

BIBLIOGRAPHY

Abd El-Zaher, E.H.F., Mostafa, A.A., Abu-El-Soud, S.M., El-Gaar, E.M. (2015). Optimization and characterization of exopolysaccharides from *Pleurotus salmoneo-stramineus* and its possible application. Egyptian Journal of Experimental Biology (Botany), 11(2): 181-188.

Abdel-Aziz, S.M., Hamed, H.A., Mouafi, F.E., Gad, A.S. (2012). Acidic pH-shock induces the production of an exopolysaccharide by the fungus *Mucor rouxii*: utilization of beet-molasses. New York Science Journal, 5(2): 52-61.

Adebayo, E.A., Oloke, J.K., Majolagbe, O.N., Gumma, R.A., Ajani, T.C. (2012). Antimicrobial and anti-inflammatory potential of polysaccharide from Kaihou, *Pleurotus pulmonarius* LAU 09. African Journal of Microbiology, 6(13): 3315-3323.

Aderogba, M.A., Okoh, E.K., Idowu, T. (2005). Evaluation of the antioxidant activity of the secondary metabolites from *Piliostigma reticulatum* (DC.) Hochst. Journal of Biological Sciences, 5(2): 239-242.

Ajith, T.A., Janardhanan, K.K. (2007). Indian medicinal mushrooms as a source of antioxidant and antitumor agents. Journal of Clinical Biochemistry and Nutrition, 40(3): 157-162.

Akinfemi, A., Adu, O.A., Doherty, F. (2010). Conversion of sorghum stover into animal feed with white-rot fungi *Pleurotus ostreatus* and *Pleurotus pulmonarius*. African Journal of Biotechnology, 9(11): 1706-1712.

Aleksander, P., Piotr, A., Tadeusz, T., Makarewicz, M. (2009). Accumulation and release of metal ions by brewer's yeast during successive fermentation. Journal of the Institute of Brewing, 115(1): 78-83.

Alexopoulos, C.J., Mims, C.W. (1979). *Introductory Mycology*, 3rd Edition, John Wiley & Sons, New York, pp: 1-613.

Aliyu, A.B., Ibrahim, M.A., Hassan, I., Amupitan, J.O. (2012). Free radical scavenging and total antioxidant capacity of methanol extract of *Ethulia conyzoides* growing in Nigeria. *Romanian Biotechnological Letters*, 17(4): 7458-7465.

Al-Manhel, A.J., Niamah, A.K. (2017). Mannan extract from *Saccharomyces cerevisiae* used as prebiotic in bioyogurt production from buffalo milk. *International Food Research Journal*, 24(5):2259-2264.

Alves, C., Ferrao, P.M.C., Silva, A.J., Reis, L.G., Freitas, M., Rodrigues, L.B., Alves, D.E. (2010). Eco-design of automotive components making use of natural jute fiber composites. *Journal of Cleaner Production*, 18: 313–327.

Amrouche, T., Boutin, Y., Prioult, G., Fliss, I. (2006). Effects of bifidobacterial cytoplasm, cell wall and exopolysaccharide on mouse lymphocyte proliferation and cytokine production. *International Dairy Journal*, 16(1): 70-80.

Anderson, R.A., Conway, H., Peplinski, A.J. (1970). Gelatinization of corn grits by roll cooking, extrusion cooking and steaming. *Starch-Stärke*, 22(4): 130-135.

Arena, A., Maugeri, T.L., Pavone, B., Iannello, D., Gugliandolo, C., Bisignano, G. (2006). Antiviral and immunoregulatory effect of a novel exopolysaccharide from a marine thermotolerant *Bacillus licheniformis*. *International Immune-pharmacology*, 6(1): 8-13.

Asfors, K.E., Ley, K. (1993). Sulfated polysaccharides in inflammation. *Journal of Laboratory and Clinical Medicine*, 121: 201-202.

Ates, O., Arga, K.Y., Oner, E.T. (2013). The stimulatory effect of mannitol on levan biosynthesis: lessons from metabolic systems analysis of *Halomonas smyrnensis* AAD6T. *Biotechnology Progress*, 29(6): 1386-1397.

Atri, N.S., Kaur, A., Kaur, H. (2003). Wild mushrooms—collection and identification. *Mushroom Research*, 14: 56-59.

Atri, N.S., Kaur, A., Kaur, H. (2005). Wild Mushrooms: Collection and identification. In: *Frontiers In Mushroom Biotechnology*, Rai RD, Upadhyay RC, Sharma SR (Eds), NRCM Chambaghat, Solan, pp: 9-26.

Bae, J.T., Park, J.P., Song, C.H., Yu, C.B., Park, M.K., Yun, J.W. (2001). Effect of carbon source on the mycelial growth and exo-biopolymer production by submerged culture of *Paecilomyces japonica*. *Journal of Bioscience and Bioengineering*, 91(5): 522-524.

Baldev, E., MubarakAli, D., Ilavarasi, A., Pandiaraj, D., Ishack, K.A.S.S., Thajuddin, N. (2013). Degradation of synthetic dye, Rhodamine B to environmentally non-toxic products using microalgae. *Colloids Surfaces B: Biointerfaces*, 105: 207-214.

Baldrian, P. (2003). Interactions of heavy metals with white-rot fungi. *Enzyme and Microbial Technology*, 32(1): 78-91.

Banat, I.M. (1995a). Characterization of biosurfactants and their use in pollution removal—State of the Art. *Acta Biotechnologica*, 15(3): 251-267.

Banat, I.M. (1995b). Biosurfactants production and possible uses in microbial enhanced oil recovery and oil pollution remediation: a review. *Bioresource Technology*, 51(1): 1-12.

Banat, I.M., Makkar, R.S., Cameotra, S.S. (2000). Potential commercial applications of microbial surfactants. *Applied Microbiology and Biotechnology*, 53(5): 495-508.

Banerjee, D., Jana, M., Mahapatra, S. (2009). Production of exopolysaccharide by endophytic *Stemphylium* sp. *Micologia Aplicada International*, 21(2): 57-62.

Bar-Or, Y., Shilo, M. (1987). Characterization of macromolecular flocculants produced by *Phormidium* sp. strain J-1 and by *Anabaenopsis circularis* PCC 6720. *Applied and Environmental Microbiology*, 53(9): 2226-2230.

- Barreto-Bergter, E., Gorin, P.A.J. (1983). Structural chemistry of polysaccharides from fungi and lichens. *Advances in Carbohydrate Chemistry and Biochemistry*, 41: 67-103.
- Bartha, R. (1986). Biotechnology of petroleum pollutant biodegradation. *Microbial Ecology*, 12: 155-172.
- Baskar, B.B., Baskaran, C. (2012). Bioremediation of azo dyes using fungi. *International Journal of Research in Pharmacy & Science*, 2(4): 28-37.
- Biagini, G., Bertani, A., Muzarelli, R.A.A., Damadei, A., Benedetto, G., Belligolli, A., Riccoti, G., Zucchini, C., Rizzoli, C. (1991). Wound management with *N*-carboxybutyl chitosan. *Biomaterials*, 12(3): 281-286.
- Billany, M.R. (2007). Suspensions and emulsions. In: *The design and manufacture of medicine*, Aulton M (Ed), 3rd edition. Philadelphia: Churchill Livingstone, Elsevier, pp: 383-405.
- Bindu, S.V.S.S.L.N.H., Charya, M.A.S. (2017). Physiological studies on mycelial growth and exopolysaccharide production by *Fomitopsis feei*. *International Journal of Current Microbiology and Applied Sciences*, 6(6): 743-755.
- Boitnott, J.K., Margolis, S. (1966). Mineral oil in human tissues. I. Detection of saturated hydrocarbons using thin-layer chromatography. *Bulletin of the Johns Hopkins Hospital*. 118: 402-413.
- Branda, S.S., Vik, A., Friedman, L., Kolter, R. (2005). Biofilm: the matrix revisited. *Trends in Microbiology*, 13: 20-26.
- Burchard, W., Thurn, A., Wachenfeld, E. (1985). Structure of branched polymers. In: *Physics of Finely Divided Matter*, Springer, Berlin, Heidelberg, pp: 128-134.
- Burns, P.J., Yeo, P., Keshavarz, T., Roller, S., Evans, C.S. (1994). Physiological studies of exopolysaccharide production from basidiomycetes *Pleurotus sp. florida*; effect of C and N
-

source on polysaccharide production for potential as a hypocholesterolemic, antitumor and a fat mimetic. *Enzyme and Microbial Technology*, 34: 566–572.

Buswell, J.A. (2001). Fungal degradation of chlorinated monoaromatics and BTEX compounds. In: *Fungi in Bioremediation*, Gadd GM (Ed), Cambridge University Press, Cambridge, pp: 113-135.

Calvo, C., Manzanera, M., Silva-Castro, G.A. Uad, I., González-López, J. (2009). Application of bioemulsifiers in soil oil bioremediation processes- Future prospects. *Science of the Total Environment*, 407(12): 3634-3640.

Cameron, D.R., Cooper, D.G., Neufeld, R.J. (1988). The mannoprotein of *Saccharomyces cerevisiae* is an effective bioemulsifier. *Applied and Environmental Microbiology*, 54(6): 1420-1425.

Carbonero, E.R., Gracher, A.H.P., Smiderle, F.R., Rosado, F.R., Sasaki, G.L., Gorin, P.A.J. (2006). A β - glucan from the fruit bodies of an edible mushrooms *Pleurotus eryngii* and *Pleurotus ostreatoraseus*. *Carbohydrate polymers*, 66: 252-257.

Carocho, M., Ferreira, I.C. (2013). A review on antioxidants, pro-oxidants and related controversy: natural and synthetic compounds, screening and analysis methodologies and future perspectives. *Food and Chemical Toxicology*, 51:15-25.

Casida, L.E. (1997). *Industrial Microbiology*. New Age International (P) Ltd. Publishers, New Delhi, India, pp: 21.

Catley, B.J. (1971). Utilization of carbon sources by *Pullularia pullulans* for the elaboration of extracellular polysaccharides. *Applied Microbiology*, 22(4): 641-649.

Cerning, J. (1995). Production of exopolysaccharides by lactic acid bacteria and dairy propionic bacteria. *Le lait*, 75(4-5): 463-472.

Chang, S.T., Buswell, J.A. (1996). Mushroom nutraceuticals. *World Journal of Microbiology and Biotechnology*, 12(5): 473-476.

Chattopadhyay, N., Ghosh, T., Sinha, S., Chattopadhyay, K., Karmakar, P., Ray, B. (2010). Polysaccharides from *Turbinaria conoides*: Structural features and antioxidant capacity. *Food Chemistry*, 118(3): 823-829.

Chauveau, C., Talaga, P., Wieruszkeski, J.W., Chavant, L. (1996). A water-soluble β -D-glucan from *Boletus erythropus*. *Phytochemistry*, 43(2):413-415.

Chen, G.T., Ma, X.M., Liu, S.T., Liao, Y.L., Zhao, G.Q. (2012a). Isolation, purification and antioxidant activities of polysaccharides from *Grifola frondosa*. *Carbohydrate Polymers*, 89(1): 61-66.

Chen, J., Mao, D., Yong, Y., Li, J., Wei, H., Liu, L. (2012b). Hepatoprotective and hypolipidemic effects of water-soluble polysaccharidic extract of *Pleurotus eryngii*. *Food Chemistry*, 130: 687-694.

Chen, J., Zhang, T., Jiang, B., Mu, W., Miao, M. (2012c). Characterization and antioxidant activity of *Ginkgo biloba* exocarp polysaccharides. *Carbohydrate Polymers*, 87(1): 40-45.

Chen, H., Rubenthaler, G.L., Schanus, E.G. (1998). Effect of apple fiber and cellulose on the physical properties of wheat flour. *Journal of Food Science*, 53: 304-305.

Chen, S., Misra, M., Smith, R.W. (1992). Flocculation of mineral fines using hydrophobic *Mycobacterium Phlei*. *Waste Processing and Recycling in Mining and Metallurgical Industries*, 183-191.

Chen, W., Zhao, Z., Chen, S.F., Li, Y.Q. (2008). Optimization for the production of exopolysaccharide from *Fomes fomentarius* in submerged culture and its antitumor effect in vitro. *Bioresource Technology*, 99: 3187-3194.

