

REFERENCES

- Abbasi, T., and Abbasi, S.A., 2010, "Biomass energy and the environmental impacts associated with its production and utilization", **Renewable and Sustainable Energy Reviews**, Vol. 14, pp. 919-937.
- Abdulla, H.M., and El-Shatoury, S.A., 2007, "Actinomycetes in rice straw decomposition", **Waste Management**, Vol. 27, pp. 850-853.
- Agarwal, A.K., 2007, "Biofuels (alcohols and biodiesel) applications as fuels for internal combustion engines", **Progress in Energy and Combustion Science**, Vol. 33, pp. 233-271.
- Agnihotri, S., Dutt, D., and Kumar, A., 2012, "Effect of xylanases from *C. Disseminatus* SW-1 NTCC-1165 on pulp and effluent characteristics during CEHH bleaching of soda-AQ bagasse pulp", **The International Journal of Science and Technology** Vol. 1, pp. 346-357
- Ali, B.R.S., Romaniec, M.P.M., Hazlewood, G.P., and Freedman, R.B., 1995a, "Characterization of the subunits in an apparently homogeneous subpopulation of *Clostridium thermocellum* cellulosomes", **Enzyme and Microbial Technology**, Vol. 17, pp. 705-711.
- Ali, S., Hall, J., Soole, K.L., Fontes, C.M., Hazlewood, G.P., Hirst, B.H., and Gilbert, H.J., 1995b, "Targeted expression of microbial cellulases in transgenic animals", **Progress in Biotechnology**, Vol. 10, pp. 279-293.
- Annison, G., 1992, "Commercial enzyme supplementation of wheatbased diets raises ileal glycanase activities and improves apparent metabolisable energy, starch and pentosan digestibilities in broiler chickens", **Animal Feed Science and Technology**, Vol. 38, pp. 105-121.
- AOAC. 1997. AOAC method 973.18, fiber (acid detergent) and lignin in animal feed. in: *Official methods of analysis of Association of Official Analytical Chemists*, (Ed.) Helrick, K., Association of Official Analytical Chemists. Arlington, VA., pp. 28-29.

Aparicio, R., Fischer, H., Scott, D.J., Verschueren, K.H.G., Kulminskaya, A.A., Eneiskaya, E.V., Neustroev, K.N., Craievich, A.F., Golubev, A.M., and Polikarpov, I., 2002, "Structural insights into the β -mannosidase from *T. reesei* obtained by synchrotron small-angle X-ray solution scattering enhanced by X-ray crystallography", **Biochemistry**, Vol. 41, pp. 9370-9375.

Attwood, G.T., Blaschek, H.P., and White, B.A., 1994, "Transcriptional analysis of the *Clostridium cellulovorans* endoglucanase gene, engB", **FEMS Microbiology Letters**, Vol. 124, pp. 277-284.

Baah, J., Tait, R.M., and Tuah, A.K., 1999, "The effect of supplementation with ficus leaves on the utilization of cassava peels by sheep", **Bioresource technology**, Vol. 67, pp. 47-51.

Bachmann, S.L., and McCarthy, A.J., 1991, "Purification and cooperative activity of enzymes constituting the xylan-degrading system of *Thermomonospora fusca*", **Applied and Environmental Microbiology**, Vol. 57, pp. 2121-2130.

Bajpai, P., 1999, "Application of enzymes in the pulp and paper industry", **Biotechnology Progress**, Vol. 15, pp. 147-157.

Bajpai, P., Anand, A., Sharma, N., Mishra, S.P., Bajpai, P.K., and Lachenal, D., 2006, "Enzymes improve ECF bleaching of pulp", **Bioresources**, Vol. 1, pp. 34-44.

Baker, J., McCarley, J., Lovett, R., Yu, C.-H., Adney, W., Rignall, T., Vinzant, T., Decker, S., Sakon, J., and Himmel, M., 2005, "Catalytically enhanced endocellulase cel 5A from *Acidothermus cellulolyticus*", **Applied Biochemistry and Biotechnology**, Vol. 121, pp. 129-148.

Baker, R.A., and Wicker, L., 1996, "Current and potential applications of enzyme infusion in the food industry", **Trends in Food Science and Technology**, Vol. 7, pp. 279-284.

Baklanova, O.N., Plaksin, G.V., Drozdov, V.A., Duplyakin, V.K., Chesnokov, N.V., and Kuznetsov, B.N., 2003, "Preparation of microporous sorbents from cedar nutshells and hydrolytic lignin", **Carbon**, Vol. 41, pp. 1793-1800.

Balat, M., Balat, M., Kirtay, E., and Balat, H., 2009, "Main routes for the thermo-conversion of biomass into fuels and chemicals. Part 1: Pyrolysis systems", **Energy Conversion and Management**, Vol. 50, pp. 3147-3157.

Bamforth, C.W., 2009, "Current perspectives on the role of enzymes in brewing", **Journal of Cereal Science**, Vol. 50, pp. 353-357.

Bandivadekar, K.R., and Deshpande, V.V., 1994, "Enhanced stability of cellulase-free xylanase from *Chainia* sp. (NCL 82.5.1)", **Biotechnology Letters**, Vol. 16, pp. 179-182.

Basinskiene, L., Garmuviene, S., Juodeikiene, G., and Haltrich, D., 2006, "Fungal xylanase and its use for the bread-making process with wheat flour. ", **Food and Beverages**, San Francisco, California,

Battan, B., Sharma, J., Dhiman, S.S., and Kuhad, R.C., 2007, "Enhanced production of cellulase-free thermostable xylanase by *Bacillus pumilus* ASH and its potential application in paper industry", **Enzyme and Microbial Technology**, Vol. 41, pp. 733-739.

Bayer, E.A., Belaich, J.-P., Shoham, Y., and Lamed, R., 2004, "The cellulosomes: multienzyme machines for degradation of plant cell wall polysaccharides", **Annual Review of Microbiology**, Vol. 58, pp. 521-554.

Bayer, E.A., Chanzy, H., Lamed, R., and Shoham, Y., 1998a, "Cellulose, cellulases and cellulosomes", **Current Opinion in Structural Biology**, Vol. 8, pp. 548-557.

Bayer, E.A., and Lamed, R., 1986, "Ultrastructure of the cell surface cellulosome of *Clostridium thermocellum* and its interaction with cellulose", **Journal of Bacteriology**, Vol. 167, pp. 828-836.

Bayer, E.A., Morag, E., and Lamed, R., 1994, "The cellulosome: a treasure trove for biotechnology", **Trends in Biotechnology**, Vol. 12, pp. 379-386.

Bayer, E.A., Setter, E., and Lamed, R., 1985, "Organization and distribution of the cellulosome in *Clostridium thermocellum*", **Journal of Bacteriology**, Vol. 163, pp. 552-559.

Bayer, E.A., Shimon, L.J.W., Shoham, Y., and Lamed, R., 1998b, "Cellulosomes: structure and ultrastructure", **Journal of Structural Biology**, Vol. 124, pp. 221-234.

Bayer, E.A., Shoham, Y., and Lamed, R., 2006, "Cellulose-decomposing bacteria and their enzyme systems", **Prokaryotes**, Vol. pp. 578-617.

Beg, Q.K., Kapoor, M., Mahajan, L., and Hoondal, G.S., 2001, "Microbial xylanases and their industrial applications: a review", **Applied Microbiology and Biotechnology**, Vol. 56, pp. 326-338.

Belaich, A., Parsiegl, G., Gal, L., Villard, C., Haser, R., and Belaich, J.P., 2002, "Cel9M, a new family 9 cellulase of the *Clostridium cellulolyticum* cellulosome", **Journal of Bacteriology**, Vol. 184, pp. 1378-1384.

Berry, M.J., Davis, P.J., and Gidley, M.J., 2001, Conjugated polysaccharide fabric detergent and conditioning products, **US patent 6**, 225,462.

Bhat, M., 2000, "Cellulases and related enzymes in biotechnology", **Biotechnology Advances**, Vol. 18, pp. 355-383.

Biely, P., 1985, "Microbial xylanolytic systems", **Trends in Biotechnology**, Vol. 3, pp. 286-290.

Biely, P., Vrsanska, M., Tenkanen, M., and Kluepfel, D., 1997, "Endo- β -1,4-xylanase families: differences in catalytic properties", **Journal of Biotechnology**, Vol. 57, pp. 151-166.

Birijlall, N., Manimaran, A., Santhosh Kumar, K., Permaul, K., and Singh, S., 2011, "High level expression of a recombinant xylanase by *Pichia pastoris* NC38 in a 5 L fermenter and its efficiency in biobleaching of bagasse pulp", **Bioresource Technology**, Vol. 102, pp. 9723-9729.

Blair, B.G., and Anderson, K.L., 1999a, "Cellulose-inducible ultrastructural protuberances and cellulose-affinity proteins of *Eubacterium cellulosolvens*", **Anaerobe**, Vol. 5, pp. 547-554.

Blair, B.G., and Anderson, K.L., 1999b, "Regulation of cellulose inducible structures of *Clostridium cellulovorans*", **Canadian Journal of Microbiology**, Vol. 45, pp. 242-249.

Blanco, P., Sieiro, C., and Villa, T.G., 1999, "Production of pectic enzymes in yeasts", **FEMS Microbiology Letters**, Vol. 175, pp. 1-9.

Bohicchio, R., and Reicher, F., 2003, "Are hemicelluloses from *Podocarpus lambertii* typical of gymnosperms?", **Carbohydrate Polymers**, Vol. 53, pp. 127-136.

Bolduan, v.G., Jung, H., Schnabel, E., and Schneider, R., 1988, "Recent advances in the nutrition of weaner piglets", **Pig News and Information**, Vol. 9, pp. 381-385.

Bonnin, E., Le Goff, A., Saulnier, L., Chaurand, M., and Thibault, J.-F., 1998, "Preliminary characterisation of endogenous wheat arabinoxylan-degrading enzymic extracts", **Journal of Cereal Science**, Vol. 28, pp. 53-62.

Boraston, A.B., Bolam, D.N., Gilbert, H.J., and Davies, G.J., 2004, "Carbohydrate binding modules: fine tuning polysaccharide recognition", **Biochemical Journal**, Vol. 382, pp. 769-781.

Boraston, A.B., McLean, B.W., Kormos, J.M., Alam, M., Gilkes, N.R., Haynes, C.A., Tomme, P., Kilburn, D.G., and Warren, R.A.J., 1999, "Carbohydrate-binding modules: Diversity of structure and function", **Recent Advances in Carbohydrate Bioengineering**, Vol. pp. 202-211.

Bowen, R., and Harper, S., 1990, "Decomposition of wheat straw and related compounds by fungi isolated from straw in arable soils", **Soil Biology and Biochemistry**, Vol. 22, pp. 393-399.

Bravman, T., Mechaly, A., Shulami, S., Belakhov, V., Baasov, T., Shoham, G., and Shoham, Y., 2001, "Glutamic acid 160 is the acid-base catalyst of β -xylosidase from *Bacillus stearothermophilus* T-6: a family 39 glycoside hydrolase", **FEBS Letters**, Vol. 495, pp. 115-119.

Brechtel, E., and Bahl, H., 1999, "In *Thermoanaerobacterium thermosulfurigenes* EM1 S-Layer homology domains do not attach to peptidoglycan", **Journal of Bacteriology**, Vol. 181, pp. 5017-5023.

Bridgwater, A.V., 1999, "Principles and practice of biomass fast pyrolysis processes for liquids", **Journal of Analytical and Applied Pyrolysis**, Vol. 51, pp. 3-22.

Brummell, D.A., 2006, "Cell wall disassembly in ripening fruit", **Functional Plant Biology**, Vol. 33, pp. 103-119.

Buchert, J., Oksanen, T., Pere, J., Siika-Aho, M., Suurnäkki, A., and Viikari, L., 1998, "Applications of *Trichoderma reesei* enzymes in the pulp and paper industry", **Trichoderma and Gliocladium**, Vol. 2, pp. 343-363.

Cabezas, L., Calderon, C., Medina, L., Bahamon, I., Cardenas, M., Bernal, A., Gonzalez, A., and Restrepo, S., 2012, "Characterization of cellulases of fungal endophytes isolated from *Espeletia* spp", **Journal of Microbiology**, Vol. 50, pp. 1009-1013.

