Do, D.D.; Clark, D.S. and Bailey, J.E. (1982). Modeling enzyme immobilization in porous solid supports. *Biotech. and Bioeng.*, 24: 1527-1546.

- Dobreva, E.; Ivanova, V.; Stefanova, M.; Tonkova, A.; Kabaivanova, L. and Spassova, D. (1998a). Thermostable alpha-amylase production by *Bacillus licheniformis* cells immobilized on polyacrylates with cyclic carbonate groups in the side chain. *Microbiol. Research*, 153(2): 157-162.
- Dobreva, E.; Tonkova, A.; Ivanova, V.; Stefanova, M.; Kabaivanova, L. and Spasova, D. (1998b). Immobilization of *bacillus licheniformis* cells, producers of thermostable alpha-amylase, on polymer membranes. *J. Industrial Microbiol. and Biotech.*, 20(3-4): 166-170.
- Eaton, O.L. (1980). The physico-chemical properties of silicons enzyme supports and their effects on composite performance. (c.f. Silylated surface, D.E. Leyden and W.T. Collins, Eds., Gordon and Breach, Science publishers, INC., New York, 10016, P. 201-229.
- Farid, M.A.; El-Enshasy, H.A. and El-Deen, A.M.N. (2002): Alcohol production from starch by mixed cultures of *Aspergillus awamori* and immobilized *Saccharomyces cerevisiae* at different agitation speeds. *J. Basic Microbiol.*, 42(3): 162-171.
- Flov, P.Q. and Hayashida, S. (1983). Continuous production of high-glucose syrup by chitin-immobilized amylase. *Biotech. and Bioeng.*, vol. XXV: 1973-1980.
- Freire, D.M.G. and Santanna, G.L. (1990). Properties and application of immobilized glucoamylase on chitin. *Applied Biochem. Biotech.*, 26: 23-34.

- Fujli, M.; Homma, T. and Taniguchi, M. (1988). Synergism of  $\alpha$ -amylase and glucoamylase on hydrolysis of native starch granules. *Biotech. and Bioeng.*, 32: 910-915.
- Garcia, A.; Oh, S. and Engler, C.R. (1989). Cellulase immobilization of  $\text{Fe}_3\text{O}_4$  and characterization. *Biotech. and Bioeng.*, 33: 321-326.
- Handa, T.; Hirose, A.; Akino, T.; Watanabe, K. and Tsuchiya, H. (1983). Preparation of immobilized  $\alpha$ -amylase covalently attached to granular polyacrylnitrile. *Biotech. and Bioeng.*, vol. XXV: 2957-2967.
- Hellendoorn, L.; Ottengraf, S.P.P.; Heuvel, V.; Pennings, J. A.M.; Santos, V.A.P. and Wijffels, R.H. (1999). Kinetics and performance of co-immobilized system of amyloglucosidase and *Zymomonas mobilis*. *Biotech. and Bioeng.*, 63(6): 694-704.
- Jain, D. and Ghose, T.K. (1984). Cllbiose hydrolysis using *Pichia etchellsii* cells immobilized in Ca-alginate. *Biotech. and Bioeng.*, 26: 340-346.
- Khurama, A.L. and Ho, C.T. (1989). Immobilization of amylases on silica support to study breakdown products of potato starch by HPLC. *J. Liquid Chromatography*, 12(9): 1669-1677.
- Kierstan, M.P.J. and Coughlan, M.P. (1985). Immobilization of cells and enzymes by gel entrapment: A practical approach., P. 39-48. IRL Press, Oxford, OX8 IJJ, England.

- Klei, H.; Sudstrom, D.W. and Shim, D. (1985). Immobilization of enzymes by microencapsulation. Immobilized cells and enzymes, P. 49-54, IRL Press, Oxford, OX8 IJJ, England.
- Kozaki, Y. and Inoue, H. (1984). Adsorption of  $\alpha$ -amylase onto raw starch. J. Ferment. Technol., 62: 111-117.
- Kurokawa, Y.; Suzuki, K. and Tamai, Y. (1998). Adsorption of enzymes ( $\beta$ -galactosidase and  $\alpha$ -chymotrypsin): Immobilization properties of gel fiber prepared by the gel formation of cellulose acetate and titanium iso-propoxide. Biotech. and Bioeng., 59(5): 561-656.
- Lamb, S.B. and Stuckey, D.C. (1999). Enzyme immobilization on colloidal liquid aphrons (CLAS): The influence of protein properties. Enzyme and Microb. Technol., 24: 541-548.
- Lee, C.M.; Kim, C.H.; Yusof, Z.A.M. and Rhee, S. (1987). Sago starch sacchrification and simulataneous ethanol fermentation by amyloglucosidase and *Zymomonas mobilis*. J. Chem. Tech. Biotechnol., 38: 235-242.
- Lee, D.D.; Reilly, P.J. and Lee, Y.Y. (1980). Effect of pore diffusion limitation on dextrin hydrolysis by immobilized glucoamylase. Biotech. and Bioeng., 22: 1-17.
- Lim, L.; Macdonald, D.G.; Hill, G.A. and Lim, L.H. (2003): Hydrolysis of starch particles using immobilized barley alpha-amylas. Biochem. Eng. J., 13(1). 53-62.
- Lineweaver, H. and Burk, D. (1954). Methods of plotting enzyme kinetic data. J. Am. Chem. Soc., 56: 658-663.