Chen, J., Engelen, L. (2012). Excellent review of all the current topics encompassing food oral processing, In: Food oral processing: fundamentals of eating and sensory perception, Wiley Blackwell (Ed), pp: 408.

Cheng, K.C., Demirci, A., Catchmark, J.M. (2011). Pullulan: biosynthesis, production, and applications. *Applied Microbiology and Biotechnology*, 92: 29-44.

Cheng, Z.L., Li, Y.F., Bai, X., Zhao, G.H. (2009). Use of microorganisms immobilized on composite polyurethane foam to remove Cu(II) from aqueous solution. *Journal of Hazardous Materials*, 167 (1-3): 1106-1113.

Chiura, H., Iizuka, M., Yamamoto, T. (1982). A glucomannan as an extracellular product of *Candida utilis*. Production and characterization of a glucomannan II. Structure of a glucomannan: characterization of oligosaccharides obtained by partial hydrolysis. *Agricultural and Biological Chemistry*, 46(7): 1723-1742.

Cho, E.J., Oh, J.Y., Chang, H.Y., Yun, J.W. (2006). Production of exopolysaccharides by submerged mycelial culture of a mushroom *Tremella fuciformis*. *Journal of Biotechnology*, 127(1): 129-140.

Choi, D., Maeng, J., Ding, J., Cha, W. (2007). Exopolysaccharide production and mycelial growth in an air-lift bioreactor using *Fomitopsis pinicola*. *Journal of Microbiology and Biotechnology*, 17(8): 1369-1378.

Cirigliano, M.C., Carman, G.M. (1985). Purification and characterization of liposan, a bioemulsifier from *Candida lipolytica*. *Applied and Environmental Microbiology*, 50(4): 846-850.

Cohen, R., Jensen, K.A., Houtman, C.J., Hammel, K.E. (2002). Significant levels of extracellular reactive oxygen species produced by brown rot basidiomycetes on cellulose. *FEBS Letters*, 531, 483-488.

Colegrove, G.T. (1983). Agricultural applications of microbial polysaccharides. *Industrial & Engineering Chemistry Product Research and Development*, 22(3): 456-460.

Collins, K.G., Fitzgerald, G.F., Stanton, C., Ross, R.P. (2016). Looking beyond the terrestrial: the potential of seaweed derived bioactives to treat non-communicable diseases. *Marine drugs*, 14(3): 1-31.

Cookson, J.T. (1995). *Bioremediation Engineering: Design and Application*, McGraw Hill, New York, NY, pp: 524.

Coufort, C., Bouyer, D., Liné, A. (2005). Flocculation related to local hydrodynamics in a Taylor–Couette reactor and in a jar. *Chemical Engineering Science*, 60(8-9): 2179-2192.

Coulibaly, L., Gourene, G., Agathos, N.S. (2003). Utilization of fungi for biotreatment of raw waste waters. *African Journal of Biotechnology*, 2: 620-630.

Coviello, T., Grassi, M., Palleschi, A., Bocchinfuso, G., Coluzzi, G., Banishoeib, F., Alhaique, F. (2005). A new scleroglucan/borax hydrogel: swelling and drug release studies. *International Journal of Pharmaceutics*, 289(1-2): 97-107.

Crescenzi, F., Buffagni, M., D’Angeli, E., Porcelli, F. (2002). A new biosurfactant for use in the cleanup of oil spills on sea water environment. In: *Oil and Hydrocarbon Spills III*, Brebbia CA (Ed), WIT Press, Southampton, UK, pp: 245-251.

Crescenzi, F., Camilli, E., Fascetti, F., Porcelli, F., Prosperi, G., Saceddu, P. (2003). Microbial degradation of biosurfactant dispersed oil. *International Oil Spill Conference*, #499.

Daba, A.S., Ezeronye, O.U. (2003). Anti-cancer effect of polysaccharides isolated from higher basidiomycetes mushrooms. *African Journal of Biotechnology*, 2(12): 672-678.

Daba, A.S., Youssef, G.A., Kabeil, S.S., Hafez, E.E. (2011). Production of recombinant cellulase enzyme from *Pleurotus ostreatus* (Jacq.) P. Kumm. (type NRRL-0366). *African Journal of Microbiology Research*, 5(10): 1197-1202.

Dawes, E.A. (1990). Novel microbial polymers: an introductory overview. In: Novel biodegradable microbial polymers, Springer, Dordrecht, pp: 3-16.

Dea, I.C., Morrison, A. (1975). Chemistry and interactions of seed galactomannans. *Advances in Carbohydrate Chemistry and Biochemistry*, 31: 241-312.

Deacon, J.W. (1997). *Modern mycology*. Blackwell. Publishing Ltd., Garsington Road, Oxford OX4 2DQ, UK, pp: 186-205.

Delben, F., Forabosco, A., Guerrini, M., Liut, G., Torri, G. (2006). Pullulans produced by strains of *Cryphonectria parasitica* – II. NMR evidence. *Carbohydrate Polymers*, 63: 545–554.

Demirci, A.S., Palabiyik, I., Altan, D.D., Apaydin, D., Gumus, T. (2017). Yield and rheological properties of exopolysaccharide from a local isolate: *Xanthomonas axonopodis* pv. Vesicatoria. *Electronic Journal of Biotechnology*, 30: 18-23.

Desai, J.D., Banat, I.M. (1997). Microbial production of surfactants and their commercial potential. *Microbiology and Molecular biology reviews*, 61(1): 47-64.

Dieter, K., Brigitte, H., Hans-Peter, F., Andreas, B. (2005). Cellulose: fascinating biopolymer and sustainable raw material. *Angewandte Chemie*, 44: 3358-3393.

Diken, E., Ozer, T., Arikan, M., Emrence, Z., Oner, E.T., Ustek, D., Arga, K.Y. (2015). Genomic analysis reveals the biotechnological and industrial potential of levan producing halophilic extremophile, *Halomonas smyrnensis* AAD6T. *Springer Plus*, 4: 393-405.

Dikit, P., Methacanon, P., Visessanguan, W., Aran, H., Maneerat, S. (2010). Characterization of an unexpected bioemulsifier from spent yeast obtained from Thai traditional liquor distillation. *International Journal of Biological Macromolecules*, 47(4): 465-470.

Dlamini, A.M., Peiris, P.S., Bavor, J.H., Kailasapathy, K. (2007). Characterization of the exopolysaccharide produced by a whey utilizing strain of *Klebsiella oxytoca*. *African Journal of Biotechnology*, 6(22): 2603-2611.

Douglas, H.W., Collins A.E., Parkinson, D. (1959). Electric charge and other surface properties of some fungal spores. *Biochimica et Biophysica Acta*, 33(2): 535-538.

Duan, J., Gregory, J. (2003). Coagulation by hydrolysing metal salts. *Advances in colloid and interface science*, 100: 475-502.

Dube, J., Smith, R.W., Misra, M., Chen, S. (1992). Microorganisms as chemical reagents: the hematite system. *Minerals Engineering*, 5(3-5): 547-556.

Duboc, P., Mollet, B. (2001). Applications of exopolysaccharides in the dairy industry. *International Dairy Journal*, 11(9): 759-768.

Dubois, M.K.A., Gilles, J.K., Hamilton, P.A., Rebers, A., Smith, F. (1956). Calorimetric method for determination of sugars and related substances. *Analytical Chemistry*, 28: 350-356.

Ekiert, M., Mlyniec, A., Uhl, T. (2015). The influence of degradation on the viscosity and molecular mass of poly(lactide acid) biopolymer. *Dianostyka*, 16(4): 63-70.

Elisashvili, V.I., Kachlishvili, E.T., Wasser, S.P. (2009). Carbon and nitrogen source effects on basidiomycetes exopolysaccharide production. *Applied Biochemistry and Microbiology*, 45(5): 531-535.

Eriksson, K.E., Blanchette, R.A., Ander, P. (1990). Morphological aspects of wood degradation by fungi and bacteria. In: *Microbial and enzymatic degradation of wood and wood components*, Springer, Berlin, Heidelberg, pp: 1-87.

Espíndola, L.H.S., Espindola, F.S., Freitas, G.R.D., Brandeburgo, M.A.M. (2007). Biodegradation of red 40 dye by the mushroom *Pleurotus florida*. *Bioscience Journal*, 23(3): 90-93.

Fang, M., Dapeng, L., Lina, Z., Xiaolei, L., Shan, Q. (2008). Combination of compound bio-flocculant and PAFC for treatment of algae-laden water. *China Water & Wastewater*, 24(3): 39-41.

Fang, Q.H., Tang, Y.J., Zhong, J.J. (2002). Significance of inoculation density control in production of polysaccharide and ganoderic acid by submerged culture of *Ganoderma lucidum*. *Process Biochemistry*, 37: 1375-1379.

Farina, J.I., Sineriz, F., Molina, O.E., Perotti, N.I. (1998). High scleroglucan production by *Sclerotium rolfsii*: influence of medium composition. *Biotechnology Letters*, 20(9): 825-831.

Fattom, A., Shilo, M. (1984). Phormidium J-1 bioflocculant: production and activity. *Archives of Microbiology*, 139: 421–426.

Feng, Y.M., Chang, X.L., Wang, W.H., Ma, R.Y. (2009). Separation of galacto-oligosaccharides mixture by nanofiltration. *Journal of the Taiwan Institute of Chemical Engineers*, 40: 326-332.

Francois, P., Andre, M., Pierre, M. (1986). Microbial polysaccharides with actual potential industrial applications. *Biotechnology Advances*, 4: 245-259.

Fransson, L.Å., Cöster, L., Carlstedt, I., Malmström, A. (1985). Domain structure of proteoheparan sulphate from confluent cultures of human embryonic skin fibroblasts. *Biochemical Journal*, 231(3): 683-687.

Franzetti, A., Gandolfi, I., Bestetti, G., Smyth, T.J., Banat, I.M. (2010). Production and applications of trehalose lipid biosurfactants. *European Journal of Lipid Science and Technology*, 112(6): 617-627.

Freitas, F., Alves, V.D., Carvalheira, M., Costa, N., Oliveira, R., Reis, M.A. (2009). Emulsifying behaviour and rheological properties of the extracellular polysaccharide produced by *Pseudomonas oleovorans* grown on glycerol byproduct. *Carbohydrate Polymers*, 78(3): 549-556.

Fukahori, S., Yano, H., Akiba, J., Ogasawara, S., Momosaki, S., Sanada, S., Kojiro, M. (2008). Fucoidan, a major component of brown seaweed, prohibits the growth of human cancer cell lines in vitro. *Molecular medicine reports*, 1(4): 537-542.

Gancel, F., Novel, G. (1994). Exopolysaccharide production by *Streptococcus salivarius* ssp. thermophiles cultures. Conditions of production. *Journal of Dairy Science*, 77: 685-688.

Gao, J., Bao, H.Y., Xin, M.X., Liu, Y.X., Li, Q., Zhang, Y.F. (2006). Characterization of a bioflocculant from a newly isolated *Vagococcus* sp. W31. *Journal of Zhejiang University Science B*, 7(3): 186-192.

Garg, U., Ganguly, N.K., Sharma, S.M. (1987). Quantitative histopathological method for the evaluation of experimental ascending pyelonephritis. *Medical Science Research*, 15(7): 367-368.

Garozzo, D., Impallomeni, G., Spina, E., Sturiale, L. (1998). The structure of the exocellular polysaccharide from the cyanobacterium *Cyanospira capsulata*. *Carbohydrate Research*, 307(1-2): 113-124.

Gautam, K.K., Tyagi, V.K. (2006). Microbial surfactants: a review. *Journal of Oleo Science*, 55(4): 155-166.

Geddes, R. (1985). Glycogen: a structural viewpoint. *The polysaccharides*, 3: 283-336.

Georgiou, G., Lin, S.C., Sharma, M.M. (1992). Surface-active compounds from microorganisms. *Bio/Technology*, 10: 60-65.

Gerhard, L., (2005). From clay mineral crystals to colloidal mineral dispersions. In: Coagulation and Flocculation, Dobias B, Stechemesser H (Eds), 2nd edition, CRC Press, Boca Raton, FL, pp: 519-600.