Caffall, K.H., and Mohnen, D., 2009, "The structure, function, and biosynthesis of plant cell wall pectic polysaccharides", **Carbohydrate Research**, Vol. 344, pp. 1879-1900.

Cann, I.K.O., Stroot, P.G., Mackie, K.R., White, B.A., and Mackie, R.I., 2001, "Characterization of two novel saccharolytic, anaerobic thermophiles, *Thermoanaerobacterium polysaccharolyticum* sp. nov. and *Thermoanaerobacterium zae* sp. nov., and emendation of the genus *Thermoanaerobacterium*", **International Journal of Systematic and Evolutionary Microbiology**, Vol. 51, pp. 293-302.

Caputo, A.C., Palumbo, M., Pelagagge, P.M., and Scacchia, F., 2005, "Economics of biomass energy utilization in combustion and gasification plants: effects of logistic variables", **Biomass and Bioenergy**, Vol. 28, pp. 35-51.

Carpita, N.C., 1996, "Structure and biogenesis of the cell walls of grasses", **Annual Review of Plant Physiology and Plant Molecular Biology**, Vol. 47, pp. 445-476.

Cavaco-Paulo, A., Almeida, L., and Bishop, D., 1998, "Hydrolysis of cotton cellulose by engineered cellulases from *Trichoderma reesei*", **Textile Research Journal**, Vol. 68, pp. 273-280.

Cavka, A., Alriksson, B., Rose, S.H., van Zyl, W.H., and Jönsson, L.J., 2011, "Biorefining of wood: combined production of ethanol and xylanase from waste fiber sludge", **Journal of Industrial Microbiology and Biotechnology**, Vol. 38, pp. 891-899.

Chakar, F.S., and Ragauskas, A.J., 2004, "Review of current and future softwood kraft lignin process chemistry", **Industrial Crops and Products**, Vol. 20, pp. 131-141.

Chander Kuhad, R., Mehta, G., Gupta, R., and Sharma, K.K., 2010, "Fed batch enzymatic saccharification of newspaper cellulose improves the sugar content in the hydrolysates and eventually the ethanol fermentation by *Saccharomyces cerevisiae*", **Biomass and Bioenergy**, Vol. 34, pp. 1189-1194.

Chauhan, S., Choudhury, B., Singh, S.N., and Ghosh, P., 2006, "Application of xylanase enzyme of *Bacillus coagulans* as a prebleaching agent on non-woody pulps", **Process Biochemistry**, Vol. 41, pp. 226-231.

Chen, H.P., and Brown Jr, R.M., 1998, "Occurrence of polypeptides in other organisms cross-reacting with antibodies against *A. xylinum* cellulose synthase", **Cellulose**, Vol. 5, pp. 263-279.

Chiacchierini, E., Mele, G., Restuccia, D., and Vinci, G., 2007, "Impact evaluation of innovative and sustainable extraction technologies on olive oil quality", **Trends in Food Science and Technology**, Vol. 18, pp. 299-305.

Chiranjeevi, T., Rani, G.B., Chandel, A.K., Sekhar, P.V.S., Prakasham, R.S., and Addepally, U., 2012, "Optimization of holocellulolytic enzymes production by *Cladosporium cladosporioides* using Taguchi-L'16 orthogonal array", **Journal of Biobased Materials and Bioenergy**, Vol. 6, pp. 148-157.

Cinar, I., 2005, "Effects of cellulase and pectinase concentrations on the colour yield of enzyme extracted plant carotenoids", **Process Biochemistry**, Vol. 40, pp. 945-949.

Collins, T., Gerday, C., and Feller, G., 2005, "Xylanases, xylanase families and extremophilic xylanases", **FEMS Microbiology Reviews**, Vol. 29, pp. 3-23.

Collins, T., Meuwis, M.-A., Stals, I., Claeysens, M., Feller, G., and Gerday, C., 2002, "A novel family 8 xylanase, functional and physicochemical characterization", **Journal of Biological Chemistry**, Vol. 277, pp. 35133-35139.

Corral, O.L., and Villasenor-Ortega, F., 2006, "Xylanases", **Advances in Agricultural and Food Biotechnology**, Vol. 2, pp. 305-321.

Coughlan, M.P., and Hazlewood, G.P., 1993, " β -1,4-D-xylan-degrading enzyme systems", **Biotechnology and Applied Biochemistry**, Vol. 17 pp. 259-289.

Dalrymple, B.P., Cybinski, D.H., Layton, I., McSweeney, C.S., Xue, G.-P., Swadling, Y.J., and Lowry, J.B., 1997, "Three *Neocallimastix patriciarum* esterases associated with the degradation of complex polysaccharides are members of a new family of hydrolases", **Microbiology**, Vol. 143, pp. 2605-2614.

Damiano, V.B., Bocchini, D.A., Gomes, E., and Da Silva, R., 2003, "Application of crude xylanase from *Bacillus licheniformis* 77-2 to the bleaching of eucalyptus Kraft pulp", **World Journal of Microbiology and Biotechnology**, Vol. 19, pp. 139-144.

Dashtban, M., Schraft, H., and Qin, W., 2009, "Fungal bioconversion of lignocellulosic residues; opportunities and perspectives", **International Journal of Biological Sciences**, Vol. 5, pp. 578.

De Carvalho, L.M.J., De Castro, I.M., and Da Silva, C.A.B., 2008, "A study of retention of sugars in the process of clarification of pineapple juice (*Ananas comosus*, L. Merrill) by micro-and ultrafiltration", **Journal of Food Engineering**, Vol. 87, pp. 447-454.

De Faveri, D., Aliakbarian, B., Avogadro, M., Perego, P., and Converti, A., 2008, "Improvement of olive oil phenolics content by means of enzyme formulations: effect of different enzyme activities and levels", **Biochemical Engineering Journal**, Vol. 41, pp. 149-156.

De O. Petkowicz, C.L., Reicher, F., Chanzy, H., Taravel, F.R., and Vuong, R., 2001, "Linear mannan in the endosperm of *Schizolobium amazonicum*", **Carbohydrate Polymers**, Vol. 44, pp. 107-112.

De Oliveira da Silva, L.A., and Carmona, E.C., 2008, "Production and characterization of cellulase-free xylanase from *Trichoderma inhamatum*", **Applied Biochemistry and Biotechnology**, Vol. 150, pp. 117-125.

De Vries, R.P., and Visser, J., 2001, "*Aspergillus* enzymes involved in degradation of plant cell wall polysaccharides", **Microbiology and Molecular Biology Reviews**, Vol. 65, pp. 497-522.

Debeche, T., Bliard, C., Debeire, P., and O'Donohue, M.J., 2002, "Probing the catalytically essential residues of the α -l-arabinofuranosidase from *Thermobacillus xylanilyticus*", **Protein Engineering**, Vol. 15, pp. 21-28.

Demain, A.L., Newcomb, M., and Wu, J.H.D., 2005, "Cellulase, clostridia, and ethanol", **Microbiology and Molecular Biology Reviews**, Vol. 69, pp. 124-154.

Demirbas, A., 2001a, "Biomass resource facilities and biomass conversion processing for fuels and chemicals", **Energy Conversion and Management**, Vol. 42, pp. 1357-1378.

Demirbas, A., 1997, "Calculation of higher heating values of biomass fuels", **Fuel**, Vol. 76, pp. 431-434.

Demirbas, A., 2004, "Combustion characteristics of different biomass fuels", **Progress in Energy and Combustion Science**, Vol. 30, pp. 219-230.

Demirbas, A., 2009, "Political, economic and environmental impacts of biofuels: A review", **Applied Energy**, Vol. 86, Supplement 1, pp. S108-S117.

Demirbas, A., 2005, "Potential applications of renewable energy sources, biomass combustion problems in boiler power systems and combustion related environmental issues", **Progress in Energy and Combustion Science**, Vol. 31, pp. 171-192.

Demirbas, A., 2003a, "Relationships between lignin contents and fixed carbon contents of biomass samples", **Energy Conversion and Management**, Vol. 44, pp. 1481-1486.

Demirbas, A., 2003b, "Sustainable cofiring of biomass with coal", **Energy Conversion and Management**, Vol. 44, pp. 1465-1479.

Demirbas, A., 2001b, "Yields of hydrogen rich gaseous products via pyrolysis from selected biomass samples", **Fuel**, Vol. 80, pp. 1885-1891.

Dey, D., Hinge, J., Shendye, A., and Rao, M., 1992, "Purification and properties of extracellular endoxylanases from alkalophilic thermophilic *Bacillus* sp.", **Canadian Journal of Microbiology**, Vol. 38, pp. 436-442.

Dhiman, T.R., Zaman, M.S., Gimenez, R.R., Walters, J.L., and Treacher, R., 2002, "Performance of dairy cows fed forage treated with fibrolytic enzymes prior to feeding", **Animal Feed Science and Technology**, Vol. 101, pp. 115-125.

Dienes, D., Egyhazi, A., and Reczey, K., 2004, "Treatment of recycled fiber with *Trichoderma* cellulases", **Industrial Crops and Products**, Vol. 20, pp. 11-21.

Ding, S.Y., Bayer, E.A., Steiner, D., Shoham, Y., and Lamed, R., 1999, "A novel cellulosomal scaffoldin from *Acetivibrio cellulolyticus* that contains a family 9 glycosyl hydrolase", **Journal of Bacteriology**, Vol. 181, pp. 6720-6729.

Ding, S.Y., Rincon, M.T., Lamed, R., Martin, J.C., McCrae, S.I., Aurilia, V., Shoham, Y., Bayer, E.A., and Flint, H.J., 2001, "Cellulosomal scaffoldin-like proteins from *Ruminococcus flavefaciens*", **Journal of Bacteriology**, Vol. 183, pp. 1945-1953.

Doi, R.H., and Kosugi, A., 2004, "Cellulosomes: plant cell wall degrading enzyme complexes", **Nature Reviews Microbiology**, Vol. 2, pp. 541-551.

Doi, R.H., Kosugi, A., Murashima, K., Tamaru, Y., and Han, S.O., 2003, "Cellulosomes from mesophilic bacteria", **Journal of Bacteriology**, Vol. 185, pp. 5907-5914.

Dotzauer, C., Ehrmann, M.A., and Vogel, R.F., 2002, "Occurrence and detection of *Thermoanaerobacterium* and *Thermoanaerobacter* in canned food", **Food Technology and Biotechnology**, Vol. 40, pp. 21-26.

Dourado, F., Bastos, M., Mota, M., and Gama, F., 2002, "Studies on the properties of Celluclast/Eudragit L-100 conjugate", **Journal of Biotechnology**, Vol. 99, pp. 121-131.

Drummond, A.-R.F., and Drummond, I.W., 1996, "Pyrolysis of sugar cane bagasse in a wire mesh reactor", **Industrial and Engineering Chemistry Research**, Vol. 35, pp. 1263-1268.

Ducros, V.M.A., Zechel, D.L., Murshudov, G.N., Gilbert, H.J., Szabo, L., Stoll, D., Withers, S.G., and Davies, G.J., 2002, "Substrate distortion by a β -mannanase: snapshots of the michaelis and covalent-intermediate complexes suggest a B2,5 conformation for the transition state", **Angewandte Chemie International Edition**, Vol. 41, pp. 2824-2827.

Duong, T.V.C., Johnson, E.A., and Demain, A.L., 1983, "Thermophilic, anaerobic and cellulolytic bacteria", **Topics in Enzyme and Fermentation Biotechnology**, Vol. 7, pp. 156-195.

Eda, S., Ohnishi, A., and Kato, K., 1976, "Xylan isolated from the stalk of *Nicotiana tabacum*", **Agricultural and Biological Chemistry**, Vol. 40, pp. 359-364.

Eichhorn, S.J., and Davies, G.R., 2006, "Modelling the crystalline deformation of native and regenerated cellulose", **Cellulose**, Vol. 13, pp. 291-307.

Erbeznik, M., Jones, C.R., Dawson, K.A., and Strobel, H.J., 1997, "*Clostridium thermocellum* JW20 (ATCC 31549) is a coculture with *Thermoanaerobacter ethanolicus*", **Applied and Environmental Microbiology**, Vol. 63, pp. 2949-2951.