- Martinsen, A.; Braek, G.S. and Smidsrod, O. (1989). Alginate as immobilization material: 1. Correlation between chemical and physical properties of alginate gel beads. *Biotech. and Bioeng.*, 33: 79-89.
- Matsumura, M.; Hirata, J.; Ishii, S. and Kobayashi, J. (1988). Kinetics of saccharification of raw starch by glucoamylase. *J. Chem. Tech. Biotechnol.*, 42: 51-67.
- Mattenheimer, H. (1976). The theory of enzyme test. Boehringer Manuheim GmbH Diagnostica W. Germany.
- Mattiasson, B. (1983). Immobilized cells and organelles. vol. 1, B. Mattiason, Ed. (CRC, Boca Raton, FL), pp. 3-25.
- Monshipouri, M. and Nevfeld, R.J. (1992): Kinetics and activity distribution of urease coencapsulated with Hemoglobin within polyamide membranes. *Appl. Biotechnol.*, 32: 111-126.
- Mosbach, K. (1976). *Methods in Enzymology*, vol. 44, Academic press, INC. N.Y.
- Mosbach, K. (1988). Immobilized enzymes and cells: *Methods in Enzymology*, v. 137, Academic Press, INC. N.Y.
- Noda, T.; Furuta, S. and Suda, I. (2001). Sweet potato beta-amylase immobilized on chitosan beads and its application in the semi-continuous production of maltose. *Carbohydrate Polymers*, 44(3): 189-195,
- Norman, B.E. (1981). *Enzymes food processing*. Birch, G.G.; Blakebrough, N. and Parker, K.J., Eds., Applied Science Publis. Hers, London, pp. 15-50.

- Olson, A.C. and Korous, R.A. (1977). In: "Enzymes in food and beverage processing", R.L. Ory and A.J. St. Angelo, Eds (CAS, Washington, D.C., pp. 100-131.
- Pandey, A.; Soccol, C.R. and Soccol, V.T. (2000). Biopotential of immobilized amylases. *Indian J. Microbiol.*, 40(1): 1-14.
- Paramo, E.D.; Kirchner, O.G.; Hervagault, J.F.; Thomas, D.; Barbotin, J.N.; Finkelstein, M and Davison, B.H. (2000). Alpha-amylase production by free and immobilized *Bacillus subtilis*. *Appl. Biochem. and Biotech.*, 84-86: 479-485.
- Pieters, B.R.; Bardeletti, G. and Coulet, P.R. (1992). Glucoamylase immobilization on a magnetic microparticle for the continuous hydrolysis of maltodextrin in a fluidized bed reactor. *Appl. Biochem. and Biotech.*, 32: 37-53.
- Plant, A.L.; Brown, L.L.; Haller, W. and Durst, R.A. (1991). Immobilization of binding proteins on nonporous supports: Comparison of protein loading, activity and stability. *Appl. Biochem. and Biotech.*, 30: 83-98.
- Prabhune, A. and Sivaraman, H. (1991). Immobilization of penicillin acylase in porous beads of polyacrylamide gel. *Appl. Biochem. and Biotech.*, 30: 265-272.
- Qayyum, H.; Jawaid, I. and Saleemuddin, M. (1985). Entrapment of concanavalin A-glucoenzyme complex in calcium alginate gels. *Biotech. and Bioeng.*, 27: 1102-1107.