Gerin, P.A., Dufrene, Y., Bellon-Fontaine, M.N., Asther, M., Rouxhet, P.G. (1993). Surface properties of the conidiospores of *Phanerochaete chrysosporium* and their relevance to pellet formation. *Journal of Bacteriology*, 175(16): 5135-5144.

Ghada, S.I., Manal, G.H., Mohsen, M.S.A., Eman, A.G. (2012). Production and biological evaluation of exopolysaccharide from isolated *Rhodotorula glutinins*. *Journal of Basic and Applied Science*, 6(3): 401-408.

Ghosh, P.K., Sarkar, A., Pramanik, K., Mait, T.K. (2016). The extracellular polysaccharide produced by *Enterobacter* spp. isolated from root nodules of *Abrus precatorius* L. *Biocatalysis and Agricultural Biotechnology*, 4: 24-29.

Gientka, I., Bzducha-Wróbel, A., Stasiak-Róžańska, L., Bednarska, A.A., Błażejczak, S. (2016). The exopolysaccharides biosynthesis by *Candida* yeast depends on carbon sources. *Electronic Journal of Biotechnology*, 22: 31-37.

Gloaguen, V., Morvan, H., Hoffmann, L. (1995). Released and capsular polysaccharides of *Oscillatoriaceae* (Cyanophyceae, Cyanobacteria). *Algological Studies*, 78: 53-69.

Gomoiu, I., Catley, B.J. (1996). Properties of a kaolin-flocculating polymer elaborated by *Byssochlamys nivea*. *Enzyme and Microbial Technology*, 19(1): 45-49.

Gorin, P.A.J. (1981). Carbon-13 Nuclear Magnetic Resonance Spectroscopy of Polysaccharides. *Advances in Carbohydrate Chemistry and Biochemistry*, 38: 13-104.

Graber, M., Morin, A., Duchiron, F., Monsan, P.F. (1988). Microbial polysaccharides containing 6-deoxysugars. *Enzyme and Microbial Technology*, 10(4): 198-206.

Grasdalen, H., Smidsrød, O. (1987). Gelation of gellan gum. *Carbohydrate polymers*, 7(5): 371-393.

Guiraud, J.P., Fontana, A. (1992). Isolation and characterization of a flocculating mutant of *Saccharomyces diastaticus*. *Research in Microbiology*, 143(1): 81-91.

Gulcin, I., Beydemir, I.G., Kufrevioglu, O.I. (2004). Evaluation of the in vitro antioxidant properties of extracts of broccoli (*Brassica oleracea* L.). *Italian Journal of Food Sciences*, 16: 1- 17.

Gurjar, M., Khire, J.M., Khan, M.I. (1995). Bioemulsifier production by *Bacillus stearothermophilus* VR-8 isolate. *Letters in Applied Microbiology*, 21(2): 83-86.

Gutierrez, A., Bocchini, P., Galletti, G.C., Martinez, A.T. (1996). Analysis of lignin-polysaccharide complexes formed during grass lignin degradation by cultures of *Pleurotus* species. *Applied and Environmental Microbiology*, 62(6): 1928-1934.

Hall, L.D., Johnson, L.F. (1969). Chemical studies by ¹³C nuclear magnetic resonance spectroscopy: Some chemical shift dependencies of oxygenated derivatives. *Journal of the Chemical Society Chemical Communications*, 509–510.

Han, P.P., Sun, Y., Wu, X.Y., Yuan, Y.J., Dai, Y.J., Jia, S.R. (2014). Emulsifying, flocculating, and physicochemical properties of exopolysaccharide produced by cyanobacterium *Nostoc flagelliforme*. *Applied Biochemistry and Biotechnology*, 172(1): 36-49.

Hanessian, S., Haskell, T.H. (1964). Structural studies on staphylococcal polysaccharide antigen. *Journal of Biological Chemistry*, 239(9): 2758-2764.

Harimawan, A., Ting, Y.P. (2016). Investigation of extracellular polymeric substances (EPS) properties of *P. aeruginosa* and *B. subtilis* and their role in bacterial adhesion. *Colloids and Surfaces B: Biointerfaces*, 146: 459-467.

Hassan, A.N., Frank, J.F., Schmid, K.A., Shalabi S.I. (1996). Rheological properties of yoghurt made with encapsulated non-ropy lactic cultures. *Journal of Dairy Science*, 79: 2091-2097.

Hawksworth, D.L. (2004). Fungal diversity and its implications for genetic resource collections. *Studies in Mycology*, 50: 9-18.

Hawksworth, D.L., Kirk, P.M., Sutton, B.C., Pegler, D.N. (1995). *Ainsworth & Bisby's Dictionary of the Fungi*. 8th edition, CAB International, Wallingford, pp: 616.

He, J., Zou, J., Shao, Z., Zhang, J., Liu, Z., Yu, Z. (2010). Characteristics and flocculating mechanism of a novel bioflocculant HBF-3 produced by deep-sea bacterium mutant *Halomonas* sp. V3a'. *World Journal of Microbiology & Biotechnology*, 26: 1135–1141.

He, P., Geng, L., Mao, D., Xu, C. (2012a). Production, characterization and antioxidant activity of exopolysaccharides from submerged culture of *Morchella crassipes*. *Bioprocess and Biosystems Engineering*, 35(8): 1325-1332.

He, P., Geng, L., Wang, Z., Mao, D., Wang, J., Xu, C. (2012b). Fermentation optimization, characterization and bioactivity of exopolysaccharides from *Funalia trogii*. *Carbohydrate polymers*, 89: 17-23.

Head, I.M. (1998) Bioremediation: towards a credible technology. *Microbiology*, 144: 599-608.

Hofmann, P., Jann, B., Jann, K. (1985). Structure of the fructose-containing K52 capsular polysaccharide of uropathogenic *Escherichia coli* O4: K52: H-. *European Journal of Biochemistry*, 147(3): 601-609.

Hogg, R., Rattanakawin, C. (2002). The role of polymers in dispersion stability. In: *Speciality Chemicals in Mineral Processing*, Scuse DR (Ed), pp: 3-20.

Hosokawa, J., Nishiyama, M., Yoshihara, K., Kubo, T. (1990). Biodegradable film derived from chitosan and homogenized cellulose. *Industrial & Engineering Chemistry Research*, 29(5): 800-805.

Houghton, J.J., Quarmby, J., Stephenson, T. (2001). Municipal wastewater sludge dewaterability and the presence of microbial extracellular polymer. *Water Science and Technology*, 44(2-3): 373-379.

How, M.J., Brimacombe, J.S., Stacey, M. (1964). The pneumococcal polysaccharides. In *Advances in carbohydrate chemistry*, Wolfrom ML (Ed), pp:303-358.

Hu, S.H., Liang, Z.C., Chia, Y.C., Lien, J.L., Chen, K.L., Lee, M.Y., Wang, J.C. (2006). Antihyperlipidemic and antioxidant effects of extracts from *Pleurotus citrinopileatus*. *Journal of Agriculture and Food Chemistry*, 22: 2103-2110.

Huang, K.H., Chen, B.Y., Shen, F.T., Young, C.C. (2012). Optimization of exopolysaccharide production and diesel oil emulsifying properties in root nodulating bacteria. *World Journal of Microbiology and Biotechnology*, 28(4): 1367-1373.

Hwang, H.J., Kim, S.W., Choi, J.W., Yun, J.W. (2003a). Production and characterization of exopolysaccharides from submerged culture of *Phellinus linteus* KCTC 6190. *Enzyme and Microbial Technology*, 33(2-3): 309-319.

Hwang, H.J., Kim, S.W., Xu, C.P., Choi, J.W., Yun, J.W. (2003b). Production and molecular characteristics of four groups of exopolysaccharides from submerged culture of *Phellinus gilvus*. *Journal of Applied Microbiology*, 94(4): 708-19.

Israilides, C., Scanlon, B., Smith, A., Jumel, K. Harding, S. (1994). Characterisation of pullulans produced from agro-industrial wastes. *Carbohydrate Polymers*, 25: 203– 209.

Isroi, R., Syamsiah, S., Niklasson, C., Nur Cahyanto, M., Lundquist, K., Taherzadeh, M.J. (2011). Biological pretreatment of lignocelluloses with white-rot fungi and its applications: a review. *Bioresources*, 6(4): 5224-5259.

Itou, T., Teramoto, A., Matsuo, T., Suga, H. (1986). Ordered structure in aqueous polysaccharide. Cooperative order-disorder transition in aqueous schizophyllan. *Macromolecules*, 19(4): 1234-1240.

Jang, J.H., Ike, M., Kim, S.M., Fujita, M. (2001). Production of a novel bioflocculant by fed-batch culture of *Citrobacter* sp. *Biotechnology letters*, 23(8): 593-597.

Jiao, Y.C., Chen, Q.H., Zhou, J.S., Zhang, H.F., Chen, H.Y. (2008). Improvement of exopolysaccharides production and modeling kinetics by *Armillaria luteo-virens* Sacc. in submerged cultivation. *LWT-Food Science and Technology*, 41(9): 1694-1700.

Jin, M., Cai, Y.X., Li, J.R. (1996). 1, 10-Phenanthroline-Fe²⁺ oxidative assay of hydroxyl radical produced by H₂O₂/Fe²⁺. *Progress in Biochemistry and Biophysics*, 23: 553-555.

Joo, J.H., Lim, J.M., Kim, H.O., Kim, S.W., Hwang, H.J., Choi, J.W., Yun, J.W. (2004). Optimization of submerged culture conditions for exopolysaccharide production in *Sarcodon aspratus* (Berk) S. Ito TG-3. *World Journal of Microbiology and Biotechnology*, 20(7): 767-773.

Jose, N., Ajith, T.A., Jananrdhanan, K.K. (2002). Antioxidant, antiinflammatory and antitumor activities of culinary-medicinal mushroom *Pleurotus pulmonarius* (Fr.) Quel. (Agaricomycetidae). *International Journal of Medicinal Mushrooms*, 4: 329-335.

Kachholz, T., Schlingmann, M. (1987). Possible food and agricultural applications of microbial surfactants: an assessment. In: *Biosurfactants and Biotechnology*, Kosaric N, Carns, WL, Gray NCC (Eds), Marcel Dekker, New York, USA, pp: 183-210.

Kandemir, N., Yemenicioglu, A., Mecitoglu, C., Elmaci, Z.S., Arslanoglu, A., Göksungur, Y., Baysal, T. (2005): Production of antimicrobial films by incorporation of partially purified lysozyme into biodegradable films of crude exopolysaccharides obtained from *Aureobasidium pullulans* fermentation. *Food Technology & Biotechnology*, 43: 343-350.

Kanmani, P., Yuvaraj, N., Paari, K.A., Pattukumar, V., Arul, V. (2011). Production and purification of a novel exopolysaccharide from lactic acid bacterium *Streptococcus phocae* PI80 and its functional characteristics activity in vitro. *Bioresource Technology*, 102(7): 4827-4833.

Kao, T., Chen, B. (2006). Functional components in soybean cake and their effects on antioxidant activity. *Journal of Agricultural and Food Chemistry*, 54: 7544-7555.

Kasiranjan, A.K.T.K., Eyini. (2015). Optimization of Mycelial Growth and Exopolysaccharide Production by *Pleurotus Pulmonarius* Using Response Surface Methodology. 2nd International Conference on Agriculture, Environment and Biological Sciences (ICAEBS'15). 11-15.

Kaushik, P., Malik, A. (2009). Fungal dye decolourization: recent advances and future potential. *Environment International*, 35: 127-141.

Kelco, D. (1987). Alginate products for scientific water control, 3rd edition, San Diego, CA, pp: 41.

Keshavarz, T., Roy, I. (2010). Polyhydroxyalkanoates: bioplastics with a green agenda. *Current Opinion in Microbiology*, 13(3): 321-326.

Khori, A., Nurasyikin (2013). Production of instant fish and maize soup powder by extrusion process. *Food Science and Technology in the Faculty of Applied Sciences. Universiti Teknologi MARA*.

Kim, D., Robyt, J.F., Lee, S.Y., Lee, J.H., Kim, Y.M. (2003a). Dextran molecular size and degree of branching as a function of sucrose concentration, pH, and temperature of reaction of *Leuconostoc mesenteroides* B512FMCM dextransucrase. *Carbohydrate Research*, 338:1183-1189.