Faaij, A., 2006, "Modern biomass conversion technologies", **Mitigation and Adaptation Strategies for Global Change**, Vol. 11, pp. 335-367.

Felsenstein, J., 1985, "Phylogenies and the comparative method", **American Naturalist**, Vol. 125, pp. 1-15.

Fernando, S., Adhikari, S., Chandrapal, C., and Murali, N., 2006, "Biorefineries: current status, challenges, and future direction", **Energy and Fuels**, Vol. 20, pp. 1727-1737.

Fierobe, H.P., Bayer, E.A., Tardif, C., Czjzek, M., Mechaly, A., Belaich, A., Lamed, R., Shoham, Y., and Belaich, J.P., 2002, "Degradation of cellulose substrates by cellulosome chimeras: substrate targeting versus proximity of enzyme components", **Journal of Biological Chemistry**, Vol. 277, pp. 49621-49630.

Fierobe, H.P., Mechaly, A., Tardif, C., Belaich, A., Lamed, R., Shoham, Y., Belaich, J.P., and Bayer, E.A., 2001, "Design and production of active cellulosome chimeras: selective incorporation of dockerin-containing enzymes into defined functional complexes", **Journal of Biological Chemistry**, Vol. 276, pp. 21257-21261.

Fillat, A., Colom, J.F., and Vidal, T., 2010, "A new approach to the biobleaching of flax pulp with laccase using natural mediators", **Bioresource Technology**, Vol. 101, pp. 4104-4110.

Flint, H.J., Martin, J., McPherson, C.A., Daniel, A.S., and Zhang, J.X., 1993, "A bifunctional enzyme, with separate xylanase and beta(1,3-1,4)-glucanase domains, encoded by the xynD gene of *Ruminococcus flavefaciens*", **Journal of Bacteriology**, Vol. 175, pp. 2943-2951.

Fontaine, S., Bardoux, G., Benest, D., Verdier, B., Mariotti, A., and Abbadie, L., 2004, "Mechanisms of the priming effect in a savannah soil amended with cellulose", **Soil Science Society of America Journal**, Vol. 68, pp. 125-131.

Fooks, L.J., and Gibson, G.R., 2002, "In vitro investigations of the effect of probiotics and prebiotics on selected human intestinal pathogens", **FEMS Microbiology Ecology**, Vol. 39, pp. 67-75.

Fowler, M.S., Leheup, P., and Cordier, J.L. 1997. Cocoa, coffee and tea. in: *Microbiology of fermented foods*, (Ed.) Wood, B.B., Springer US, pp. 128-147.

Francisco, J.A., Stathopoulos, C., Warren, R.A.J., Kilburn, D.G., and Georgiou, G., 1993, "Specific adhesion and hydrolysis of cellulose by intact *Escherichia coli* expressing surface anchored cellulase or cellulose binding domains", **Nature Biotechnology**, Vol. 11, pp. 491-495.

Freier, D., Mothershed, C.P., and Wiegel, J., 1988, "Characterization of *Clostridium thermocellum* JW20", **Applied and Environmental Microbiology**, Vol. 54, pp. 204-211.

Fujino, T., Beguin, P., and Aubert, J.P., 1993, "Organization of a *Clostridium thermocellum* gene cluster encoding the cellulosomal scaffolding protein CipA and a protein possibly involved in attachment of the cellulosome to the cell surface", **Journal of Bacteriology**, Vol. 175, pp. 1891-1899.

Fuller, J.J., Ross, R.J., and Dramm, J.R., 1995, "Nondestructive evaluation of honeycomb and surface checks in red oak lumber", **Forest Products Journal**, Vol. 45, pp. 42-44.

Gailing, M.F., Guibert, A., and Combes, D., 2000, "Fractional factorial designs applied to enzymatic sugar beet pulps pressing improvement", **Bioprocess Engineering**, Vol. 22, pp. 69-74.

Gal, L., Pages, S., Gaudin, C., Belaich, A., Reverbel-Leroy, C., Tardif, C., and Belaich, J.P., 1997, "Characterization of the cellulolytic complex (cellulosome) produced by *Clostridium cellulolyticum*", **Applied and Environmental Microbiology**, Vol. 63, pp. 903-909.

Galbe, M., and Zacchi, G., 2007, "Pretreatment of lignocellulosic materials for efficient bioethanol production", **Advances in Biochemical Engineering/Biotechnology**, Vol. 108, pp. 41-65.

Ganghofner, D., Kellermann, J., Staudenbauer, W.L., and Bronnenmeier, K., 1998, "Purification and properties of an amylopullulanase, a glucoamylase, and an α -glucosidase in the amylytic enzyme system of *Thermoanaerobacterium thermosaccharolyticum*", **Bioscience, Biotechnology and Biochemistry**, Vol. 62, pp. 302-308.

Gattinger, L.D., Duvnjak, Z., and Khan, A.W., 1990, "The use of canola meal as a substrate for xylanase production by *Trichoderma reesei*", **Applied Microbiology and Biotechnology**, Vol. 33, pp. 21-25.

Gaudin, C., Belaich, A., Champ, S., and Belaich, J.P., 2000, "CelE, a multidomain cellulase from *Clostridium cellulolyticum*: a key enzyme in the cellulosome", **Journal of Bacteriology**, Vol. 182, pp. 1910-1915.

Geng, A., He, Y., Qian, C., Yan, X., and Zhou, Z., 2010, "Effect of key factors on hydrogen production from cellulose in a co-culture of *Clostridium thermocellum* and *Clostridium thermopalmarium*", **Bioresource Technology**, Vol. 101, pp. 4029-4033.

Gerngross, U.T., Romaniec, M.P.M., Kobayashi, T., Huskisson, N.S., and Demain, A.L., 1993, "Sequencing of a *Clostridium thermocellum* gene (cipA) encoding the celulosomal S(L)-protein reveals an unusual degree of internal homology", **Molecular Microbiology**, Vol. 8, pp. 325-334.

Ghosh, P., and Singh, A. 1993. Physicochemical and biological treatments for enzymatic/microbial conversion of lignocellulosic biomass. in: *Advances in Applied Microbiology*, (Eds.) Saul, N. and Allen, I.L., Vol. Volume 39, Academic Press, pp. 295-333.

Goldstein, M.A., Takagi, M., Hashida, S., Shoseyov, O., Doi, R.H., and Segel, I.H., 1993, "Characterization of the cellulose binding domain of the *Clostridium cellulovorans* cellulose binding protein A", **Journal of Bacteriology**, Vol. 175, pp. 5762-5768.

Gomes, D.J., 1994, "Production of highly thermostable xylanase by a wild strain of thermophilic fungus *Thermoascus aurantiacus* and partial characterization of the enzyme", **Journal of Biotechnology**, Vol. 37, pp. 11-22.

Gomes, J., Purkarthofer, H., Hayn, M., Kapplmuller, J., Sinner, M., and Steiner, W., 1993, "Production of a high level of cellulase-free xylanase by the thermophilic fungus *Thermomyces lanuginosus* in laboratory and pilot scales using lignocellulosic materials", **Applied Microbiology and Biotechnology**, Vol. 39, pp. 700-707.

Gonzalez-Serrano, E., Cordero, T., Rodriguez-Mirasol, J., Cotoruelo, L., and Rodriguez, J.J., 2004, "Removal of water pollutants with activated carbons prepared from H₃PO₄ activation of lignin from kraft black liquors", **Water Research**, Vol. 38, pp. 3043-3050.

Graham, H., and Balnavel, D., 2008, "Dietary enzymes for increasing energy availability", **Biotechnology in Animal Feeds and Animal Feeding**, Vol. pp. 295.

Guglielmi, G., and Beguin, P., 1998, "Cellulase and hemicellulase genes of *Clostridium thermocellum* from five independent collections contain few overlaps and are widely scattered across the chromosome", **FEMS microbiology letters**, Vol. 161, pp. 209-215.

Gupta, R., Khasa, Y.P., and Kuhad, R.C., 2011a, "Evaluation of pretreatment methods in improving the enzymatic saccharification of cellulosic materials", **Carbohydrate Polymers**, Vol. 84, pp. 1103-1109.

Gupta, R., Mehta, G., Khasa, Y., and Kuhad, R., 2011b, "Fungal delignification of lignocellulosic biomass improves the saccharification of cellulose", **Biodegradation**, Vol. 22, pp. 797-804.

Gupta, R., Sharma, K.K., and Kuhad, R.C., 2009, "Separate hydrolysis and fermentation (SHF) of *Prosopis juliflora*, a woody substrate, for the production of cellulosic ethanol

by *Saccharomyces cerevisiae* and *Pichia stipitis* NCIM 3498", **Bioresource Technology**, Vol. 100, pp. 1214-1220.

Gupte, A., and Madamwar, D., 1997, "Solid state fermentation of lignocellulosic waste for cellulase and β -glucosidase production by cocultivation of *Aspergillus ellipticus* and *Aspergillus fumigatus*", **Biotechnology Progress**, Vol. 13, pp. 166-169.

Haltrich, D., Nidetzky, B., Kulbe, K.D., Steiner, W., and Zupancic, S., 1996, "Production of fungal xylanases", **Bioresource Technology**, Vol. 58, pp. 137-161.

Han, S.O., Yukawa, H., Inui, M., and Doi, R.H., 2003a, "Regulation of expression of cellulosomal cellulase and hemicellulase genes in *Clostridium cellulovorans*", **Journal of Bacteriology**, Vol. 185, pp. 6067-6075.

Han, S.O., Yukawa, H., Inui, M., and Doi, R.H., 2003b, "Transcription of *Clostridium cellulovorans* cellulosomal cellulase and hemicellulase genes", **Journal of Bacteriology**, Vol. 185, pp. 2520-2527.

Harkki, A., Uusitalo, J., Bailey, M., Penttilä, M., and Knowles, J., 1989, "A novel fungal expression system: secretion of active calf chymosin from the filamentous fungus *Trichoderma reesei*", **Nature Biotechnology**, Vol. 7, pp. 596-603.

Harman, G.E., and Kubicek, C.P. 1998. Enzymes, biological control and commercial applications. in: *Trichoderma and Gliocladium*, Vol. 2, Taylor and Francis. London, UK, pp. 311–326.

Haruta, S., Cui, Z., Huang, Z., Li, M., Ishii, M., and Igarashi, Y., 2002, "Construction of a stable microbial community with high cellulose degradation ability", **Applied Microbiology and Biotechnology**, Vol. 59, pp. 529-534.

Hayashi, J.i., Kazehaya, A., Muroyama, K., and Watkinson, A.P., 2000, "Preparation of activated carbon from lignin by chemical activation", **Carbon**, Vol. 38, pp. 1873-1878.

Hebeish, A., and Ibrahim, N., 2007, "The impact of frontier sciences on textile industry", **Colourage**, Vol. 54, pp. 41-55.

Hematy, K., Cherk, C., and Somerville, S., 2009, "Host pathogen warfare at the plant cell wall", **Current Opinion in Plant Biology**, Vol. 12, pp. 406-413.

Himmel, M.E., Ding, S.-Y., Johnson, D.K., Adney, W.S., Nimlos, M.R., Brady, J.W., and Foust, T.D., 2007, "Biomass recalcitrance: engineering plants and enzymes for biofuels production", **Science**, Vol. 315, pp. 804-807.

Himmel, M.E., Xu, Q., Luo, Y., Ding, S.-Y., Lamed, R., and Bayer, E.A., 2010, "Microbial enzyme systems for biomass conversion: emerging paradigms", **Biofuels**, Vol. 1, pp. 323-341.

Hogg, D., Woo, E.-J., Bolam, D.N., McKie, V.A., Gilbert, H.J., and Pickersgill, R.W., 2001, "Crystal structure of mannanase 26A from *Pseudomonas cellulosa* and analysis of residues involved in substrate binding", **Journal of Biological Chemistry**, Vol. 276, pp. 31186-31192.

Hood, E.E., Hood, K.R., and Fritz, S.E., 1991, "Hydroxyproline-rich glycoproteins in cell walls of pericarp from maize", **Plant Science**, Vol. 79, pp. 13-22.