- Rani, A.S.; Mlm, D. and Satyanarayana, S. (1999). Characterization amyloglucosidase bound on chitin. J. Sci. and Industrial Research, 58(1): 31-33.
- Ray, R.R.; Jana, S.C. and Nanda, G. (1995). Immobilization of beta-amylase from *Bacillus megaterium* B<sub>6</sub> into gelatin film by cross-linking. J. Applied-Bacteriol., 79(2): 157-162.
- Riccio, P.; Rossano, R.; Vinella, M.; Domizio, P.; Zito, F.; Sansevrino, F.; D'Elia, A. and Rosi, I. (1999). Extraction and immobilization in one step of two  $\beta$ -glucosidase released from a yeast strain of *Debaryomyces hansenii*. Enzyme and Micro. Technol., 24: 123-129.
- Roig, M.G.; Slade, A.; Kennedy, J.F.; Taylor, D.W. and Garaita, M.G. (1995). Investigations of stabilities, pH and temperature profiles and kinetic parameters of glucoamylase immobilized on plastic supports. Appl. Biochem. and Biotech., 50: 11-33.
- Rollings, J.E. and Thompson, R.W. (1984). Kinetics of enzymatic starch liquefaction: Simulation of the high molecular weight product distribution. Biotechnol. and Bioeng., vol. XXVI: 1475-1484.
- Sardar, M.; Agarwal, R.; Kumar, A. and Gupta, M.N. (1997). Noncovalent immobilization of enzymes on an enteric polymer Eudeagit S-100. Enzyme Microb. Technol., 20(5): 361-367.
- Sasvari, Z. and Asboth, B. (1999). Crosslinking of glucoamylases via carbohydrates effects catalysis but impairs stability. Biotech. and Bioeng., 63(4): 369-463.

- Schafhauser, D.Y. and Storey, K.B. (1992). Immobilization of amyloglucosidase onto granular chicken bone. *Appl. Biochem. and Biotech.*, 32: 89-109.
- Sims, A.K. and Cheryan, M. (1992). Hydrolysis of liquefied corn starch in a membrane reactor. *Biotech. and Bioeng.*, 39: 960-967.
- Slininger, P.J.; Fanta, G.F. and Abbott, T.P. (1988). Glucoamylase immobilized on acid-hydrolyzed starch graft polyacrylonitrile. *Biotech. and Bioeng.*, 31: 759-769.
- Somogyi, M.J. (1952). Notes on Sugar determination. *J. Biol. Chem.*, 195: 19-23.
- Sterfanova, M.E.; Tonkova, A.I.; Dobрева, E.P. and Spasova, D.I. (1998). Agar gel immobilization of *bacillus brevis* cells of production of thermostable alpha-amylase. *Folia Microbiologica*, 43(1): 42-46.
- Subramanian, A.; Kennel, S.J.; Oden, P.I.; Jacobson, K.B.; Woodward, J. and Doktycz, M.J. (1998). Comparison of techniques for enzyme immobilization on silicon supports. *Enzyme and Microb. Technol.*, 24: 26-36.
- Tanaka, H.; Kurosawa, H; Kokufuta, E. and Veliky, I.A. (1984): Preparation of immobilized glucoamylase using Ca-alginate gel coated with partially quaternized polyethyleneimine. *Biotech. and Bioeng.*, 26: 1393-1394.
- Tanyolac, D.; Yuruksoy, B.I. and Ozdural, A.R. (1998): Immobilization of a thermostable alpha-amylases, Termamyl R, onto nitrocellulose membrane by cibacron Blue F<sub>3</sub>GA dye binding. *Biochem. Engineering J.*, 2(3): 179-186.

- Tien, C.; Beenhuang, C.; Tien, C.J. and Chiang, B.H. (1999). Immobilization of alpha-amylase on a zirconium dynamic membrane. *Process Biochem.*, 35(3-4): 377-383.
- Trevan, M.D. (1980). *Immobilized enzymes: An introduction and applications in biotechnology*. Plymouth, Devon, England.
- Tumturk, H.; Aksoy, S. and Hasirci, N. (2000). Covalent immobilization of alpha-amylase onto poly (2-hydroxy ethyl methacrylate) and poly (styrene-2-hydroxy ethyl methacrylate) microspheres and the effect of  $Ca^{+2}$  ions on the enzyme activity. *Food Chem.*, 68(3): 259-266.
- Uhlich, T.; Ulbricht, M. and Tomaschewski, G. (1996). Immobilization of enzymes in photochemically cross-link polyvinyl alcohol. *Enzyme and Microb. Technol.*, 19: 124-131.
- Vanee, K. and Robert, O. (1991). Starch hydrolysis kinetics of *Bacillus licheniformis*  $\alpha$ -amylase. *J. Chem. Tech. Biotech.*, 51: 209-223.
- Weetall, H.H. (1974). In "Immobilized biochemical and affinity chromatography", R.B. Evnlap, Ed. Plenum, New York, p. 191-212.
- Weetall, H.H. (1993). Preparation of immobilized proteins covalently coupled through silane coupling agents to inorganic supports. *Appl. Biochem. and Biotech.*, 41: 157-188.