Kim, S.W., Hwang, H.J., Xu, C.P., Sung, J.M., Choi, J.W., Yun, J.W. (2003b). Optimization of submerged culture process for the production of mycelial biomass and exo-polysaccharides by *Cordyceps militaris* C738. *Journal of Applied Microbiology*, 94(1): 120-126.

Kim, H.O., Yun, J.W. (2005). A comparative study on the production of exopolysaccharides between two entomopathogenic fungi *Cordyceps militaris* and *Cordyceps sinensis* in submerged mycelial cultures. *Journal of Applied Microbiology*, 99(4): 728-738.

Kim, H.O., Lim, J.M., Joo, J.H., Kim, S.W., Hwang, H.J., Choi, J.W., Yun, J.W. (2005). Optimization of submerged culture condition for the production of mycelial biomass and exopolysaccharides by *Agrocybe cylindracea*. *Bioresource Technology*, 96(10): 1175-1182.

Kitazawa, H., Harata, T., Uemura, J., Saito, T., Kaneko, T., Itoh, T. (1998). Phosphate group requirement for mitogenic activation of lymphocytes by an extracellular phosphopolysaccharide from *Lactobacillus delbrueckii* ssp. *bulgaricus*. *International Journal of Food Microbiology*, 40(3), 169-175.

Kleerebezem, R., Pol, L.W.H., Lettinga, G. (1999). Energetics of product formation during anaerobic degradation of phthalate isomers and benzoate. *FEMS Microbiology & Ecology*, 29: 273-282.

Klemm, D., Heublein, B., Fink, Hans-Peter., Bohn, A. (2005). Cellulose: Fascinating Biopolymer and Sustainable Raw Material. *Angewandte Chemie International Edition*, 44 (22): 3358–93.

Kodali, V.P., Sen, R. (2008). Antioxidant and free radical scavenging activities of an exopolysaccharide from a probiotic bacterium. *Biotechnology Journal: Healthcare Nutrition Technology*, 3(2): 245-251.

Kony, D.B., Damm, W., Stoll, S., Van Gunsteren, W.F., Hünenberger, P.H. (2007). Explicit-solvent molecular dynamics simulations of the polysaccharide schizophyllan in water. *Biophysical Journal*, 93(2): 442-455.

Kornerup, A., Wanscher, J.H. (1987). *Methuen handbook of colours*, 3rd edition, Eyre Methuen, London, pp: 1-252.

Kroner, K.H., Hustedt, H., Kula, M.R. (1982). Evaluation of crude dextran as phase-forming polymer for the extraction of enzymes in aqueous two-phase systems in large scale. *Biotechnology and Bioengineering*, 24(5): 1015-1045.

Kuan-Chen, C., Demirci, A., Catchmark, J.M. (2011). Pullulan: Biosynthesis, production and applications. *Applied Microbiology and Biotechnology*, 92: 29-44.

Kumar, A.S., Mody, K., Jha, B. (2007). Bacterial exopolysaccharides- a perception. *Journal of Basic Microbiology*, 47: 103-117.

Kumar, C.G., Joo, H.S., Choi, J.W., Koo, Y.M., Chang, C.S. (2004). Purification and characterization of an extracellular polysaccharide from haloalkalophilic *Bacillus* sp. I-450. *Enzyme and Microbial Technology*, 34: 673-681.

Kurane, R., Matsuyama, H. (1994). Production of a bioflocculant by mixed culture. *Bioscience, Biotechnology and Biochemistry*, 58(9): 1589-1594.

Lama, L., Nicolaus, B., Calandrelli, V., Manca, M.C., Romano, I., Gambacorta, A. (1996). Effect of growth conditions on endo-and exopolymer biosynthesis in *Anabaena cylindrica* 10 C. *Phytochemistry*, 42(3): 655-659.

Laroche, C., Michaud, P. (2007). New developments and prospective applications for β (1, 3) glucans. *Recent patents on Biotechnology*, 1(1): 59-73.

Laws, A., Gu, Y., Marshall, V. (2001). Biosynthesis, characterization, and design of bacterial exopolysaccharides from lactic acid bacteria. *Biotechnology Advances*, 19(8): 597-625.

Leck, A. (1999). Preparation of lactophenol cotton blue slide mounts. *Community Eye Health*, 12(30): 24.

Lee, W.Y., Park, Y., Ahn, J.K., Ka, K.H., Park, S.Y. (2007b). Factors influencing the production of endopolysaccharide and exopolysaccharide from *Ganoderma applanatum*. *Enzyme and Microbial Technology*, 40(2): 249-254.

Lee, W.Y., Park, Y., Ahn, J.K., Park, S.Y. (2007a). Factors influencing the production of endopolysaccharide and exopolysaccharide from *Ganoderma applanatum*. *Enzyme and Microbial Technology*, 40(2): 249-254.

Li, J., Kisara, K., Danielsson, S., Lindstrom, M.E., Gellerstedt, G. (2007b). An improved methodology for the quantification of uronic acid units in xylans and other polysaccharides. *Carbohydrate Research*, 342: 1442– 1449.

Leigh, J.A., Coplin, D.L. (1992). Exopolysaccharides in plant-bacterial interactions. *Annual Reviews in Microbiology*, 46(1):307-346.

Li, J.H., Wang, E.T., Chen, W.F., Chen, W.X. (2008). Genetic diversity and potential for promotion of plant growth detected in nodule endophytic bacteria of soybean grown in Heilongjiang province of China. *Soil Biology & Biochemistry*, 40: 238–246.

Li, N., Li, L., Fang, J.C., Wong, J.H., Ng, T.B., Jiang, Y., Wang, C.R., Zhang, N.Y., Wen, T.Y., Qu, L.Y., Lv, P.Y., Zhao, R., Shi, B., Wang, Y.P., Wang, X.Y., Liu, F. (2012). Isolation and identification of a novel polysaccharide–peptide complex with antioxidant, anti-

proliferative and hypoglycaemic activities from the abalone mushroom. *Bioscience Reports*, 32(3): 221–228.

Liang, Z.W., Li, W.H., Yang, S.Y., Du, P. (2010). Extraction and structural characteristics of extracellular polymeric sub-stances (EPS), pellets in autotrophic nitrifying biofilm and activated sludge. *Chemosphere*, 81: 626–63.

Lim, D.J., Kim, J.D., Kim, M.Y., Yoo, S.H., Kong, J.U. (2007). Physicochemical properties of the exopolysaccharides produced by marine bacterium *Zoogloea* sp. KCCM10036. *Journal of Microbiology and Biotechnology*, 17: 979-984.

Lim, J.M., Kim, S.W., Hwang, H.J., Joo, J.H., Kim, H.O., Choi, J.W., Yun, J.W. (2004). Optimization of medium by orthogonal matrix method for submerged mycelial culture and exopolysaccharide production in *Collybia maculata*. *Applied Biochemistry and Biotechnology*, 119(2): 159-170.

Lin, E.S., Chen, Y.H. (2007). Factors affecting mycelial biomass and exopolysaccharide production in submerged cultivation of *Antrodia cinnamomea* using complex media. *Bioresource Technology*, 98(13): 2511-2517.

Lin, E.S., Sung, S.C. (2006). Cultivating conditions influence exopolysaccharide production by the edible Basidiomycete *Antrodia cinnamomea* in submerged culture. *International Journal of Food Microbiology*, 108(2): 182-187.

Linderberg, B., Mcpherson, J. (1954). Studies on the chemistry of lichens. VI. The structure of pustulan. *Acta Chentica Scandinavica*, 8: 985-988.

Lindstrom, J.E., Braddock, J.F. (2002). Biodegradation of petroleum hydrocarbons at low temperature in the presence of the dispersant Corexit 9500. *Marine Pollution Bulletein*, 44: 739-747.

Liu, F., Ooi, V.E.C., Chang, S.T. (1997). Free radical scavenging activities of mushroom polysaccharide extracts. *Life sciences*, 60(10): 763-771.

Liu, W., Wang, H., Pang, X., Yao, W., Gao, X. (2010a). Characterization and antioxidant activity of two low-molecular-weight polysaccharides purified from the fruiting bodies of *Ganoderma lucidum*. *International Journal of Biological Macromolecules*, 46(4): 451-457.

Liu, Z.J., Guo, Y.K., Bai, J.G. (2010b). Exogenous hydrogen peroxide changes antioxidant enzyme activity and protects ultrastructure in leaves of two cucumber ecotypes under osmotic stress. *Journal of Plant Growth Regulation*, 29(2):171-183.

Liu, Y.W., Gao, J.L., Guan, J., Qian, Z.M., Feng, K., Li, S.P. (2009). Evaluation of antiproliferative activities and action mechanisms of extracts from two species of *Ganoderma* on tumor cell lines. *Journal of Agricultural and Food Chemistry*, 57: 3087-3093.

Lowry, O.H., Rosebrough, N.J., Farr, A.L., Randall, R.J. (1951). Protein measurement with the folin phenol reagent. *Journal of Biological Chemistry*, 193: 265-275.

Mabinya, L.V., Cosa, S., Mkwetshana, N., Okoh, A.I. (2011). *Halomonas* sp. OKOH-a marine bacterium isolated from the bottom sediment of Algoa Bay produces a polysaccharide bioflocculant: partial characterization and biochemical analysis of its properties. *Molecules*, 16(6):4358-4370.

Madla, S., Methacanon, P., Prasitsil, M., Kirtikara, K. (2005). Characterization of biocompatible fungi-derived polymers that induce IL-8 production. *Carbohydrate polymers*, 59(3): 275-280.

Mahapatra, S., Banerjee, D. (2012). Structural elucidation and bioactivity of a novel exopolysaccharide from endophytic *Fusarium solani* SD5. *Carbohydrate polymers*, 90(1): 683-689.

Mahapatra, S., Banerjee, D. (2013). Fungal exopolysaccharide: production, composition and applications. *Microbiology Insights*, 6: 1-16.

Mahmoud, M.N.E.D., El-fallal A., Toson E.A., Hereher F.E. (2004). Exopolysaccharides Production by *Pleurotus pulmonarius* : Factors Affecting Formation and Their Structures. *Pakistan Journal of Biological Sciences*, 7(6): 1078-1084.

Majumdar, I., D'Souza, F., Bhosle, N.B. (1999). Microbial exopolysaccharides: effect on corrosion and partial chemical characterization. *Journal of Indian Institute of Science*, 79: 539-550.

Mandal, A., Samanta, A., Bera, A. Ojha, K. (2010). Characterization of oil–water emulsion and its use in enhanced oil recovery. *Industrial & Engineering Chemistry Research*, 49(24):12756-12761.

Manners, D.J. (1985). Starch. In: *Biochemistry of storage carbohydrates in green plants*, Dey PM, Dixon RA (Eds), Academic Press, New York, pp: 149–203.

Manzi, P., Pizzoferrato, L. (2000). Beta-glucans in edible mushrooms. *Food Chemistry*, 68(3): 315-318.

Mata, T.M., Martins, A.A., Caetano, N.S. (2010). Microalgae for biodiesel production and other applications: a review. *Renewable and Sustainable Energy Reviews*, 14: 217–232.

Mau, J.L., Lin, H.C., Song, S.F. (2002). Antioxidant properties of several specialty mushrooms. *Food Research International*, 35: 519-526.

Maugeri, T.L., Gugliandolo, C., Caccamo, D., Panico, A., Lama, L., Gambacorta, A., Nicolaus, B. (2002). A halophilic thermos-tolerant *Bacillus* isolated from a marine hot spring able to produce a new exopolysaccharide. *Biotechnology Letters*, 24(7): 515-519.

May, C.D. (1990). Industrial pectins: Sources, production and applications. *Carbohydrate Polymers*, 12 (1): 79–99.

Maziero, R., Cavazzoni, V., Bononi, V.L.R. (1999). Screening of basidiomycetes for the production of exopolysaccharide and biomass in submerged culture. *Revista De Microbiologia*, 30(1): 77-84.

McNeil, B., Kristiansen, B. (1990). Temperature effects on polysaccharide formation by *Aureobasidium pullulans* in stirred tanks. *Enzyme and Microbial Technology*, 12(7): 521-526.

Medina, K., Carrau, F.M., Gioia, O., Bracesco, N. (1997). Nitrogen availability of grape juice limits killer yeast growth and fermentation activity during mixed-culture fermentation with sensitive commercial yeast strains. *Applied and Environmental Microbiology*, 63: 2821-2825.