Hoondal, G., Tiwari, R., Tewari, R., Dahiya, N., and Beg, Q., 2002, "Microbial alkaline pectinases and their industrial applications: a review", **Applied Microbiology and Biotechnology**, Vol. 59, pp. 409-418.

Hoster, F., Daniel, R., and Gottschalk, G., 2001, "Isolation of a new *Thermoanaerobacterium thermosaccharolyticum* strain (FH1) producing a thermostable dextranase", **Journal of General and Applied Microbiology**, Vol. 47, pp. 187-192.

Humpf, H.U., and Schreier, P., 1991, "Bound aroma compounds from the fruit and the leaves of blackberry (*Rubus laciniata* L.)", **Journal of Agricultural and Food Chemistry**, Vol. 39, pp. 1830-1832.

Hungate, R.E. 1969. A roll tube method for cultivation of strict anaerobes. in: *Method in Microbiology*, (Eds.) Norris, J.R. and Ribbons, D.W., Vol. 3B, Academic Press, Inc. New York, pp. 117-132.

Hurlbert, J.C., and Preston, J.F., 2001, "Functional characterization of a novel xylanase from a corn strain of *Erwinia chrysanthemi*", **Journal of Bacteriology**, Vol. 183, pp. 2093-2100.

Ibrahim, N.A., El-Badry, K., Eid, B.M., and Hassan, T.M., 2011, "A new approach for biofinishing of cellulose containing fabrics using acid cellulases", **Carbohydrate Polymers**, Vol. 83, pp. 116-121.

Irwin, D., Jung, E.D., and Wilson, D.B., 1994, "Characterization and sequence of a *Thermomonospora fusca* xylanase", **Applied and Environmental Microbiology**, Vol. 60, pp. 763-770.

Jayani, R.S., Saxena, S., and Gupta, R., 2005, "Microbial pectinolytic enzymes: A review", **Process Biochemistry**, Vol. 40, pp. 2931-2944.

Jiang, Z.Q., Yang, S.Q., Tan, S.S., Li, L.T., and Li, X.T., 2005, "Characterization of a xylanase from the newly isolated thermophilic *Thermomyces lanuginosus* CAU44 and its application in bread making", **Letters in Applied Microbiology**, Vol. 41, pp. 69-76.

Joshi, M.D., Sidhu, G., Pot, I., Brayer, G.D., Withers, S.G., and McIntosh, L.P., 2000, "Hydrogen bonding and catalysis: a novel explanation for how a single amino acid substitution can change the pH optimum of a glycosidase", **Journal of Molecular Biology**, Vol. 299, pp. 255-279.

Jung, K.H., Lee, K.M., Kim, H., Yoon, K.H., Park, S.H., and Pack, M.Y., 1998, "Cloning and expression of a *Clostridium thermocellum* xylanase gene in *Escherichia coli*", **Biochemistry and Molecular Biology International**, Vol. 44, pp. 283-292.

Kakiuchi, M., Isui, A., Suzuki, K., Fujino, T., Fujino, E., Kimura, T., Karita, S., Sakka, K., and Ohmiya, K., 1998, "Cloning and DNA sequencing of the genes encoding *Clostridium josui* scaffolding protein CipA and cellulase CelD and identification of their gene products as major components of the cellulosome", **Journal of Bacteriology**, Vol. 180, pp. 4303-4308.

Kalum, L., and Andersen, B.K., 2000, Enzymatic treatment of denim, **US patent 6,146,428**.

Kaper, T., van Heusden, H.H., van Loo, B., Vasella, A., van der Oost, J., and de Vos, W.M., 2002, "Substrate specificity engineering of β -mannosidase and β -glucosidase from *Pyrococcus* by exchange of unique active site residues", **Biochemistry**, Vol. 41, pp. 4147-4155.

Kapoor, M., Beg, Q.K., Bhushan, B., Singh, K., Dadhich, K.S., and Hoondal, G.S., 2001, "Application of an alkaline and thermostable polygalacturonase from *Bacillus* sp. MG-cp-2 in degumming of ramie (*Boehmeria nivea*) and sunn hemp (*Crotalaria juncea*) bast fibres", **Process Biochemistry**, Vol. 36, pp. 803-807.

Karlsson, E.N., Dahlberg, L., Torto, N., Gorton, L., and Holst, O., 1998, "Enzymatic specificity and hydrolysis pattern of the catalytic domain of the xylanase Xyn1 from *Rhodothermus marinus*", **Journal of Biotechnology**, Vol. 60, pp. 23-35.

Karmakar, M., and Ray, R., 2011, "Current trends in research and application of microbial cellulases", **Research Journal of Microbiology**, Vol. 6, pp. 41-53.

Karnis, A., 1995, "The role of latent and delatent mechanical pulp fines in sheet structure and pulp properties", **Paperi Ja Puu**, Vol. 77, pp. 491-497.

Kataeva, I., Guglielmi, G., and Beguin, P., 1997, "Interaction between *Clostridium thermocellum* endoglucanase CelD and polypeptides derived from the cellulosome-integrating protein CipA: stoichiometry and cellulolytic activity of the complexes", **Biochemical Journal**, Vol. 326, pp. 617-624.

Kato, S., Haruta, S., Cui, Z.J., Ishii, M., and Igarashi, Y., 2004, "Effective cellulose degradation by a mixed-culture system composed of a cellulolytic *Clostridium* and aerobic non-cellulolytic bacteria", **FEMS Microbiology Ecology**, Vol. 51, pp. 133-142.

Kato, S., Haruta, S., Cui, Z.J., Ishii, M., and Igarashi, Y., 2005, "Stable coexistence of five bacterial strains as a cellulose-degrading community", **Applied and Environmental Microbiology**, Vol. 71, pp. 7099-7106.

Kato, Y., and Matsuda, K., 1981, "Occurrence of a soluble and low molecular weight xyloglucan and its origin in etiolated mung bean hypocotyls", **Agricultural and biological chemistry**, Vol. 45, pp. 1-8.

Kauffmann, C., Shoseyov, O., Shpigel, E., Bayer, E.A., Lamed, R., Shoham, Y., and Mandelbaum, R.T., 2000, "Novel methodology for enzymatic removal of atrazine from water by CBD-fusion protein immobilized on cellulose", **Environmental Science and Technology**, Vol. 34, pp. 1292-1296.

Kaur, G., Kumar, S., and Satyanarayana, T., 2004, "Production, characterization and application of a thermostable polygalacturonase of a thermophilic mould *Sporotrichum thermophile* Apinis", **Bioresource Technology**, Vol. 94, pp. 239-243.

Khan, A.W., and Murray, W.D., 1982, "Influence of *Clostridium saccharolyticum* on cellulose degradation by *Acetivibrio cellulolyticus*", **Journal of applied Bacteriology**, Vol. 53, pp. 379-383.

Kibblewhite, R., Bawden, A., and Brindley, C., 1995, "TMP fibre and fines qualities of thirteen radiata pine wood types", **Appita Journal**, Vol. 48, pp. 367-377.

Kim, H., Goto, M., Jeong, H.-J., Jung, K., Kwon, H., and Furukawa, K., 1998, "Functional analysis of a hybrid endoglucanase of bacterial origin having a cellulose binding domain from a fungal exoglucanase", **Applied Biochemistry and Biotechnology**, Vol. 75, pp. 193-204.

Ko, C.-H., Tsai, C.-H., Tu, J., Yang, B.-Y., Hsieh, D.-L., Jane, W.-N., and Shih, T.-L., 2011, "Identification of *Paenibacillus* sp. 2S-6 and application of its xylanase on biobleaching", **International Biodeterioration and Biodegradation**, Vol. 65, pp. 334-339.

Kohring, S., Wiegel, J., and Mayer, F., 1990, "Subunit composition and glycosidic activities of the cellulase complex from *Clostridium thermocellum* JW20", **Applied and Environmental Microbiology**, Vol. 56, pp. 3798-3804.

Kosugi, A., Murashima, K., and Doi, R.H., 2002a, "Characterization of two noncellulosomal subunits, ArfA and BgaA, from *Clostridium cellulovorans* that cooperate with the cellulosome in plant cell wall degradation", **Journal of Bacteriology**, Vol. 184, pp. 6859-6865.

Kosugi, A., Murashima, K., Tamaru, Y., and Doi, R.H., 2002b, "Cell-surface-anchoring role of N-terminal surface layer homology domains of *Clostridium cellulovorans* EngE", **Journal of Bacteriology**, Vol. 184, pp. 884-888.

Koukiekolo, R., Cho, H.Y., Kosugi, A., Inui, M., Yukawa, H., and Doi, R.H., 2005, "Degradation of corn fiber by *Clostridium cellulovorans* cellulases and hemicellulases

and contribution of scaffolding protein CbpA", **Applied and Environmental Microbiology**, Vol. 71, pp. 3504-3511.

Krause, D.O., Denman, S.E., Mackie, R.I., Morrison, M., Rae, A.L., Attwood, G.T., McSweeney, C.S., 2003, "Opportunities to improve fiber degradation in the rumen: Microbiology, ecology, and genomics", **FEMS Microbiology Reviews**, Vol. 27, pp. 663-693.

Kuhad, R., Singh, A., and Eriksson, K.-E. 1997a. Microorganisms and enzymes involved in the degradation of plant fiber cell walls. in: *Biotechnology in the Pulp and Paper Industry*, (Eds.) Eriksson, K.E.L., Babel, W., Blanch, H.W., Cooney, C.L., Enfors, S.O., Eriksson, K.E.L., Fiechter, A., Klibanov, A.M., Mattiasson, B., Primrose, S.B., Rehm, H.J., Rogers, P.L., Sahn, H., Schügerl, K., Tsao, G.T., Venkat, K., Villadsen, J., Stockar, U. and Wandrey, C., Vol. 57, Springer Berlin Heidelberg, pp. 45-125.

Kuhad, R.C., Gupta, R., Khasa, Y.P., and Singh, A., 2010, "Bioethanol production from *Lantana camara* (red sage): pretreatment, saccharification and fermentation", **Bioresource Technology**, Vol. 101, pp. 8348-8354.

Kuhad, R.C., Gupta, R., and Singh, A., 2011, "Microbial cellulases and their industrial applications", **Enzyme Research**, Vol. 2011, pp. 10.

Kuhad, R.C., Kumar, M., and Singh, A., 1994, "A hypercellulolytic mutant of *Fusarium oxysporum*", **Letters in Applied Microbiology**, Vol. 19, pp. 397-400.

Kuhad, R.C., and Singh, A., 1993, "Lignocellulose biotechnology: current and future prospects", **Critical Reviews in Biotechnology**, Vol. 13, pp. 151-172.

Kuhad, R.C., Singh, A., and Eriksson, K.E., 1997b, "Microorganisms and enzymes involved in the degradation of plant fiber cell walls", **Advances in Biochemical Engineering/Biotechnology**, Vol. 57, pp. 45-125.

Kulkarni, N., Shendye, A., and Rao, M., 1999, "Molecular and biotechnological aspects of xylanases", **FEMS Microbiology Reviews**, Vol. 23, pp. 411-456.

Kumar, R., and Singh, R.P., 2001, "Semi-solid-state fermentation of *Eichhornia crassipes* biomass as lignocellulosic biopolymer for cellulase and β -glucosidase production by cocultivation of *Aspergillus niger* RK3 and *Trichoderma reesei* MTCC164", **Applied Biochemistry and Biotechnology**, Vol. 96, pp. 71-82.

Kumar, R., Singh, S., and Singh, O.V., 2008, "Bioconversion of lignocellulosic biomass: biochemical and molecular perspectives", **Journal of Industrial Microbiology and Biotechnology**, Vol. 35, pp. 377-391.

Kyu, K.L., Ratanakhanokchai, K., Uttapap, D., and Tanticharoen, M., 1994, "Induction of xylanase in *Bacillus circulans* B6", **Bioresource Technology**, Vol. 48, pp. 163-167.

Laemmli, U.K., 1970, "Cleavage of structural proteins during the assembly of the head of bacteriophage T4", **Nature**, Vol. 227, pp. 680-685.