Meltzer, Y.L. (1981). *Water-soluble polymers, developments since 1978*, Noyes Data Corp., Park Ridge, New Jersey.

Miranda, C.C., Dekker, R.F., Serpeloni, J.M., Fonseca, E.A., Cólus, I.M., Barbosa, A.M. (2008). Anticlastogenic activity exhibited by botryosphaeran, a new exopolysaccharide produced by *Botryosphaeria rhodina* MAMB-05. *International Journal of Biological Macromolecules*, 42(2): 172-177.

Mishra, A., Jha, B. (2013). Microbial exopolysaccharides. In: *The Prokaryotes*, Springer, Berlin, Heidelberg, pp: 179-192.

Misra, M., Smith, R.W. (1991). Flocculation and flotation of coal by adhesion of hydrophobic *Mycobacterium Phlei*. *Colloid and Surfaces*, 996(8): 13-24.

Mitchell, J.R., Ledward, D.A. (1985). *Functional properties of food macromolecules*, Elsevier Applied Science Publishers, London and New York.

Mittal, G.S. (1992). *Food Biotechnology: Techniques and Applications*. Lancaster: Technomic Publishing Co., New York.

- Mocanu, G., Carpov, A., Chapelle, S., Merle, L., Muller, G. (1995). Chemically modified pullulans II. New hydrophobically substituted derivatives. *Canadian Journal of Chemistry*, 73: 1933–1940.
- Mohan, P.K., Nakhla, G., Yanful, E.K. (2006). Biokinetics of biodegradation of surfactants under aerobic, anoxic and anaerobic conditions. *Water Research*, 40: 533-540.
- Momoh, M.A., Adikwu, M.U. (2008). Determination of hydrophile-lipophile balance (hlb) of bovine mucin for possible emulsifying properties. *Animal Research International*, 5(2): 840 - 842.
- Monari, C., Retini, C., Casadevall, A., Netski, D., Bistoni, F., Kozel, T.R., Vecchiarelli, A. (2003). Differences in outcome of the interaction between *Cryptococcus neoformans* glucuronoxylomannan and human monocytes and neutrophils. *European Journal of Immunology*, 33(4): 1041-1051.
- Mondal, S., Chakraborty, I., Rout, D., Islam, S.S. (2006). Isolation and structural elucidation of a water-soluble polysaccharide (PS-I) of a wild edible mushroom, *Termitomyces striatus*. *Carbohydrate Research*, 341(7): 878-886.
- Monsan, P., Bozonnet, S., Albenne, C., Joucla, G., Willemot, R.M., Remaud, M. (2001). Homopolysaccharides from lactic acid bacteria. *International Dairy Journal*, 11: 675-685.
- Monteiro, A.S., Bonfim, M.R., Domingues, V.S., Corrêa, A., Siqueira, E.P., Zani, C.L. (2010). Santos VL identification and characterization of bioemulsifier-producing yeasts isolated from effluents of a dairy industry. *Bioresource Technology*, 101(14): 5186-93.
- Moon, S.H., Park, C.S., Kim, Y.J., Park, Y.I. (2006). Biosorption isotherms of Pb (II) and Zn (II) on Pestan, an extracellular polysaccharide, of *Pestalotiopsis* sp. KCTC 8637P. *Process Biochemistry*, 41(2): 312-316.
-

Morgan, P., Lewis, S.T., Watkinson, R.J. (1991). Comparison of abilities of white-rot fungi to mineralize selected xenobiotic compounds. *Applied and Environmental Microbiology*, 34: 693-696.

Morris, G., Harding, S. (2009). Polysaccharides, microbial. *Encyclopedia of Microbiology*, 3: 482-494.

Mota, R., Guimaraes, R., Buttel, Z., Rossi, F., Colica, G. (2013). Production and characterization of extracellular carbohydrate polymer from *Cyanothece* sp. CCY 0110. *Carbohydrate Polymers*, 92: 1408-1415.

Mukherjee, P., Atala, A. (2005). Biomaterials for genitourinary tissue engineering, In: *Scaffolding in Tissue Engineering*, Ma PX, Elisseeff J (Eds), Boca Raton, FL: Taylor and Francis, CRC Press, pp: 357.

Muthusamy, K., Gopalakrishnan, S., Ravi, T.K., Sivachidambaram, P. (2008). Biosurfactants: properties, commercial production and application. *Current science*, 94(6): 736-747.

Nagaoka, M., Hashimoto, S., Watanabe, T., Yokokura, T., Mori, T. (1994). Antiulcer effects of lactic acid bacteria and their cell wall polysaccharides. *Biological and Pharmaceutical Bulletin*, 17: 1012-1017.

Nakamura, J., Miyashiro, S., Hirose, Y. (1976). Screening, isolation, and some properties of microbial cell flocculants. *Agricultural and Biological Chemistry*, 40(2): 377-383.

Nanba, H. (1993). Maitake mushroom-the king mushroom. *Mushroom News*, 41(2): 22-25.

Naraian, R., Singh, D., Verma, A., Garg, S.K. (2010). Studies on *in vitro* degradability of mixed crude enzyme extracts produced from *Pleurotus* spp. *Journal of Environmental Biology*, 31(6): 945-951.

Necas, J., Bartosikova, L., Brauner, P., Kolar, J. (2008). Hyaluronic acid (hyaluronan): a review. *Veterinarni Medicina*, 53(8): 397-411.

Nehad, E.A., Shamy, A.R.E. (2010). Physiological studies on the production of exopolysaccharide by fungi. *Agriculture and Biology Journal of North America*, 1(6): 1303-1308.

Nelson, D.L., Cox, M.M. (2013). *Lehninger principles of biochemistry*, 6th Edition, New York: Freeman.

Neu, T.R., Lawrence, J.R. (2010). Extracellular polymeric substances in microbial biofilms. In book: *Microbial Glycobiology, Structures, Relevance and Applications*, San Diego, CA, Editors: Anthony M, Patrick B, Otto H, Mark VI, 1st edition, Elsevier, pp: 735-758.

Nicolaus, B., Kambourova, M., Oner, E.T. (2010). Exopolysaccharides from extremophiles: from fundamentals to biotechnology. *Environmental Technology*, 31(10): 1145-1158.

Nicolaus, B., Panico, A., Lama, L., Romano, I., Manca, M.C., De Giulio, A., Gambacorta, A. (1999). Chemical composition and production of exopolysaccharides from representative members of heterocystous and non-heterocystous cyanobacteria. *Phytochemistry*, 52(4): 639-647.

Nishinari, K., Takemasa, M., Osaka, J.H.Z., Takahashi, R. (2007). Storage Plant Polysaccharides: Xyloglucans, Galactomannans, Glucomannans. In: *Comprehensive Glycoscience*, Kamerling JP (Ed), Elsevier, pp: 613-652.

Noss, I., Doekes, G., Thorne, P.S., Heederik, D.J., Wouters, I.M. (2013). Comparison of the potency of a variety of β -glucans to induce cytokine production in human whole blood. *Innate immunity*, 19(1): 10-19.

Novak, M., Vetvicka, V. (2009). Glucans as biological response modifiers. *Endocrine, Metabolic & Immune Disorders-Drug Targets*, 9(1): 67-75.

Nwodo, U.U., Green, E., Okoh, A.I. (2012). Bacterial exopolysaccharides: functionality and prospects. *International Journal of Molecular Sciences*, 13(11): 14002-14015.

Olafsdottir, E.S., Ingólfssdottir, K. (2001). Polysaccharides from lichens: structural characteristics and biological activity. *Planta Medica*, 67(03): 199-208.

Ono, K., Yasuda, N., Ueda, S. (1977). Effect of pH on pullulan elaboration by *Aureobasidium pullulans* S-1. *Agricultural Biological Chemistry*, 41: 2113-2118.

Ooi, V.E, Liu, F. (2000). Immunomodulation and anti-cancer activity of polysaccharide-protein complexes. *Current Medicinal Chemistry*, 7: 715-29.

Osmalek, T., Froelich, A., Tasarek, S. (2014). Application of gellan gum in pharmacy and medicine. *International Journal of Pharmaceutics*, 466 (1-2): 328-340.

Oyaizu, M. (1986). Studies on products of browning reactions: Antioxidative activities of products of browning reaction prepared from glucosamine. *Japanese Journal of Nutrition*, 44: 307-315.

Papagianni, M., Joshi N., Moo-Young, M. (2002). Comparative studies on extracellular protease secretion and glucoamylase production by free and immobilized *Aspergillus niger* cultures. *Journal of Industrial Microbiology & Biotechnology*, 29(5): 259-63.

Papon, P., Simon, L., Caye-Vaugien, C. (1989). *Aureobasidium pullulans* bilan morphologique, metabolique et energetique. *Journal of Cryp Mycology*, 10: 227-242.

Patel, M., Patel, U., Gupte, S. (2014). Production of exopolysaccharide (eps) and its application by new fungal isolates SGMP1 and SGMP2. *International Journal of Agriculture, Environment & Biotechnology*, 7: 511-523.

Patil, S.V., Patil, C.D., Salunke, B.K., Salunkhe, R.B., Bathe, G.A., Patil, D.M. (2011). Studies on characterization of bioflocculant exopolysaccharide of *Azotobacter indicus* and its

potential for wastewater treatment. *Applied Biochemistry and Biotechnology*, 163(4), 463-472.

Patil, S.V., Patil, C.D., Salunke, R.B., Bathe, G.A., Patil, D.M. (2010). Studies on characterization of bioflocculant exopolysaccharide of *Azotobacter indicus* and its potential for wastewater treatment. *Applied Biochemistry Biotechnology*, 163(4): 463-472.

Paul, G.C., Thomas, C.R. (1996). A structured model for hyphal differentiation and penicillin production using *Penicillium chrysogenum*. *Biotechnology and Bioengineering*, 51: 558-572.

Paulo, E.M., Vasconcelos, M.P., Oliveira, I.S., Assis, S. (2012). An alternative method for screening lactic acid bacteria for the production of exopolysaccharides with rapid confirmation. *Ciência e Tecnologia de Alimentos*, 32(4):710-714.

Pavlova, K., Panchev, I., Krachanova, M., Gocheva, M. (2009). Production of an exopolysaccharide by Antarctic yeast. *Folia Microbiologica*, 54(4): 343.

Perfumo, A., Smyth, T.J.P., Marchant, R., Banat, I.M. (2010). Production and roles of biosurfactants and bioemulsifiers in accessing hydrophobic substrates. *Handbook of Hydrocarbon and Lipid Microbiology*, 1501-1512.

Petersen, G.R., Schubert, W.W., Richards, G.F., Nelson, G.A. (1990). Yeasts producing exopolysaccharides with drag-reducing activity. *Enzyme and Microbial Technology*, 12(4): 255-259.

Pokhrel, C.P., Ohga, S. (2007). Submerged culture conditions for mycelial yield and polysaccharides production by *Lyophyllum decastes*. *Food Chemistry*, 105(2): 641-646.

Pollock, T.J., Thorne, L., Armentrout, R.W. (1992). Isolation of new *Aureobasidium* strains that produce high-molecular-weight pullulan with reduced pigmentation. *Applied and Environmental Microbiology*, 58: 877-883.

Pooja, K.P., Chandra, T.S. (2009). Production and partial characterization of a novel capsular polysaccharide kp-eps produced by *Paenibacillus pabuli* strain atskp. *World Journal of Microbiology & Biotechnology*, 25: 835-841.

Prasongsuk, S., Berhow, M.A., Dunlap, C.A., Weisleder, D., Leathers, T.D., Eveleigh, D.E., Punnapayak, H. (2007). Pullulan production by tropical isolates of *Aureobasidium pullulans*. *Journal of Industrial Microbiology & Biotechnology*, 34(1): 55-61.

Priegnitz, B., Wargenau, A., Brandt, U., Fleissner, A. (2012). The role of initial spore adhesion in pellet and biofilm formation in *Aspergillus niger*. *Fungal genetics and biology*, 40(1): 30-38.

Prieto, P., Pineda, M., Aguilar, M. (1999). Spectrophotometric quantitation of antioxidant capacity through the formation of a phosphomolybdenum complex: Specific application to the determination of Vitamin E1. *Analytical Biochemistry*, 269: 337-341.