Laine, C., Tamminen, T., and Hortling, B., 2004, "Carbohydrate structures in residual lignin-carbohydrate complexes of spruce and pine pulp", **Holzforschung**, Vol. 58, pp. 611-621.

Lamed, R., Naimark, J., Morgenstern, E., and Bayer, E.A., 1987, "Specialized cell surface structures in cellulolytic bacteria", **Journal of Bacteriology**, Vol. 169, pp. 3792-3800.

Lamed, R., Setter, E., and Bayer, E.A., 1983, "Characterization of a cellulose-binding, cellulase-containing complex in *Clostridium thermocellum*", **Journal of Bacteriology**, Vol. 156, pp. 828-836.

Lamed, R., and Zeikus, J.G., 1980, "Ethanol production by thermophilic bacteria: relationship between fermentation product yields of and catabolic enzyme activities in *Clostridium thermocellum* and *Thermoanaerobium brockii*", **Journal of Bacteriology**, Vol. 144, pp. 569-578.

Laurie, J.I., Clarke, J.H., Ciruela, A., Faulds, C.B., Williamson, G., Gilbert, H.J., Rixon, J.E., Millward-Sadler, J., and Hazlewood, G.P., 1997, "The NodB domain of a multidomain xylanase from *Cellulomonas fimi* deacetylates acetylxylan", **FEMS Microbiology Letters**, Vol. 148, pp. 261-264.

Lee, D., Yu, A.H., and Saddler, J.N., 1995, "Evaluation of cellulase recycling strategies for the hydrolysis of lignocellulosic substrates", **Biotechnology and Bioengineering**, Vol. 45, pp. 328-336.

Lee, Y.-E., Lowe, S.E., and Zeikus, J.G., 1993, "Gene cloning, sequencing, and biochemical characterization of endoxylanase from *Thermoanaerobacterium saccharolyticum* B6A-RI", **Applied and Environmental Microbiology**, Vol. 59, pp. 3134-3137.

Leibovitz, E., and Beguin, P., 1998, "Comparison of two scaffolding polypeptides for the integration of different proteins in synthetic complexes derived from the *Clostridium thermocellum* cellulosome", **Enzyme and Microbial Technology**, Vol. 22, pp. 588-593.

Leibovitz, E., and Beguin, P., 1996, "A new type of cohesin domain that specifically binds the dockerin domain of the *Clostridium thermocellum* cellulosome integrating protein CipA", **Journal of Bacteriology**, Vol. 178, pp. 3077-3084.

Leibovitz, E., Ohayon, H., Gounon, P., and Beguin, P., 1997, "Characterization and subcellular localization of the *Clostridium thermocellum* scaffoldin dockerin binding protein sdbA", **Journal of Bacteriology**, Vol. 179, pp. 2519-2523.

Lemaire, M., Miras, I., Gounon, P., and Beguin, P., 1998, "Identification of a region responsible for binding to the cell wall within the S-layer protein of *Clostridium thermocellum*", **Microbiology**, Vol. 144, pp. 211-217.

Lemaire, M., Ohayon, H., Gounon, P., Fujino, T., and Beguin, P., 1995, "OlpB, a new outer layer protein of *Clostridium thermocellum*, and binding of its S-layer-like domains to components of the cell envelope", **Journal of Bacteriology**, Vol. 177, pp. 2451-2459.

Lemus, R., Brummer, E.C., Moore, K.J., Molstad, N.E., Burras, C.L., and Barker, M.F., 2002, "Biomass yield and quality of 20 switchgrass populations in southern Iowa, USA", **Biomass and Bioenergy**, Vol. 23, pp. 433-442.

Levy, I., and Shoseyov, O., 2002, "Cellulose-binding domains: biotechnological applications", **Biotechnology Advances**, Vol. 20, pp. 191-213.

Lewis, G., Hunt, C., Sanchez, W., Treacher, R., Pritchard, G., and Feng, P., 1996, "Effect of direct-fed fibrolytic enzymes on the digestive characteristics of a forage-based diet fed to beef steers", **Journal of Animal Science**, Vol. 74, pp. 3020-3028.

Li, X.L., Chen, H., and Ljungdahl, L.G., 1997, "Two cellulases, CelA and CelC, from the polycentric anaerobic fungus *Orpinomyces* strain PC-2 contain N-terminal docking domains for a cellulase-hemicellulase complex", **Applied and Environmental Microbiology**, Vol. 63, pp. 4721-8.

Liab, K., Azadi, P., Collins, R., Tolan, J., Kim, J.S., and Eriksson, K.E.L., 2000, "Relationships between activities of xylanases and xylan structures", **Enzyme and Microbial Technology**, Vol. 27, pp. 89-94.

Limon, M.C., Margolles-Clark, E., Benitez, T.a., and Penttila, M., 2001, "Addition of substrate-binding domains increases substrate-binding capacity and specific activity of a chitinase from *Trichoderma harzianum*", **FEMS Microbiology Letters**, Vol. 198, pp. 57-63.

Liu, Y., Shi, J., and Langrish, T.A.G., 2006, "Water-based extraction of pectin from flavedo and albedo of orange peels", **Chemical Engineering Journal**, Vol. 120, pp. 203-209.

Liu, Y., Yu, P., Song, X., and Qu, Y., 2008, "Hydrogen production from cellulose by co-culture of *Clostridium thermocellum* JN4 and *Thermoanaerobacterium thermosaccharolyticum* GD17", **International Journal of Hydrogen Energy**, Vol. 33, pp. 2927-2933.

Longland, A.C., Theodorou, M.K., Sanderson, R., Lister, S.J., Powell, C.J., and Morris, P., 1995, "Non-starch polysaccharide composition and in vitro fermentability of tropical forage legumes varying in phenolic content", **Animal Feed Science and Technology**, Vol. 55, pp. 161-177.

Lora, J.H., and Glasser, W.G., 2002, "Recent industrial applications of lignin: a sustainable alternative to nonrenewable materials", **Journal of Polymers and the Environment**, Vol. 10, pp. 39-48.

Lorito, M., Hayes, C., Di Pietro, A., Woo, S., and Harman, G., 1994, "Purification, characterization, and synergistic activity of a glucan 1, 3- β -Glucosidase and an N-acetyl- β -glucosaminidase from *Trichoderma harzianum*", **Phytopathology**, Vol. 84, pp. 398-405.

Lowry, O.H., Rosebrough, N.J., Farr, A.L., and Randall, R.J., 1951, "Protein measurement with the Folin phenol reagent", **Journal of Biological Chemistry**, Vol. 193, pp. 265-275.

Lynd, L., 1989, "Production of ethanol from lignocellulosic materials using thermophilic bacteria: critical evaluation of potential and review lignocellulosic materials", **Advances in Biochemical Engineering/Biotechnology**, Vol. 38, pp. 1-52.

Lynd, L.R., Grethlein, H.E., and Wolkin, R.H., 1989, "Fermentation of cellulosic substrates in batch and continuous culture by *Clostridium thermocellum*", **Applied and Environmental Microbiology**, Vol. 55, pp. 3131-3139.

Lynd, L.R., Van Zyl, W.H., McBride, J.E., and Laser, M., 2005, "Consolidated bioprocessing of cellulosic biomass: an update", **Current Opinion in Biotechnology**, Vol. 16, pp. 577-583.

Lynd, L.R., Weimer, P.J., Van Zyl, W.H., and Pretorius, I.S., 2002, "Microbial cellulose utilization: fundamentals and biotechnology", **Microbiology and Molecular Biology Reviews**, Vol. 66, pp. 506-577.

Maalej, I., Belhaj, I., Masmoudi, N.F., and Belghith, H., 2009, "Highly thermostable xylanase of the thermophilic fungus *Talaromyces thermophilus*: Purification and characterization", **Applied Biochemistry and Biotechnology**, Vol. 158, pp. 200-212.

Madamwar, D., and Patel, S., 1992, "Formation of cellulases by co-culturing of *Trichoderma reesei* and *Aspergillus niger* on cellulosic waste", **World Journal of Microbiology and Biotechnology**, Vol. 8, pp. 183-186.

Maheshwari, D.K., Gohade, S., Paul, J., and Varma, A., 1994, "Paper mill sludge as a potential source for cellulase production by *Trichoderma reesei* QM 9123 and *Aspergillus niger* using mixed cultivation", **Carbohydrate Polymers**, Vol. 23, pp. 161-163.

Maheshwari, R., and Kamalam, P.T., 1985, "Isolation and culture of a thermophilic fungus, *Melanocarpus albomyces*, and factors influencing the production and activity of xylanase", **Journal of General Microbiology**, Vol. 131, pp. 3017-3027.

Mai, C., Kues, U., and Militz, H., 2004, "Biotechnology in the wood industry", **Applied Microbiology and Biotechnology**, Vol. 63, pp. 477-494.

Mai, V., Wiegel, J., and Lorenz, W.W., 2000, "Cloning, sequencing, and characterization of the bifunctional xylosidase–arabinosidase from the anaerobic thermophile *Thermoanaerobacter ethanolicus*", **Gene**, Vol. 247, pp. 137-143.

Mansfield, S.D., Mooney, C., and Saddler, J.N., 1999, "Substrate and enzyme characteristics that limit cellulose hydrolysis", **Biotechnology Progress**, Vol. 15, pp. 804-816.

Mansfield, S.D., Wong, K.K., De Jong, E., and Saddler, J.N., 1996, "Modification of Douglas-fir mechanical and kraft pulps by enzyme treatment", **Tappi Journal**, Vol. 79, pp. 125-132.

Mariko, A., Takashi, E., and Takahiro, H., 2004, "Crystalline transformation of native cellulose from cellulose I to cellulose II polymorph by a ball-milling method with a specific amount of water", **Cellulose**, Vol. 11, pp. 163-167.

Marlatt, C., Ho, C.T., and Chien, M., 1992, "Studies of aroma constituents bound as glycosides in tomato", **Journal of Agricultural and Food Chemistry**, Vol. 40, pp. 249-252.

Matuschek, M., Sahm, K., Zibat, A., and Bahl, H., 1996, "Characterization of genes from *Thermoanaerobacterium thermosulfurigenes* EM1 that encode two glycosyl hydrolases with conserved S-layer-like domains", **Molecular and General Genetics** Vol. 252, pp. 493-496.

Mazumder, K., and York, W.S., 2010, "Structural analysis of arabinoxylans isolated from ball-milled switchgrass biomass", **Carbohydrate Research**, Vol. 345, pp. 2183-2193.

- McBee, R., 1950, "The anaerobic thermophilic cellulolytic bacteria", **Bacteriological Reviews**, Vol. 14, pp. 51.
- McCann, M.C., and Carpita, N.C., 2008, "Designing the deconstruction of plant cell walls", **Current Opinion in Plant Biology**, Vol. 11, pp. 314-320.
- McKendry, P., 2002, "Energy production from biomass (part 1): overview of biomass", **Bioresource Technology**, Vol. 83, pp. 37-46.
- Mechaly, A., Yaron, S., Lamed, R., Fierobe, H.P., Belaich, A., Belaich, J.P., Shoham, Y., and Bayer, E.A., 2000, "Cohesin-dockerin recognition in cellulosome assembly: experiment versus hypothesis", **Proteins: Structure, Function, and Bioinformatics**, Vol. 39, pp. 170-177.
- Milala, M., Shugaba, A., Gidado, A., Ene, A., and Wafar, J., 2005, "Studies on the use of agricultural wastes for cellulase enzyme production by *Aspergillus niger*", **Research Journal of Agriculture and Biological Science**, Vol. 1, pp. 325-328.
- Minussi, R.C., Pastore, G.M., and Durán, N., 2002, "Potential applications of laccase in the food industry", **Trends in Food Science and Technology**, Vol. 13, pp. 205-216.
- Miras, I., Schaeffer, F., Beguin, P., and Alzari, P.M., 2002, "Mapping by site-directed mutagenesis of the region responsible for cohesin-dockerin interaction on the surface of the seventh cohesin domain of *Clostridium thermocellum* CipA", **Biochemistry**, Vol. 41, pp. 2115-2119.
- Mishra, S., Beguin, P., and Aubert, J.P., 1991, "Transcription of *Clostridium thermocellum* endoglucanase genes celF and celD", **Journal of Bacteriology**, Vol. 173, pp. 80-85.
- Modler, H.W., 1994, "Bifidogenic factors, sources, metabolism and applications", **International Dairy Journal**, Vol. 4, pp. 383-407.
- Mohan, D., Pittman, C.U., and Steele, P.H., 2006, "Pyrolysis of wood/biomass for bio-oil: a critical review", **Energy and Fuels**, Vol. 20, pp. 848-889.