Quesada, E., Béjar, V., Calvo, C. (1993). Exopolysaccharide production by *Volcaniella eurihalina*. *Experientia*, 49(12): 1037-1041.

Raghukumar, C., D'Souza-Ticlo, D., Verma, A. (2008). Treatment of colored effluents with lignin-degrading enzymes: an emerging role of marine-derived fungi. *Critical Reviews in Microbiology*, 34(3-4): 189-206.

Rahi, D.K., Rajak, R.C., Shukla, K.K., Pandey, A.K. (2005). Diversity and nutraceutical potential of wild edible mushrooms of Central India. In: *Microbial Diversity : Current perspectives and Potential applications*, Sattyanarayana T, Johri BN (Eds), I.K. International Pvt. Ltd., New Delhi, India, pp: 967-980.

Rajarathnam, S., Shashirekha, M.N., Bano, Z. (1992). Inhibition of growth of the mushroom *Pleurotus flabellatus* (Berk and Br.) Sacc. on rice straw, by *Sclerotium rolfsii* Sacc. *Scientia Horticulturae*, 51(3-4): 295-302.

Ramirez, M.A.J.R. (2016). Characterization and safety evaluation of exopolysaccharide produced by *Rhodotorula minuta* BIOTECH 2178. *International Journal of Food Engineering*, 2 (1): 1-5.

Rao, L., Hayat, K., Lva, Y., Karangwa, E., Xia, S., Jia, C., Zhong, F., Zhang, X. (2010). Effect of ultrafiltration and fining adsorbents on the clarification of green tea. *Journal of Food Engineering*, 102: 321-326.

Rao, R.S.P., Muralikrishna, G. (2004). Non-starch polysaccharide–phenolic acid complexes from native and germinated cereals and millet. *Food Chemistry*, 84(4): 527-531.

Raza, W., Yang, W., Jun, Y., Shakoor, F., Huang, Q., Shen, Q. (2012). Optimization and characterization of a polysaccharide produced by *Pseudomonas fluorescens* WR–1 and its antioxidant activity. *Carbohydrate Polymers*, 90: 921- 929.

Reilly, J.W.J. (2013). Pharmaceutical excipients. In: Remington–Essentials of Pharmaceutics. London, United Kingdom: Pharmaceutical Press, pp: 683-704.

Remminghorst, U., Rehm, B.H. (2009). Microbial production of alginate: Biosynthesis and applications. In: *Microbial Production of Biopolymers and Polymer Precursor: Applications and Perspectives*, Bernd HA (Ed), Rehm Institute of Molecular BioSciences, Massey University, New Zealand.

Retini, C., Kozel, T.R., Pietrella, D., Monari, C., Bistoni, F., Vecchiarelli, A. (2001). Interdependency of Interleukin-10 and Interleukin-12 in Regulation of T-Cell differentiation and effector function of monocytes in response to stimulation with *Cryptococcus neoformans*. *Infection and Immunity*, 69(10): 6064-6073.

Rhim, J.W., Lee, J., Hong, S. (2006). Water resistance and mechanical properties of biopolymer (alginate and soy protein) coated paperboards. *LWT- Food Science and Technology*, 39(7): 806-813.

Rho, D., Mulchandani, A., Luong, J.H.T., Leduy, A. (1988). Oxygen requirement in pullulan fermentation. *Applied Microbiology and Biotechnology*, 28: 361–366.

Rieger, M.M. (1986). Emulsion. In: *The Theory and Practice of Industrial Pharmacy*, Lachman L, Lieberman H, Kanig J (Eds), 3rd edition. Lea and Febiger, Philadelphia, PA, pp: 502.

Roberts, P., Evans, S. (2014). *The book of fungi: a life-size guide to six hundred species from around the world*. University of Chicago Press, 2014 Dec 10.

Roller, S., Dea, I.C.M. (1992). Biotechnology in the production and modification of biopolymers for foods. *Critical Reviews in Biotechnology*, 12(3): 261-277.

Ron, E.Z., Rosenberg, E. (2001). Natural roles of biosurfactants: Minireview. *Environmental Microbiology*, 3(4): 229-236.

Rosado, F.R., Carbonero, E.R., Kimmelmeier, C., Tischer, C.A., Gorin, P.A.J., Lacomini, M. (2013): A partially 3-O-methylated (1-4) linked, α -D-galactan and α -D-mannan from *Pleurotus ostreatoroseus* Sing. *FEMS Microbiology Letters*, 212(2): 261-265.

Rosenberg, E., Ron, E.Z. (1997). Bioemulsans: microbial polymeric emulsifiers. *Current Opinion in Biotechnology*, 8(3): 313-316.

Rosenberg, E., Ron, E.Z. (1999). High-and low-molecular-mass microbial surfactants. *Applied Microbiology and Biotechnology*, 52(2): 154-162.

Roukas, T., Liakopoulou-Kyriakides, M. (1999). Production of pullulan from beet molasses by *Aureobasidium pullulans* in a stirred tank fermentor, *Journal of Food Engineering*, 40(1-2): 89-94.

Rout, D., Mondal, S., Chakraborty, I., Pramanik, M., Islam, S.S. (2005). Chemical analysis of a new (1→ 3)-, (1→ 6)-branched glucan from an edible mushroom, *Pleurotus florida*. *Carbohydrate Research*, 340(16): 2533-2539.

Rubin-Bejerano, I., Abeijon, C., Magnelli, P., Grisafi, P., Fink, G.R. (2007). Phagocytosis by human neutrophils is stimulated by a unique fungal cell wall component. *Cell Host & Microbe*, 2(1): 55-67.

Ruiter, G.A.D., Van Bruggen-Van der Lugt, A.W., Mischnick, P., Smid, P., Van Boom, J.H., Notermans, S.H., Rombouts, F.M. (1994). 2-O-methyl-D-mannose residues are immunodominant in extracellular polysaccharides of *Mucor racemosus* and related molds. *Journal of Biological Chemistry*, 269(6): 4299-4306.

Sachin, L.B., Shweta, N.S., Naimesh, M.P., Prasad, A.T., Subhash, L.B. (2006). Hypoglycemic Activity of Aqueous Extract of *Pleurotus pulmonarius* in Alloxan-Induced Diabetic Mice. *Pharmaceutical Biology*, 44(6): 421-425.

Saeki, H., Sasaki, M., Komatsu, K., Miura, A., Matsuda, H. (2009). Oil spill remediation by using the remediation agent JE1058BS that contains a biosurfactant produced by *Gordonia* sp. strain JE-1058. *Bioresource Technology*, 100(2): 572-577.

Saito, K., Sato, S.I., Shimoi, H., Iefuji, H., Tadenuma, M. (1990). Flocculation mechanism of *Hansenula anomala* J224. *Agricultural and Biological Chemistry*, 54(6): 1425-1432.

Salehizadeh, H., Shojaosadati, S.A. (2001). Extracellular biopolymeric flocculants: recent trends and biotechnological importance. *Biotechnology Advances*, 19(5): 371-385.

Salmones, D., Mata, G., Waliszewski, K.N. (2005). Comparative culturing of *Pleurotus* spp. on coffee pulp and wheat straw: biomass production and substrate biodegradation. *Bioresource Technology*, 96(5): 537-544.

Sanford, P.A., Hutchings, G.P. (1987). Chitosan – a natural, cationic biopolymer: commercial applications. In: *Industrial Polysaccharides: Genetic Engineering, Structure/Property Relations and Applications*, Yapalma M (Ed), Elsevier Science Publishers B.V., Amsterdam, The Netherlands, pp: 363-376.

Santos-Neves, J.C., Pereira, M.I., Carbonero, E.R., Gracher, A.H.P., Gorin, P.A., Sasaki, G.L., Iacomini, M. (2008). A gel-forming β -glucan isolated from the fruit bodies of the edible mushroom *Pleurotus florida*. *Carbohydrate research*, 343(9): 1456-1462.

Sarilmiser, H.K., Oner, E.T. (2014). Investigation of anti-cancer activity of linear and aldehyde-activated levan from *Halomonas smyrnensis* AAD6T. *Biochemical Engineering Journal*, 92: 28-34.

Sarubbo, L.A., Luna, J.M., Campos-Takaki, G.M. (2006). Production and stability studies of the bioemulsifier obtained from a new strain of *Candida glabrata* UCP 1002. *Electronic Journal of Biotechnology*, 9(4): 400-406.

Satpute, S.K., Banat, I.M., Dhakephalkar, P.K., Banpurkar, A.G., Chopade, B.A. (2010). Biosurfactants, bioemulsifiers and exopolysaccharides from marine microorganisms. *Biotechnology Advances*, 28(4): 436-450.

Schatschneider, S., Persicke, M., Watt, S.A., Hublik, G., Pühler, A., Niehaus, K., Vorhölter, F.J. (2013). Establishment, in silico analysis, and experimental verification of a large-scale metabolic network of the xanthan producing *Xanthomonas campestris* pv. *campestris* strain B100. *Journal of Biotechnology*, 167(2): 123-134.

Scheller, H.V., Ulvskov, P. (2010). Hemicelluloses. *Annual review of plant biology*, 61: 263-289.

Schmid, F., Stone, B.A., McDougall, B.M., Bacic, A., Martin, K.L., Brownlee, R. T., Seviour, R.J. (2001). Structure of epiglucan, a highly side-chain/branched (1 \rightarrow 3; 1 \rightarrow 6)- β -glucan from the micro fungus *Epicoccum nigrum*. *Carbohydrate Research*, 331(2): 163-171.

Schmid, J., Meyer, V., Sieber, V. (2011). Scleroglucan: biosynthesis, production and application of a versatile hydrocolloid. *Applied Microbiology and Biotechnology*, 91(4): 937-947.

Schwarze, F.W. (2007). Wood decay under the microscope. *Fungal Biology Reviews*, 21(4):133-70.

Senthilkumar, N., Murugesan, S. (2010). Sucrose and maltose as carbon sources for fermentative production of polysaccharide by *Aspergillus niger* van tiegh. *Recent Research in Science and Technology*, 2(4): 1-5.

Seviour, R.J., Stasinopoulos, S.J., Auer, D.P.F., Gibbs, P.A. (1992). Production of pullulan and other exopolysaccharides by filamentous fungi. *Critical Reviews in Biotechnology*, 12(3): 279-298.

Sharma, S., Mukkur, T.K., Benson, H.A., Chen, Y. (2009). Pharmaceutical aspects of intranasal delivery of vaccines using particulate systems. *Journal of Pharmaceutical Sciences*, 98(3): 812-43.

Sharma, S.G., Fatma, M., Singh, V.K. (1996). Biochemical changes during solid substrate fermentation of water hyacinth with *Pleurotus sajor caju*. *Mushroom Research*, 5: 89.

Sharma, S.K., Gautam, N., Atri, N.S. (2015). Optimized extraction, composition, antioxidant and antimicrobial activities of exo and intracellular polysaccharides from submerged culture of *Cordyceps cicadae*. *BMC Complementary and Alternative Medicine*, 15: 446-456.

Sheehan, M.M., García, J.L., López, R., García, P. (1997). The lytic enzyme of the pneumococcal phage Dp-1: a chimeric lysin of intergeneric origin. *Molecular Microbiology*, 25(4): 717-725.

Shen, H., Tang, G., Zeng, G., Yang, Y., Cai, X., Li, D., Zhou, N. (2013). Purification and characterization of an antitumor polysaccharide from *Portulaca oleracea*. *Carbohydrate polymers*, 93(2): 395-400.

Shih, I.L., Van, Y.T., Yeh, L.C., Lin, H.G., Chang, Y.N. (2001). Production of a biopolymer flocculant from *Bacillus licheniformis* and its flocculation properties. *Bioresource Technology*, 78(3): 267-272.

Shin, K., Oh, I., Kim, C. (1997). Production and purification of remazol brilliant blue r decolorizing peroxidase from the culture filtrate of *Pleurotus ostreatus*. *Applied and Environmental Microbiology*, 63(5): 1744-1748.

Shu, C.H., Lung, M.Y. (2004). Effect of pH on the production and molecular weight distribution of exopolysaccharide by *Antrodia camphorata* in batch cultures. *Process Biochemistry*, 39(8): 931-937.