Morag, E., Bayer, E.A., and Lamed, R., 1990, "Relationship of cellulosomal and noncellulosomal xylanases of *Clostridium thermocellum* to cellulose-degrading enzymes", **Journal of Bacteriology**, Vol. 172, pp. 6098-6105.

Moreira, L.R.S., and Filho, E.X.F., 2008, "An overview of mannan structure and mannan-degrading enzyme systems", **Applied Microbiology and Biotechnology**, Vol. 79, pp. 165-178.

Mori, Y., 1990, "Characterization of a symbiotic coculture of *Clostridium thermohydrosulfuricum* YM3 and *Clostridium thermocellum* YM4", **Applied Environment Microbiology**, Vol. 56, pp. 37-42.

Morris, E.J., 1988, "Characteristics of the adhesion of *Ruminococcus albus* to cellulose", **FEMS Microbiology Letters**, Vol. 51, pp. 113-117.

Mosier, N., Wyman, C., Dale, B., Elander, R., Lee, Y., Holtzapple, M., and Ladisch, M., 2005, "Features of promising technologies for pretreatment of lignocellulosic biomass", **Bioresource Technology**, Vol. 96, pp. 673-686.

Mueller-Harvey, I., Hartley, R.D., Harris, P.J., and Curzon, E.H., 1986, "Linkage of *p*-coumaroyl and feruloyl groups to cell wall polysaccharides of barley straw", **Carbohydrate Research**, Vol. 148, pp. 71-85.

Murashima, K., Kosugi, A., and Doi, R.H., 2003, "Synergistic effects of cellulosomal xylanase and cellulases from *Clostridium cellulovorans* on plant cell wall degradation", **Journal of Bacteriology**, Vol. 185, pp. 1518-1524.

Murashima, K., Kosugi, A., and Doi, R.H., 2002, "Synergistic effects on crystalline cellulose degradation between cellulosomal cellulases from *Clostridium cellulovorans*", **Journal of Bacteriology**, Vol. 184, pp. 5088-5095.

Murray, W.D., 1986, "Symbiotic relationship of *Bacteroides cellulosolvens* and *Clostridium saccharolyticum* in cellulose fermentation", **Applied Environment Microbiology**, Vol. 51, pp. 710-714.

Nelson, N., 1944, "A photometric adaptation of the Somogyi method for the determination of glucose", **The Journal of Biological Chemistry**, Vol. 153, pp. 375-380.

Ng, T.K., Ben-Bassat, A., and Zeikus, J.G., 1981, "Ethanol production by thermophilic bacteria: fermentation of cellulosic substrates by cocultures of *Clostridium thermocellum* and *Clostridium thermohydrosulfuricum*", **Applied and Environmental Microbiology**, Vol. 41, pp. 1337-1343.

Ng, T.K., Weimer, P.J., and Zeikus, J.G., 1977, "Cellulolytic and physiological properties of *Clostridium thermocellum*", **Archives of Microbiology**, Vol. 114, pp. 1-7.

Niehaus, F., Bertoldo, C., Kähler, M., and Antranikian, G., 1999, "Extremophiles as a source of novel enzymes for industrial application", **Applied Microbiology and Biotechnology**, Vol. 51, pp. 711-729.

Nikolova, P.V., Creagh, A.L., Duff, S.J.B., and Haynes, C.A., 1997, "Thermostability and irreversible activity loss of exoglucanase/xylanase Cex from *Cellulomonas fimi*", **Biochemistry**, Vol. 36, pp. 1381-1388.

Nolling, J., 2001, "Genome sequence and comparative analysis of the solvent-producing bacterium *Clostridium acetobutylicum*", **Journal of Bacteriology**, Vol. 183, pp. 4823-4838.

Notenboom, V., Boraston, A.B., Williams, S.J., Kilburn, D.G., and Rose, D.R., 2002, "High-resolution crystal structures of the lectin-like xylan binding domain from *Streptomyces lividans* xylanase 10A with bound substrates reveal a novel mode of xylan binding", **Biochemistry**, Vol. 41, pp. 4246-4254.

Nurizzo, D., Nagy, T., Gilbert, H.J., and Davies, G.J., 2002a, "The structural basis for catalysis and specificity of the *Pseudomonas cellulosa* α -glucuronidase, GlcA67A", **Structure**, Vol. 10, pp. 547-556.

Nurizzo, D., Turkenburg, J.P., Charnock, S.J., Roberts, S.M., Dodson, E.J., McKie, V.A., Taylor, E.J., Gilbert, H.J., and Davies, G.J., 2002b, "*Cellvibrio japonicus* α -L-arabinanase 43A has a novel five-blade β -propeller fold", **Nat Struct Mol Biol**, Vol. 9, pp. 665-668.

O-Thong, S., Prasertsan, P., Karakashev, D., and Angelidaki, I., 2008, "Thermophilic fermentative hydrogen production by the newly isolated *Thermoanaerobacterium thermosaccharolyticum* PSU-2", **International Journal of Hydrogen Energy**, Vol. 33, pp. 1204-1214.

Ochoa-Villarreal, M., Aispuro-Hernández, E., Martínez-Téllez, M.A., and Vargas-Arispuro, I., 2012, "Plant Cell Wall Polymers: Function, Structure and Biological Activity of Their Derivatives", **Polymerization**,

Ohara, H., Karita, S., Kimura, T., Sakka, K., and Ohmiya, K., 2000, "Characterization of the cellulolytic complex (cellulosome) from *Ruminococcus albus*", **Bioscience, Biotechnology and Biochemistry**, Vol. 64, pp. 254-260.

Olver, B., Dyk, J.S., Beukes, N., and Pletschke, B.I., 2011, "Synergy between EngE, XynA and ManA from *Clostridium cellulovorans* on corn stalk, grass and pineapple pulp substrates", **Biotechnology**, Vol. 1, pp. 187-192.

Pages, S., 1999, "Sequence analysis of scaffolding protein CipC and ORFXp, a new cohesin containing protein in *Clostridium cellulolyticum*: comparison of various cohesin domains and subcellular localization of ORFXp", **Journal of Bacteriology**, Vol. 181, pp. 1801-1810.

Pages, S., 1997, "Species-specificity of the cohesin-dockerin interaction between *Clostridium thermocellum* and *Clostridium cellulolyticum*: prediction of specificity determinants of the dockerin domain", **Proteins: Structure, Function, and Bioinformatics**, Vol. 29, pp. 517-527.

Pandey, M.P., and Kim, C.S., 2011, "Lignin depolymerization and conversion: A review of thermochemical methods", **Chemical Engineering & Technology**, Vol. 34, pp. 29-41.

Pariza, M.W., and Johnson, E.A., 2001, "Evaluating the safety of microbial enzyme preparations used in food processing: update for a new century", **Regulatory Toxicology and Pharmacology**, Vol. 33, pp. 173-186.

Pason, P., Kyu, K.L., and Ratanakhanokchai, K., 2006, "*Paenibacillus curdolanolyticus* strain B-6 xylanolytic-cellulolytic enzyme system that degrades insoluble polysaccharides", **Applied and Environmental Microbiology**, Vol. 72, pp. 2483-2490.

Pazarlioglu, N.K., Sariisik, M., and Telefoncu, A., 2005, "Treating denim fabrics with immobilized commercial cellulases", **Process Biochemistry**, Vol. 40, pp. 767-771.

Pekarovicova, A., Kozankova, J., Mikulasova, M., Jankovic, P., and Pekarovic, J., 1992, "SEM study of xylanase pretreated pulps", **Xylans and xylanases**, Visser, J., Beldman, G., Kusters-van, S.M. and Voragen, A., Elsevier Science Publishers, Amsterdam,

Pere, J., Puolakka, A., Nousiainen, P., and Buchert, J., 2001, "Action of purified *Trichoderma reesei* cellulases on cotton fibers and yarn", **Journal of Biotechnology**, Vol. 89, pp. 247-255.

Phitsuwan, P., Tachaapaikoon, C., Kosugi, A., Mori, Y., Kyu, K.L., and Ratanakhanokchai, K., 2010, "A cellulolytic and xylanolytic enzyme complex from an alkalothermoanaerobacterium, *Tepidimicrobium xylanilyticum* BT14", **Journal of Microbiology and Biotechnology**, Vol. 20, pp. 893-903.

Planas, A., 2000, "Bacterial 1,3-1,4- β -glucanases: structure, function and protein engineering", **Biochimica et Biophysica Acta (BBA)**, Vol. 1543, pp. 361-382.

Pohlschroeder, M., Leschine, S.B., and Canale-Parola, E., 1994, "*Spirochaeta caldaria* sp. nov., a thermophilic bacterium that enhances cellulose degradation by *Clostridium thermocellum*", **Archives of Microbiology**, Vol. 161, pp. 17-24.

Ponpium, P., Ratanakhanokchai, K., and Kyu, K.L., 2000, "Isolation and properties of a cellulosome-type multienzyme complex of the thermophilic *Bacteroides* sp. strain P-1", **Enzyme and Microbial Technology**, Vol. 26, pp. 459-465.

Prates, J.A.M., Tarbouriech, N., Charnock, S.J., Fontes, C.M.G.A., Ferreira, L.s.M.A., and Davies, G.J., 2001, "The structure of the feruloyl esterase module of xylanase 10B from *Clostridium thermocellum* provides insights into substrate recognition", **Structure**, Vol. 9, pp. 1183-1190.

Putun, A.E., Ozcan, A., Gercel, H.F., and Putun, E., 2001, "Production of biocrudes from biomass in a fixed-bed tubular reactor: product yields and compositions", **Fuel**, Vol. 80, pp. 1371-1378.

Rai, P., Majumdar, G.C., Das Gupta, S., and De, S., 2007, "Effect of various pretreatment methods on permeate flux and quality during ultrafiltration of mosambi juice", **Journal of Food Engineering**, Vol. 78, pp. 561-568.

Ratanakhanokchai, K., Kyu, K.L., and Tanticharoen, M., 1999, "Purification and properties of a xylan-binding endoxylanase from alkaliphilic *Bacillus* sp. strain K-1", **Applied and Environmental Microbiology**, Vol. 65, pp. 694-697.

Ratanakhanokchai, K., Waeonukul, R., Pason, P., Tachaapaikoon, C., Kyu, K.L., Sakka, K., Kosugi, A., and Mori, Y. 2013. *Paenibacillus curdlanolyticus* strain B-6 multienzyme complex: a novel system for biomass utilization. in: *Biomass Now - Cultivation and Utilization*, (Ed.) Matovic, M.D., InTech. Cannada, pp. 369-394.

Rattanachomsri, U., Tanapongpipat, S., Eurwilaichitr, L., and Champreda, V., 2009, "Simultaneous non-thermal saccharification of cassava pulp by multi-enzyme activity and ethanol fermentation by *Candida tropicalis*", **Journal of Bioscience and Bioengineering**, Vol. 108, pp. 357-357.

Revilla, I., and Jose, G.S., 2003, "Addition of pectolytic enzymes: an enological practice which improves the chromaticity and stability of red wines", **International Journal of Food Science and Technology**, Vol. 38, pp. 29-36.

Ricard, M., and Reid, I.D., 2004, "Purified pectinase lowers cationic demand in peroxide-bleached mechanical pulp", **Enzyme and Microbial Technology**, Vol. 34, pp. 499-504.

Rincon, M.T., Ding, S.-Y., McCrae, S.I., Martin, J.C., Aurilia, V., Lamed, R., Shoham, Y., Bayer, E.A., and Flint, H.J., 2003, "Novel organization and divergent dockerin specificities in the cellulosome system of *Ruminococcus flavefaciens*", **Journal of Bacteriology**, Vol. 185, pp. 703-713.

Roberts, J.C., McCarthy, A.J., Flynn, N.J., and Broda, P., 1990, "Modification of paper properties by the treatment of pulp with *Saccharomonospora viridis* xylanase", **Enzyme and Microbial Technology**, Vol. 12, pp. 210-213.

Roehr, M., Kosaric, N., Vardar-Sukan, F., Pieper, H., and Senn, T., 2001, "The biotechnology of ethanol", **Classical and future applications**, M., R., Wiley-VCH, Germany,

Rycroft, C., Jones, M., Gibson, G., and Rastall, R., 2001, "A comparative in vitro evaluation of the fermentation properties of prebiotic oligosaccharides", **Journal of Applied Microbiology**, Vol. 91, pp. 878-887.

Sabathe, F., and Soucaille, P., 2003, "Characterization of the CipA scaffolding protein and in vivo production of a minicellulosome in *Clostridium acetobutylicum*", **Journal of Bacteriology**, Vol. 185, pp. 1092-1096.

Saddler, J.N., and Chan, M.K.H., 1984, "Conversion of pretreated lignocellulosic substrates to ethanol by *Clostridium thermocellum* in mono- and co-culture with *Clostridium thermosaccharolyticum* and *Clostridium thermohydrosulphuricum*", **Canadian Journal of Microbiology**, Vol. 30, pp. 212-220.

Saha, B.C., 2003, "Hemicellulose bioconversion", **Journal of Industrial Microbiology and Biotechnology**, Vol. 30, pp. 279-291.

Saha, B.C., 2000, " α -L-Arabinofuranosidases: biochemistry, molecular biology and application in biotechnology", **Biotechnology Advances**, Vol. 18, pp. 403-423.

Saha, B.C., and Bothast, R.J., 1999, "Pretreatment and enzymatic saccharification of corn fiber", **Applied Biochemistry and Biotechnology: Part A Enzyme Engineering and Biotechnology**, Vol. 76, pp. 65-77.

Saidur, R., Abdelaziz, E.A., Demirbas, A., Hossain, M.S., and Mekhilef, S., 2011, "A review on biomass as a fuel for boilers", **Renewable and Sustainable Energy Reviews**, Vol. 15, pp. 2262-2289.

Sakka, K., Maeda, Y., Makamada, N., Takahashi, Z., and Shimada, K., 1994, "Purification and properties of xylanase from *Clostridium stercorarium* strain HX-1", **Agricultural and biological chemistry**, Vol. 55, pp. 247-248.

Salamitou, S., Raynaud, O., Lemaire, M., Coughlan, M., Beguin, P., and Aubert, J.P., 1994, "Recognition specificity of the duplicated segments present in *Clostridium thermocellum* endoglucanase CelD and in the cellulosome-integrating protein CipA", **Journal of Bacteriology**, Vol. 176, pp. 2822-2827.

Salazar, L., and Jayasinghe, U. 1991. Fundamentals of purification of plant viruses. in: *Techniques in plant virology, at CIP.*, (Ed.) Salazar, L., International Potato Centre. Peru, pp. 1-10.

Salih, M.E., Classen, H.L., and Campbell, G.L., 1991, "Response of chickens fed on hull-less barley to dietary β -glucanase at different ages", **Animal Feed Science and Technology**, Vol. 33, pp. 139-149.

Saloheimo, M., Barajas, V., Niku-Paavola, M.-L., and Knowles, J.K., 1989, "A lignin peroxidase-encoding cDNA from the white-rot fungus *Phlebia radiata*: characterization and expression in *Trichoderma reesei*", **Gene**, Vol. 85, pp. 343-351.

Saloheimo, M., and Niku-Paavola, M.-L., 1991, "Heterologous production of a ligninolytic enzyme: expression of the *Phlebia radiata* laccase gene in *Trichoderma reesei*", **Nature Biotechnology**, Vol. 9, pp. 987-990.

Sami, M., Annamalai, K., and Wooldridge, M., 2001, "Co-firing of coal and biomass fuel blends", **Progress in Energy and Combustion Science**, Vol. 27, pp. 171-214.

Sanchez, C., 2009, "Lignocellulosic residues: biodegradation and bioconversion by fungi", **Biotechnology Advances**, Vol. 27, pp. 185-194.

Saul, D.J., Williams, L.C., Grayling, R.A., Chamley, L.W., Love, D.R., and Bergquist, P.L., 1990, "celB, a gene coding for a bifunctional cellulase from the extreme thermophile "*Caldocellum saccharolyticum*"", **Applied and Environmental Microbiology**, Vol. 56, pp. 3117-3124.

Saulnier, L., Marot, C., Chanliaud, E., and Thibault, J.-F., 1995, "Cell wall polysaccharide interactions in maize bran", **Carbohydrate Polymers**, Vol. 26, pp. 279-287.

Saxena, R.C., Adhikari, D.K., and Goyal, H.B., 2009, "Biomass based energy fuel through biochemical routes: a review", **Renewable and Sustainable Energy Reviews**, Vol. 13, pp. 167-178.

Schaeffer, F., Matuschek, M., Guglielmi, G., Miras, I., Alzari, P.M., and Be?guin, P., 2002, "Duplicated dockerin subdomains of *Clostridium thermocellum* endoglucanase Ce1D bind to a cohesin domain of the scaffolding protein CipA with distinct thermodynamic parameters and a negative cooperativity", **Biochemistry**, Vol. 41, pp. 2106-2114.

Scheller, H.V., and Ulvskov, P., 2010, "Hemicelluloses", **Annual Review of Plant Biology**, Vol. 61, pp. 263-289.

Schubot, F.D., Kataeva, I.A., Blum, D.L., Shah, A.K., Ljungdahl, L.G., Rose, J.P., and Wang, B.-C., 2001, "Structural basis for the substrate specificity of the feruloyl esterase domain of the cellulosomal xylanase Z from *Clostridium thermocellum*", **Biochemistry**, Vol. 40, pp. 12524-12532.

Scott, D. 1978. Enzymes, industrial. in: *Encyclopedia of chemical technology*, (Eds.) Grayson, M., Ekarth, D. and Othmer, K., Wiley. New York, pp. 173-224.

Shallom, D., Belakhov, V., Solomon, D., Gilead-Gropper, S., Baasov, T., Shoham, G., and Shoham, Y., 2002, "The identification of the acid-base catalyst of α -arabinofuranosidase from *Geobacillus stearothermophilus* T-6, a family 51 glycoside hydrolase", **FEBS Letters**, Vol. 514, pp. 163-167.

Shallom, D., and Shoham, Y., 2003, "Microbial hemicellulases", **Current Opinion in Microbiology**, Vol. 6, pp. 219-228.

Sharma, M., and Kumar, A., 2013, "Xylanases: an overview", **British Biotechnology Journal**, Vol. 3, pp. 1-28.

Shimon, L.J.W., Bayer, E.A., Morag, E., Lamed, R., Yaron, S., Shoham, Y., and Frolow, F., 1997, "A cohesin domain from *Clostridium thermocellum*: the crystal structure provides new insights into cellulosome assembly", **Structure**, Vol. 5, pp. 381-390.

Shoham, Y., Lamed, R., and Bayer, E.A., 1999, "The cellulosome concept as an efficient microbial strategy for the degradation of insoluble polysaccharides", **Trends in Microbiology**, Vol. 7, pp. 275-281.

Shoseyov, O., and Doi, R.H., 1990, "Essential 170 kDa subunit for degradation of crystalline cellulose by *Clostridium cellulovorans* cellulase", **Proceedings of the National Academy of Sciences of the United States of America**, Vol. 87, pp. 2192-2195.

Shoseyov, O., Shani, Z., and Levy, I., 2006, "Carbohydrate binding modules: biochemical properties and novel applications", **Microbiology and Molecular Biology Reviews**, Vol. 70, pp. 283-295.

Shoseyov, O., Takagi, M., Goldstein, M.A., and Doi, R.H., 1992, "Primary sequence analysis of *Clostridium cellulovorans* cellulose binding protein A", **Proceedings of the National Academy of Sciences of the United States of America**, Vol. 89, pp. 3483-3487.

Shrivastava, B., Thakur, S., Khasa, Y., Gupte, A., Puniya, A., and Kuhad, R., 2011, "White-rot fungal conversion of wheat straw to energy rich cattle feed", **Biodegradation**, Vol. 22, pp. 823-831.

Siegel, D.L., and Shoseyov, O., 2001, Method of releasing solid matrix affinity adsorbed particulates, **US patent 6**, 184,011.

Sittikijyothin, W., Torres, D., and Goncalves, M.P., 2005, "Modelling the rheological behaviour of galactomannan aqueous solutions", **Carbohydrate Polymers**, Vol. 59, pp. 339-350.

Sleytr, U.B., and Beveridge, T.J., 1999, "Bacterial S-layers", **Trends in Microbiology**, Vol. 7, pp. 253-260.

Smibert, R.M., and Krie, N.R., 1994, " Phenotypic characterization ", **Methods for General and Molecular Bacteriology**, Gerhaedt, P., Murray, R.G.E., Wood, W.A. and Krieg, N.R., American Society for Microbiology, Washington, pp.607-654.

Somerville, C., 2006, "Cellulose synthesis in higher plants", **Annual Review of Cell and Developmental Biology**, Vol. 22, pp. 53-78.

Somogyi, M., 1952, "Notes in sugar determination", **Journal of Biological Chemistry**, Vol. 195, pp. 19-23.

Song, L., Siguier, B., Dumon, C., Bozonnet, S., and O'Donohue, M.J., 2012, "Engineering better biomass-degrading ability into a GH11 xylanase using a directed evolution strategy", **Biotechnology for Biofuels**, Vol. 5, pp. 3.

Sonne-Hansen, J., Mathrani, I.M., and Ahring, B.K., 1993, "Xylanolytic anaerobic thermophiles from Icelandic hot-springs", **Applied Microbiology and Biotechnology**, Vol. 38, pp. 537-541.

Soundar, S., and Chandra, T.S., 1987, "Cellulose degradation by a mixed bacterial culture", **Journal of Industrial Microbiology**, Vol. 2, pp. 257-265.

Sreenath, H.K., Shah, A.B., Yang, V.W., Gharia, M.M., and Jeffries, T.W., 1996, "Enzymatic polishing of jute/cotton blended fabrics", **Journal of Fermentation and Bioengineering**, Vol. 81, pp. 18-20.

Srivastava, S.K., Gopalkrishnan, K.S., and Ramachandran, K.B., 1987, "The production of β -glucosidase in shake flasks by *Aspergillus wentii*", **Journal of Fermentation Technology**, Vol. 65, pp. 95-99.

Sugawara, M., Suzuki, T., Totsuka, A., Takeuchi, M., and Ueki, K., 1994, "Composition of corn hull dietary fiber", **Starch**, Vol. 46, pp. 335-337.

Sukumaran, R.K., Singhanian, R.R., and Pandey, A., 2005, "Microbial cellulases: production, applications and challenges", **Journal of Scientific and Industrial Research**, Vol. 64, pp. 832.

Sun, J.L., Sakka, K., Karita, S., Kimura, T., and Ohmiya, K., 1998, "Adsorption of *Clostridium stercorarium* xylanase A to insoluble xylan and the importance of the

CBDs to xylan hydrolysis", **Journal of Fermentation and Bioengineering**, Vol. 85, pp. 63-68.

Sun, Y., and Cheng, J., 2002, "Hydrolysis of lignocellulosic materials for ethanol production: a review", **Bioresource technology**, Vol. 83, pp. 1-11.

Sunna, A., and Antranikian, G., 1997, "Xylanolytic enzymes from fungi and bacteria", **Critical Reviews in Biotechnology**, Vol. 17, pp. 39-67.

Suykerbuyk, M.E.G., Schaap, P.J., Stam, H., Musters, W., and Visser, J., 1995, "Cloning, sequence and expression of the gene coding for rhamnogalacturonase of *Aspergillus aculeatus*; a novel pectinolytic enzyme", **Applied Microbiology and Biotechnology**, Vol. 43, pp. 861-870.

Tachaapaikoon, C., Kosugi, A., Pason, P., Waeonukul, R., Ratanakhanokchai, K., Kyu, K., Arai, T., Murata, Y., and Mori, Y., 2011, "Isolation and characterization of a new cellulosome-producing *Clostridium thermocellum* strain", **Biodegradation**, Vol. 23, pp. 57-68.