Siddiqui, N.N., Aman, A., Silipo, A., Qader, S.A.U., Molinaro, A. (2014). Structural analysis and characterization of dextran produced by wild and mutant strains of *Leuconostoc mesenteroides*. *Carbohydrate polymers*, 99: 331-338.

Sidebotham, R.L. (1974). Dextrans. *Advances in Carbohydrate Chemistry and Biochemistry*, 30: 371-444.

Singer, R. (1986). *The Agaricales in modern taxonomy*, 4th edition, Koeltz Scientific Books, Koenigstein.

Singh, B., Chauhan, G.S., Kumar, S., Chauhan, N. (2007). Synthesis, characterization and swelling responses of pH sensitive psyllium and polyacrylamide based hydrogels for the use in drug delivery (I). *Carbohydrate Polymers*, 67(2): 190-200.

Singh, R.P., Karmakar, G.P., Rath, S.K., Karmakar, N.C., Pandey, S.R., Tripathy, T., Lan, N.T. (2000). Biodegradable drag reducing agents and flocculants based on polysaccharides: materials and applications. *Polymer Engineering & Science*, 40(1): 46-60.

Singham, P., Birwal, P., Yadav, B.K. (2015). Importance of objective and subjective measurement of food quality and their inter-relationship. *Journal of Food Processing & Technology*, 6(9): 2-7.

Smiderle, F.R., Olsen, L.M., Carbonero, E.R., Baggio, C.H., Freitas, C.S., Marcon, R., Iacomini, M. (2008). Anti-inflammatory and analgesic properties in a rodent model of a (1→3),(1→6)-linked β -glucan isolated from *Pleurotus pulmonarius*. *European journal of pharmacology*, 597(1-3): 86-91.

Smiderle, F.R., Olsen, L.M., Ruthes, A.C., Czelusniak, P.A., Santana-Filho, A.P., Sasaki, G.L., Iacomini, M. (2012). Exopolysaccharides, proteins and lipids in *Pleurotus pulmonarius* submerged culture using different carbon sources. *Carbohydrate Polymers*, 87(1): 368-376.

Smyth, T.J.P., Perfumo, A., McClean, S., Marchant, R., Banat, I.M. (2010). Isolation and analysis of lipopeptides and high molecular weight biosurfactants. *Handbook of Hydrocarbon and Lipid Microbiology*, 3687-3704.

Sonck, E., Stuyven, E., Goddeeris, B., Cox, E. (2010): The effect of beta-glucans on porcine leukocytes. *Veterinary Immunology and Immunopathology*, 135 (3-4): 199–207.

Sood, G., Sharma, S., Kapoor, S., Khanna, P.K. (2013). Optimization of extraction and characterization of polysaccharides from medicinal mushroom *Ganoderma lucidum* using response surface methodology. *Journal of Medicinal Plants Research*, 7(31): 2323-2329.

Stamets, P. (2005). *Mycelium Running: How mushroom can help save the world*. Berkeley, CA: Ten Speed, pp: 574.

Stasinopoulos, S.J., Seviour, R.J. (1989). Exopolysaccharide formation by isolates of *Cephalosporium* and *Acremonium*. *Mycological Research*, 92(1): 55-60.

- Stübler, D., Buchenauer, H. (1996). Antiviral Activity of the *Glucan Lichenan* (Poly- β (1 \rightarrow 3, 1 \rightarrow 4) D-anhydroglucose) 1. Biological Activity in Tobacco Plants. *Journal of Phytopathology*, 144(1): 37-43.
- Sudhakaran, V.K., Shewale, J.G. (1988). Exopolysaccharide production by *Nigrospora oryzae* var. *glucanicum*. *Enzyme and Microbial Technology*, 10(9): 547-551.
- Sugiyama, A., Suzuki, K., Mitra, S., Arashida, R., Yoshida, E., Nakano, R., Takeuchi, T. (2009). Hepatoprotective effects of paramylon, a β -1, 3-D-glucan isolated from *Euglena gracilis* Z, on acute liver injury induced by carbon tetrachloride in rats. *Journal of Veterinary Medical Science*, 71(7): 885-890.
- Suh, H.H., Kwon, G.S., Lee, C.H., Kim, H.S., Oh, H.M., Yoon, B.D. (1997) Characterization of bioflocculant produced by *Bacillus* sp. DP-152. *Journal of Fermentation and Bioengineering*, 84: 108-112.
- Sun, F., Huang, Q., Wu, J. (2014). Rheological behaviors of an exopolysaccharide from fermentation medium of a *Cordyceps sinensis* fungus (Cs-HK1). *Carbohydrate polymers*, 114: 506-513.
- Sun, H.H., Mao, W.J., Chen, Y., Guo, S.D., Li, H.Y., Qi, X.H., Xu, J. (2009). Isolation, chemical characteristics and antioxidant properties of the polysaccharides from marine fungus *Penicillium* sp. F23-2. *Carbohydrate polymers*, 78(1): 117-124.
- Sun, M.L., Zhao, F., Shi, M., Zhang, X.Y., Zhou, B.C., Zhang, Y.Z., Chen, X.L. (2015). Characterization and biotechnological potential analysis of a new exopolysaccharide from the Arctic marine bacterium *Polaribacter* sp. SM1127. *Scientific reports*, 5: 1-12.
- Survaes, S.A., Saudagar, P.S., Bajaj, I.B., Singhal, R.S. (2007). Scleroglucan: fermentative production, downstream processing and applications. *Food Technology and Biotechnology*, 45: 107-118.
-

Suryani, Ambarsari L., Artika I.M., Susanti, H.E. (2011). Characterization of bioflocculant producing-bacteria isolated from tapioca waste water. *HAYATI Journal of Biosciences*, 18(4): 193-196.

Sutherland, I.W. (1982). Biosynthesis of microbial polysaccharides. *Advances in Microbial Physiology*, 23: 79–150.

Sutherland, I.W. (1990). *Biotechnology of microbial exopolysaccharides*. Cambridge University Press, 1st edition, Cambridge University Press, Cambridge.

Sutherland, I.W. (1996). A natural terrestrial biofilm. *Journal of Industrial Microbiology*, 17: 281-285.

Sutherland, I.W. (1998). Novel and established applications of microbial polysaccharides. *Trends Biotechnology*, 16: 41-46.

Sutherland, I.W. (2001). Biofilm exopolysaccharides: a strong and sticky framework. *Microbiology*, 147(1): 3-9.

Tago, Y., Aida, K. (1977). Exocellular mucopolysaccharide closely related to bacterial floc formation. *Applied and Environmental Microbiology*, 34(3): 308-314.

Takagi, H., Kadowaki, K. (1985). Flocculant production by *Paecilomyces* sp. Taxonomic studies and culture conditions for production. *Agricultural and Biological Chemistry*, 49(11): 3151-3157.

Tam, S.C., Yip, K.P., Fund, K.P., Chang, S.T. (1986). Hypotensive and renal effect of an extract of the edible mushroom *Pleurotus sajor-caju*. *Life Sciences*, 38: 1155.

Tang, X.Z., Kumar, P., Alavi, S., Sandeep, K.P. (2012). Recent advances in biopolymers and biopolymer-based nanocomposites for food packaging materials. *Critical Reviews in Food Science and Nutrition*, 52: 426-442.

Tang, Y.J., Zhu, L.L., Liu, R.S., Li, H.M., Li, D.S., Mi, Z.Y. (2008). Quantitative response of cell growth and Tuber polysaccharides biosynthesis by medicinal mushroom Chinese truffle *Tuber sinense* to metal ion in culture medium. *Bioresource Technology*, 99(16): 7606-7615.

Tavares, A.P.A., Agapito, M.S.M., Coelho, M.A.M., Silva, J.L., Barros-Timmons, A., Coutinho, J.A.J., Xavier, A.M.R.B. (2005). Selection and optimization of culture medium for exopolysaccharide production by *Coriolus (Trametes) versicolor*. *World Journal of Microbiology and Biotechnology*, 21(8-9): 1499-1507.

Tavares, A.P.M., Coelho, M.A.Z., Coutinho, J.A.P., Xavier, A.M.R.B. (2005). Laccase improvement in submerged cultivation, induced production and kinetic modelling. *Journal of Chemical Technology and Biotechnology*, 80(6): 669-676.

Telles, C.B.S., Sabry, D.A., Almeida-Lima, J., Costa, M.S.S.P., Melo-Silveira, R.F., Trindade, E.S., Sasaki, G.L., Wisbeck, E., Furlan, S.A., Leite, E.L., Rocha, H.A.O. (2011). Sulfation of the extracellular polysaccharide produced by the edible mushroom *Pleurotus sajor-caju* alters its antioxidant, anticoagulant and antiproliferative properties in vitro. *Carbohydrate Polymers*, 85: 514-521.

Tharanathan, R.N. (2003). Biodegradable films and composite coatings: past, present and future. *Trends in Food Science & Technology*, 14(3): 71-78.

Toeda, K., Kurane, R. (1991). Microbial flocculant from *Alcaligenes cupidus* KT201. *Agricultural and Biological Chemistry*, 55(11): 2793-2799.

Tolstoguzov, V. (2004). Why are polysaccharides necessary? *Food Hydrocolloids*, 18(5): 873-877.

Tsuda, H., Hara, K., Miyamoto, T. (2008). Binding of mutagens to exopolysaccharide produced by *Lactobacillus plantarum* mutant strain 301102S. *Journal of Dairy Science*, 91(8): 2960-2966.

Tzianabos, A.O. (2000). Polysaccharide immunomodulators as therapeutic agents: structural aspects and biologic function. *Clinical Microbiology Reviews*, 13(4): 523-533.

Ürküt, Z., Dağbağlı, S., Göksungur, Y. (2007). Optimization of pullulan production using Calcium alginate-immobilized *Aureobasidium pullulans* by response surface methodology. *Journal of Chemical Technology & Biotechnology*, 82(9): 837-846.

Uzoigwe, C., Burgess, J.G., Ennis, C.J., Rahman, P.K. (2015). Bioemulsifiers are not biosurfactants and require different screening approaches. *Frontiers in Microbiology*, 6: 1-6.

Valisek, J., Cejpek, K. (2011). Pigments of higher fungi: a review. *Czech Journal of Food Sciences*, 29(2): 87-102.

Vamanu, E., Pelinescu, D., Avram, I. (2018). Antioxidative effects of phenolic compounds of mushroom mycelia in simulated regions of the human colon, *in vitro* study. *Polish Journal of Food and Nutrition Sciences*, 68(1): 83-90.

Van Dyke, M.I., Lee, H., Trevors, J.T. (1991). Applications of microbial surfactants. *Biotechnology Advances*, 9(2): 241-252.

Vane, C.H., Abbott, G.D., Head, I.M. (2001). The effect of fungal decay (*Agaricus bisporus*) on wheat straw lignin using pyrolysis-GC-MS in the presence of 171 tetramethylammonium hydroxide (TMAH). *Journal of Analytical and Applied Pyrolysis*, 60: 69-78.

Vane, C.H., Drage, T.C., Snape, C.E., Stephenson, M.H., Foster, C. (2005). Decay of cultivated apricot wood (*Prunus armeniaca*) by the ascomycete *Hypocrea sulphurea*, using solid state C-13 NMR and off-line TMAH thermochemolysis with GC-MS. *International Biodeterioration & Biodegradation*, 55: 175-185.

Vecchiarelli, A., Retini, C., Pietrella, D., Monari, C., Tascini, C., Beccari, T., Kozel, T. R. (1995). Downregulation by cryptococcal polysaccharide of tumor necrosis factor alpha and

interleukin-1 beta secretion from human monocytes. *Infection and Immunity*, 63(8): 2919-2923.

Veiter, L., Rajamanickam, V., Herwig, C. (2018). The filamentous fungal pellet relationship between morphology and productivity. *Applied Microbiology and Biotechnology*, 102(7): 2997-3006.

Vinderola, G., Perdigón, G., Duarte, J., Farnworth, E., Matar, C. (2006). Effects of the oral administration of the exopolysaccharide produced by *Lactobacillus kefiranofaciens* on the gut mucosal immunity. *Cytokine*, 36(5-6): 254-260.

Vismara, R., Vestri, S., Frassanito, A. M., Barsanti, L., Gualtieri, P. (2004). Stress resistance induced by paramylon treatment in *Artemia* sp. *Journal of Applied Phycology*, 16(1): 61-67.