Tamaru, Y., and Doi, R.H., 1999, "Three surface layer homology domains at the N terminus of the *Clostridium cellulovorans* major cellulosomal subunit Eng E", **Journal of Bacteriology**, Vol. 181, pp. 3270-3276.

Tamaru, Y., Karita, S., Ibrahim, A., Chan, H., and Doi, R.H., 2000, "A large gene cluster for the *Clostridium cellulovorans* cellulosome", **Journal of Bacteriology**, Vol. 182, pp. 5906-5910.

Tan, S.S., Li, D.Y., Jiang, Z.Q., Zhu, Y.P., Shi, B., and Li, L.T., 2008, "Production of xylobiose from the autohydrolysis explosion liquor of corncob using *Thermotoga maritima* xylanase B (XynB) immobilized on nickel-chelated Eupergit C", **Bioresource Technology**, Vol. 99, pp. 200-204.

Taniguchi, M., Suzuki, H., Watanabe, D., Sakai, K., Hoshino, K., and Tanaka, T., 2005, "Evaluation of pretreatment with *Pleurotus ostreatus* for enzymatic hydrolysis of rice straw", **Journal of bioscience and bioengineering**, Vol. 100, pp. 637-643.

Tavares, G.A., Beguin, P., and Alzari, P.M., 1997, "The crystal structure of a type I cohesin domain at 1.7 angstrom resolution", **Journal of Molecular Biology**, Vol. 273, pp. 701-713.

Tenkanen, M., Buchert, J., and Viikari, L., 1995, "Binding of hemicellulases on isolated polysaccharide substrates", **Enzyme and Microbial Technology**, Vol. 17, pp. 499-505.

Teo, V.S.J., Saul, D.J., and Bergquist, P.L., 1995, "celA, another gene coding for a multidomain cellulase from the extreme thermophile *Caldocellum saccharolyticum*", **Applied Microbiology and Biotechnology**, Vol. 43, pp. 291-296.

Teunissen, M.J., Op den Camp, H.J.M., Orpin, C.G., Huis in 't Veld, J.H.J., and Vogels, G.D., 1991, "Comparison of growth characteristics of anaerobic fungi isolated from ruminant and non-ruminant herbivores during cultivation in a defined medium", **Journal of General Microbiology**, Vol. 137, pp. 1401-1408.

Thompson, J.D., Higgins, D.G., and Gibson, T.J., 1994, "CLUSTAL W: Improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice", **Nucleic Acids Research**, Vol. 22, pp. 4673-4680.

Timell, T.E., 1967, "Recent progress in the chemistry of wood hemicelluloses", **Wood Science and Technology**, Vol. 1, pp. 45-70.

Tiwari, V., Pathak, A., and Lehri, L., 1987, "Effect of plant waste incorporation by different methods under uninoculated and inoculated conditions on wheat crops", **Biological Wastes**, Vol. 21, pp. 267-273.

Tokatlidis, K., Salamiou, S., Beguin, P., Dhurjati, P., and Aubert, J.P., 1991, "Interaction of the duplicated segment carried by *Clostridium thermocellum* cellulases with cellulosome components", **FEBS Letters**, Vol. 291, pp. 185-188.

Tomme, P., 1998, "Characterization and affinity applications of cellulose-binding domains", **Journal of Chromatography B**, Vol. 715, pp. 283-296.

Tormo, J., Lamed, R., Chirino, A.J., Morag, E., Bayer, E.A., Shoham, Y., and Steitz, T.A., 1996, "Crystal structure of a bacterial family-III cellulose-binding domain: a

general mechanism for attachment to cellulose", **EMBO Journal**, Vol. 15, pp. 5739-5751.

Torre, M., and Campillo, C., 1984, "Isolation and characterization of a symbiotic cellulolytic mixed bacterial culture", **Applied Microbiology and Biotechnology**, Vol. 19, pp. 430-434.

Tu, M., Chandra, R.P., and Saddler, J.N., 2007, "Evaluating the distribution of cellulases and the recycling of free cellulases during the hydrolysis of lignocellulosic substrates", **Biotechnology Progress**, Vol. 23, pp. 398-406.

Uhlig, H., and Linsmaier-Bednar, E.M., 1998, "Industrial enzymes and their applications", Wiley New York,

Valaskova, V., de Boer, W., Klein Gunnewiek, P.J.A., Pospisek, M., and Baldrian, P., 2009, "Phylogenetic composition and properties of bacteria coexisting with the fungus *Hypholoma fasciculare* in decaying wood", **International Society for Microbial Ecology**, Vol. 3, pp. 1218-1221.

Valls, C., and Roncero, M.B., 2009, "Using both xylanase and laccase enzymes for pulp bleaching", **Bioresource Technology**, Vol. 100, pp. 2032-2039.

Van Dyk, J.S., and Pletschke, B.I., 2012, "A review of lignocellulose bioconversion using enzymatic hydrolysis and synergistic cooperation between enzymes factors affecting enzymes, conversion and synergy", **Biotechnology Advances**, Vol. 30, pp. 1458-1480.

Van Dyk, J.S., Sakka, M., Sakka, K., and Pletschke, B.I., 2009, "The cellulolytic and hemi-cellulolytic system of *Bacillus licheniformis* SVD1 and the evidence for production of a large multi-enzyme complex", **Enzyme and Microbial Technology**, Vol. 45, pp. 372-378.

Van Petegem, F., Collins, T., Meuwis, M.-A., Gerday, C., Feller, G., and Van Beeumen, J., 2003, "The structure of a cold-adapted family 8 xylanase at 1.3 Å resolution: structural adaptation to cold and investigation of the active site", **Journal of Biological Chemistry**, Vol. 278, pp. 7531-7539.

Varrot, A., Yamamoto, H., Sekiguchi, J., Thompson, J., and Davies, G.J., 1999, "Crystallization and preliminary x-ray analysis of the 6-phospho- α -glucosidase from *Bacillus subtilis*", **Acta Crystallographica Section D: Biological Crystallography**, Vol. 55, pp. 1212-1214.

Vazquez, M.J., Alonso, J.L., Dominguez, H., and Parajo, J.C., 2001, "Xylooligosaccharides: manufacture and applications", **Trends in Food Science and Technology**, Vol. 11, pp. 387-393.

Venkateswaren, S., and Demain, A.L., 1986, "The *Clostridium thermocellum*-*Clostridium thermosaccharolyticum* ethanol production process: nutritional studies and scale-down", **Chemical Engineering Communications**, Vol. 45, pp. 53-60.

Viikari, L., Tenkanen, M., and Suurnäkki, A., 2001, "Biotechnology in the pulp and paper industry", **Biotechnology**, Wiley-VCH Verlag GmbH, pp.523-546.

Vocadlo, D.J., Wicki, J., Rupitz, K., and Withers, S.G., 2002a, "A case for reverse rotation: identification of Glu160 as an acid/base catalyst in *Thermoanaerobacterium saccharolyticum* β -xylosidase and detailed kinetic analysis of a site directed mutant", **Biochemistry**, Vol. 41, pp. 9736-9746.

Vocadlo, D.J., Wicki, J., Rupitz, K., and Withers, S.G., 2002b, "Mechanism of *Thermoanaerobacterium saccharolyticum* β -xylosidase: kinetic studies", **Biochemistry**, Vol. 41, pp. 9727-9735.

Waeonukul, R., Kyu, K.L., Sakka, K., and Ratanakhanokchai, K., 2009, "Isolation and characterization of a multienzyme complex (cellulosome) of the *Paenibacillus curdlanolyticus* B-6 grown on Avicel under aerobic conditions", **Journal of Bioscience and Bioengineering**, Vol. 107, pp. 610-614.

Wiegel, J., 1980, "Formation of ethanol by bacteria: a pledge for the use of extreme thermophilic anaerobic bacteria in industrial ethanol fermentation processes", **Experientia**, Vol. 36, pp. 1434-1446.

Wiegel, J., and Ljungdahl, L., 1981, "*Thermoanaerobacter ethanolicus* gen. nov., spec. nov., a new, extreme thermophilic, anaerobic bacterium", **Archives of Microbiology**, Vol. 128, pp. 343-348.

Wong, K.K., and Saddler, J.N., 1992, "*Trichoderma* xylanases, their properties and application", **Critical Reviews in Biotechnology**, Vol. 12, pp. 413-435.

Wong, K.K., Tan, L.U., and Saddler, J.N., 1988, "Multiplicity of beta-1,4-xylanase in microorganisms: functions and applications", **Microbiological Reviews**, Vol. 52, pp. 305-317.

Wu, J.H.D., Orme-Johnson, W.H., and Demain, A.L., 1988, "Two components of an extracellular protein aggregate of *Clostridium thermocellum* together degrade crystalline cellulose", **Biochemistry**, Vol. 27, pp. 1703-1709.

Wyman, C.E., Dale, B.E., Elander, R.T., Holtzapple, M., Ladisch, M.R., and Lee, Y., 2005, "Coordinated development of leading biomass pretreatment technologies", **Bioresource Technology**, Vol. 96, pp. 1959-1966.

Xie, X., Goodell, B., Zhang, D., Nagle, D.C., Qian, Y., Peterson, M.L., and Jellison, J., 2009, "Characterization of carbons derived from cellulose and lignin and their oxidative behavior", **Bioresource Technology**, Vol. 100, pp. 1797-1802.

Xu, Z., Bae, W., Mulchandani, A., Mehra, R.K., and Chen, W., 2002, "Heavy metal removal by novel CBD-EC20 sorbents immobilized on cellulose", **Biomacromolecules**, Vol. 3, pp. 462-465.

Yadav, S., Yadav, P.K., Yadav, D., and Yadav, K.D.S., 2009, "Pectin lyase: a review", **Process Biochemistry**, Vol. 44, pp. 1-10.

Yang, B., Dai, Z., Ding, S.-Y., and Wyman, C.E., 2011, "Enzymatic hydrolysis of cellulosic biomass", **Biofuels**, Vol. 2, pp. 421-450.

Yang, R., Xu, S., Wang, Z., and Yang, W., 2005, "Aqueous extraction of corncob xylan and production of xylooligosaccharides", **LWT-Food Science and Technology**, Vol. 38, pp. 677-682.

Youn, K.-S., Hong, J.-H., Bae, D.-H., Kim, S.-J., and Kim, S.-D., 2004, "Effective clarifying process of reconstituted apple juice using membrane filtration with filter-aid pretreatment", **Journal of Membrane Science**, Vol. 228, pp. 179-186.

Yu, E.K.C., Deschatelets, L., Louis-Seize, G., and Saddler, J.N., 1985, "Butanediol production from cellulose and hemicellulose by *Klebsiella pneumoniae* grown in sequential coculture with *Trichoderma harzianum*", **Applied and Environmental Microbiology**, Vol. 50, pp. 924-929.

Yu, E.K.C., and Saddler, J.N., 1985, "Biomass conversion to butanediol by simultaneous saccharification and fermentation", **Trends in Biotechnology**, Vol. 3, pp. 100-104.

Zaide, G., Shallom, D., Shulami, S., Zolotnitsky, G., Golan, G., Baasov, T., Shoham, G., and Shoham, Y., 2001, "Biochemical characterization and identification of catalytic residues in α -glucuronidase from *Bacillus stearothermophilus* T-6", **European Journal of Biochemistry**, Vol. 268, pp. 3006-3016.

Zhang, L., Xu, C., and Champagne, P., 2010, "Overview of recent advances in thermochemical conversion of biomass", **Energy Conversion and Management**, Vol. 51, pp. 969-982.

Zhang, T., Liu, H., and Fang, H.H.P., 2003, "Biohydrogen production from starch in wastewater under thermophilic condition", **Journal of Environmental Management**, Vol. 69, pp. 149-156.

Zverlov, V., Mahr, S., Riedel, K., and Bronnenmeier, K., 1998, "Properties and gene structure of a bifunctional cellulolytic enzyme (CelA) from the extreme thermophile '*Anaerocellum thermophilum*' with separate glycosyl hydrolase family 9 and 48 catalytic domains", **Microbiology**, Vol. 144, pp. 457-465.