Vuyst, L., Degeest, B. (1999). Heteropolysaccharides from lactic acid bacteria. *FEMS Microbiology Reviews*, 23: 153–177.

Walker, C.H., Hopkin, S.P., Sibly, R.M., Peakall, D.B. (2006). *Principles of ecotoxicology*. 3rd edition, New York: Taylor & Francis.

Wang, H., Jiang, X., Mu, H., Liang, X., Guan, H. (2007). Structure and protective effect of exopolysaccharide from *P. agglomerans* strain KFS-9 against UV radiation. *Microbiological Research*, 162(2): 124-129.

Wang, H.X., Ng, T.B. (2000). Isolation of a novel ubiquitin-like protein from *Pleurotus ostreatus* mushroom with anti-human immunodeficiency virus, translation-inhibitory, and ribonuclease activities. *Biochemical and Biophysical Research Communications*, 276(2): 587-93.

Wang, J., Wang, X.H., Ng, T.B. (2007). A peptide with HIV-1 reverse transcriptase inhibitory activity from the medicinal mushroom *Russula paludosa*. *Peptides*, 28: 560-565.

Wang, J., Zhao, X., Tian, Z., Yang, Y., Yang, Z. (2015). Characterization of an exopolysaccharide produced by *Lactobacillus plantarum* YW11 isolated from Tibet Kefir. *Carbohydrate polymers*, 125: 16-25.

Wang, J.P., Chen, Y.Z., Wang, Y., Yuan, S.J., Yu, H.Q. (2011). Optimization of the coagulation-flocculation process for pulp mill wastewater treatment using a combination of uniform design and response surface methodology. *Water Research*, 45(17): 5633-5640.

Wang, K., Li, W., Rui, X., Chen, X., Jiang, M., Dong, M. (2014). Characterization of a novel exopolysaccharide with antitumor activity from *Lactobacillus plantarum* 70810. *International Journal of Biological Macromolecules*, 63: 133-139.

Wang, W., Wang, S.X., Guan, H.S. (2012). The antiviral activities and mechanisms of marine polysaccharides: an overview. *Marine Drugs*, 10(12): 2795-2816.

Wang, X.B., Yong, N., Tang, Y.G., Wu, X.L. (2013). n -alkane chain length alters *Dietzia* sp. Strain DQ12-45-1b biosurfactant production and cell surface activity. *Applied and Environmental Microbiology*, 79: 400-402.

Wang, Y., Li, C., Liu, P., Ahmed, Z., Xiao, P., Bai, X. (2010). Physical characterization of exopolysaccharide produced by *Lactobacillus plantarum* KF5 isolated from Tibet Kefir. *Carbohydrate Polymers*, 82(3): 895-903.

Wang, Y., McNeil, B. (1995). pH effects on exopolysaccharide and oxalic acid production in cultures of *Sclerotium gluconicum*. *Enzyme and Microbial Technology*, 17(2): 124-130.

Wang, Y., McNeil, B. (1996). Scleroglucan. *Critical Reviews in Biotechnology*, 16(3): 185-215.

Wasser, S.P. (2002). Medicinal mushrooms as a source of antitumor and immunomodulating polysaccharides (mini-review). *Applied Microbiology and Biotechnology*, 60: 258-274.

Wasser, S.P. (2010). Medicinal mushroom science: history, current status, future trends, and unsolved problems. *International Journal of Medicinal Mushrooms*, 12(1): 1-16.

West, T.P., Strohfus, B. (1996). Pullulan production by *Aureobasidium pullulans* grown on ethanol stillage as a nitrogen source. *Microbios*, 88: 7-18.

Whistler, R.L. Daniel, J.R. (1990). Functions of polysaccharides in foods. In: Food Additives, Branen AL, Davidson PM, Salminen SY (Eds), Marcel Dekker, New York, NY, pp: 395-424.

Wilkolazka, A., Graz, M., Braha, B., Menge, D., Krauss, G.J. (2006). Species-specific Cd-stress response in the white rot basidiomycetes *Abortiporus biennis* and *Cerrena unicolor*. *Biometals*, 19: 39-49.

Wu, C.Y., Liang, Z.C., Lu, C.P., Wu, S.H. (2008). Effect of carbon and nitrogen sources on the production and carbohydrate composition of exopolysaccharide by submerged culture of *Pleurotus citrinopileatus*. *Journal of Food and Drug Analysis*, 16(2): 61-67.

Wu, M.H., Pan, T.M., Wu, Y.J., Chang, S.J., Chang, M.S., Hu, C.Y. (2010). Exopolysaccharide activities from probiotic bifidobacterium: Immunomodulatory effects (on J774A. 1 macrophages) and antimicrobial properties. *International Journal of Food Microbiology*, 144(1): 104-110.

Wu, S., Chen, J., Pan, S. (2012). Optimization of fermentation conditions for the production of pullulan by a new strain of *Aureobasidium pullulans* isolated from sea mud and its characterization. *Carbohydrate polymers*, 87(2): 1696-1700.

Xiao, J.H., Xiao, D.M., Xiong, Q., Liang, Z.Q., Zhong, J.J. (2010). Nutritional requirements for the hyperproduction of bioactive exopolysaccharides by submerged fermentation of the edible medicinal fungus *Cordyceps taii*. *Biochemical Engineering Journal*, 49(2): 241-249.

Xu, C.P., Kim, S.W., Hwang, H.J., Choi, J.W., Yun, J.W. (2003). Optimization of submerged culture conditions for mycelial growth and exo-biopolymer production by *Paecilomyces tenuipes* C240. *Process Biochemistry*, 38: 1025-1030.

Xu, C.P., Yun, J.W. (2004). Influence of aeration on the production and the quality of the exopolysaccharides from *Paecilomyces tenuipes* C240 in a stirred-tank fermenter. *Enzyme and Microbial Technology*, 35(1): 33-39.

Yadav, K.L., Rahi, D.K., Soni, S.K. (2014). Bioemulsifying potential of exopolysaccharide produced by an indigenous species of *Aureobasidium pullulans* RYLF10. *PeerJ PrePrints*, e726v1: 1-13.

Yadav, K.L., Rahi, D.K., Soni, S.K., Rahi, S. (2012). Diversity of exopolysaccharide producing fungi from foot hills of Shivalik ranges of Chandigarh capital region. *Research in Biotechnology*, 3(4):11-18.

Yalpani, M. (2013). Polysaccharides: syntheses, modifications and structure/property relations. In: *Studies in Organic Chemistry*, Elsevier Science Publishers, Amsterdam, Oxford, New York, Tokyo.

Yamatoya, K., Shirakawa, M., Kuwano, K., Suzuki, J., Mitamura, T. (1996). Effects of hydrolyzed xyloglucan on lipid metabolism in rats. *Food Hydrocolloids*, 10: 369–372.

Yang, C., He, N., Ling, X., Ye, M., Zhang, C., Shao, W., Li, Q. (2008). The isolation and characterization of polysaccharides from longan pulp. *Separation and Purification Technology*, 63(1): 226-230.

Yang, F.C., Ke, Y.F., Kuo, S.S. (2000). Effect of fatty acids on the mycelial growth and polysaccharide formation by *Ganoderma lucidum* in shake flask cultures. *Enzyme and Microbial Technology*, 27(3-5): 295-301.

Yang, H., He, G. (2008). Influence of nutritional conditions on exopolysaccharide production by submerged cultivation of the medicinal fungus *Shiraia bambusicola*. *World Journal of Microbiology and Biotechnology*, 24(12): 2903-2907.

Yang, Q., Luo, K., Liao, D.X., Li, X.M., Wang, D.B., Liu, X., Zeng, G.M., Li, X. (2012a). A novel bioflocculant produced by *Klebsiella* sp. and its application to sludge dewatering. *Water and Environment Journal*, 26: 560-566.

Yang, W., Pei, F., Shi, Y., Zhao, L., Fang, Y., Hu, Q. (2012b) Purification, characterization and anti-proliferation activity of polysaccharides from *Flammulina velutipes*. *Carbohydrate Polymers*, 88(2): 474-480.

Yatsyshyn, V., Fedorovych, D., Sibirny, A. (2010). Medium optimization for production of flavin mononucleotide by the recombinant strain of the yeast *Candida famata* using statistical designs. *Biochemical Engineering Journal*, 49(1): 52-60.

Yokoi, H., Yoshida T., Mori S., Hirose J., Hayashi S., Takasaki Y. (1997). Biopolymer flocculants produced by an *Enterobacter* sp. *Biotechnology Letters*, 19: 569-573.

Yoshioka, Y., Tabeta, R., Saitô, H., Uehara, N., Fukuoka, F. (1985). Antitumor polysaccharides from *P. ostreatus* (Fr.) quel.: isolation and structure of a β -glucan. *Carbohydrate Research*, 140(1): 93-100.

Young, R. (1986). Cellulose structure modification and hydrolysis, Raymond A, Rowell RM, (Eds), Wiley-Interscience, New York, pp: 379.

Yuan, B., Chi, X., Zhang, R. (2012). Optimization of exopolysaccharides production from a novel strain of *Ganoderma lucidum* CAU5501 in submerged culture. *Brazilian Journal of Microbiology*, 43(2): 490-497.

Zabel, R.A., Morrell, J.J. (2012). Wood microbiology: decay and its prevention. Academic press.

Zevenhuizen, L.P.T.M. (1997). Succinoglycan and galactoglucan. *Carbohydrate Polymers*, 33: 139–144

Zhang, B.B., Cheung, P.C. (2011). Use of stimulatory agents to enhance the production of bioactive exopolysaccharide from *pleurotus tuber-regium* by submerged fermentation. *Journal of Agricultural and Food Chemistry*, 59(4): 1210-1216.

Zhang, H., Lin, Z. (1999). Microbial flocculant and its application in environmental protection, *Journal of Environmental Sciences*, 11: 1-12.

Zhang, J., Dong, Y.C., Fan, L.L., Jiao, Z.H., Chen, Q.H. (2015). Optimization of culture medium compositions for gellan gum production by a halobacterium *Sphingomonas paucimobilis*. *Carbohydrate polymers*, 115: 694-700.

Zhang, J., Wang, R., Jiang, P., Liu, Z. (2002). Production of an exopolysaccharide bioflocculant by *Sorangium cellulosum*. *Letters in Applied Microbiology*, 34(3): 178-181.

Zhang, J., Zhang, J. (2016). The filamentous fungal pellet and forces driving its formation. *Critical Reviews in Biotechnology*, 36(6): 1066–1077.

Zhang, Y., Kong, H., Fang, Y., Nishinari, K., Phillips, G.O. (2013). Schizophyllan: A review on its structure, properties, bioactivities and recent developments. *Bioactive Carbohydrates and Dietary Fibre*, 1(1): 53-71.

Zhang, Y.H.P., Evans, B.R., Mielenz, J.R., Hopkins, R.C., Adams, M.W. (2007). High-yield hydrogen production from starch and water by a synthetic enzymatic pathway. *PloS one*, 2(5): 456.

Zhang, Z., Yao, X., Zhu, H. (2010). Potential application of geopolymers as protection coatings for marine concrete: II. Microstructure and anticorrosion mechanism. *Applied clay science*, 49(1-2): 7-12.

Zheng, J.Q., Wang, J.Z., Shi, C.W., Mao, D.B., He, P.X., Xu, C.P. (2014). Characterization and antioxidant activity for exopolysaccharide from submerged culture of *Boletus aereus*. *Process Biochemistry*, 49(6): 1047-1053.

Zhuang, Y.P., Chen, B., Chu, J., Zhang, S. (2006). Medium optimization for meilingmycin production by *Streptomyces nanchangensis* using response surface methodology. *Process Biochemistry*, 41(2): 405-409.

Zikakis, J. (2012). Chitin, chitosan, and related enzymes. Elsevier.

Zosim, Z., Gutnick, D.L., Rosenberg, E. (1987). Effect of protein content on the surface activity and viscosity of emulsan. *Colloid and Polymer Science*, 265(5): 442-447.

Zuckerberg, A., Diver, A., Pearl, Z., Gutnick, D.L., Rosenberg, E. (1979). Emulsifier of *Arthrobacter* RAG-1: chemical and physical properties. *Applied Environmental Microbiology*, 37: 414-42.