Development of immunoseparation method for the rapid capture of LAB in beers

葉哲宏、李世傑 李泰林 曾浩洋

E-mail: 9806539@mail.dyu.edu.tw

ABSTRACT

In recent years, developement of the molecular diagnostic methods for bacteria identification has been noteworthy. Conventional methods for detection of LAB are laborious and time consuming and may require 1 week . Of the molecular dctection methods, when many LAB species are subjected to identification, the biochip method could be used. To establish the online monitoring system for the detection of the LAB cells in beers during brewing, in my thesis work, the immunomagentic beads method specific for LAB species in beers will be developed for the collection and concentration of lactic acid bacteria cells including Lactobacillus brevis, L. casei, L. plantarum and Pediococcus damnosus. These four lactic acid bacteria may spoil the beer and should be detected online during the brewing processes. The antibody to these LAB species was obtained from immunized rabbit and then purified. The purified antibody was linked to magneticbead. After obtaining the immunomagnetic bead, the LAB cells in beer were captured and detected using the biochip from Dr. Chip Company. By this way, the online monitoring system for detection of LAB during the beer brewing process could be establish.

Keywords : immunomagnetic separation(IMS) , Lactobacillus spp, Beer chip

Table of Contents

REFERENCES

1.許勝傑。2009。博士論文。中興大學大學食品營養科技學系。 2.李承隆。2008。碩士論文。弘光科技大學食品營養科技學系。 2.楊韻潔。2008。碩士論文。弘光科技大學食品營養科技學系。 3.劉輝、朱正美。2002。簡明免疫學。科學出版社。 4.廖啟成。1998。乳酸菌之分類及應用。食品工業月刊.30:1-9. 5.宋華聰、林茂勇。1995。禽病檢查手冊。藝軒圖書出版社。 6. Kye, M. C., Renukaradhya, K. M., Shah-Md, A. I., Woo, J. L., Su, Y. H., Jong, M. K., Myoung, G. Y., Ji-Joong Cho and Han-Dae Yun. 2009. Novel multiplex PCR for the detection of lactic acid bacteria during kimchi fermentation. Molecular and Cellular Probes. 7. Chiang, Y. C., W. Y. Pai, C.Y. Chen, P.C. Lee, and H.Y. Tsen. 2008. PCR detection of Mastitis pathogens,Streptococcus agalactiae, Streptococcus uberis, Streptococcus bovis and Staphylococcus aureus in milk samples using new primers designed from the hsp70, hsp40, hsp10, and htr gene sequences. Molecular & Cellular Probes. (SCI) (Accepted, in press) 8. Chiang, Y. C., Chih, M. F., Wan. W. L., Chieu-Ku Lin and Hau-Yang Tsen. 2007. Real-time PCR detection of Staphylococcus aureus in milk and meat using new primers designed from the heat shock protein gene htrA sequence.J. Food Protection. 70(12):2855-9. (SCI) 9. Coleman, D. J., Chick, K. E. and Nye, K. J. 1995. An evaluation of immunomagnetic separation of the detection of Salmonellas in raw chicken carcasses. Lett. Appl. Microbiol. 21:152-154. 10. Cudjoe, K. S. and Krona, R. 1997. Detection of Salmonella from raw food samples using Dynabeads anti-Salmonella and a conventional reference method. Int. J. Food Microbiol. .37:55-62. 11. Cudjoe, K. S., Hagtvedt, T., and Dainty, R. 1995. Immunomagnetic separation of Salmonella from foods and their detection using immunomagnetic particle (IMP)-ELISA. Int. J. Food Microbiol. 27:11-25. 12. Cudjoe, K. S., Krona, R. and Olsen, E. 1994. IMS: a new selective enrichment technique for detection of Salmonella in foods. Int. J. Food Microbiol. 23:159-165. 13. Dziadkowiec, D., Mansfield, L.P. and Forsythe, S. J. 1995. The detection of Salmonella in skimmed milk powder enrichments using conventional methods and immunomagnetic separation. Lett. Appl. Microbiol. 20:361-364. 14. Edwards, M. C., and Gibbs, R. A.1995. Multiplex PCR, p.157-171. In C. W. Dieffenbach and Dveksler, G. S.(ed.), PCR primer a laboratory manual, CSHL Press, Plainview, New York. 15. Fleet, G.H., Lafon-Laforcade, S. and Ribereau-Gayon P. 1984.Evolution of Yeasts and Lactic Acid Bacteria During Fermentation and Storage of Bordeaux Wines. Appl. Environ. Microbiol. 48, 1034-1038. 16. Herrera-Leon, S, Ramiro, R, Arroyo, M, Diez R, Usera MA, Echeita MA.（2007）Blind comparison of traditional serotyping with three multiplex PCRs for the identification of Salmonella serotypes. Res.Microbiol. 158(2):122-7. 17. Hohmann, E.L. 2001. Nontyphoidal salmonellosis. Clin. Infect. Dis. 15;32(2): 263-9. 18. Johnson, T.R., Case, C.L.1995. Laboratory experiments in Microbiology 4th edition. The Benjamin / Cummings Publoshing Co.Inc. 19. Kardos, G., Farkas, T., Antal, M., Nogrady, N., Kiss, I. 2007. Novel PCR assay for identification of Salmonella enterica serovar Infantis. Lett Appl Microbiol. 45(4):421-5. - 67 - 20. LABAN P., FAVRE C., RAMET F. and LARPENT J.P. 1978. Lactobacilli isolated from French saucisson (Taxonomic Study). Zbl. Bakt. Parasitenk. 1 ATB-B 166, 105-111. 21. March, C, Manclus, JJ, Abad, A, Navarro, A, and Montoya, A. 2005. Rapid detection and counting of viable beer-spoilage lactic acid bacteria using a monoclonal chemiluminescence enzyme immunoassay and a CCD camera. J Immunol Methods. 303(1-2):92-104. 22. Mauch, H., Kumel, G., Hammer, H.J. 1980. Large-scale purification of IgM from human sera. Comparison of three optimized procedures utilizing protein A chromatography. Res Exp Med (Berl).177(1):33-41. 23. Popoff, M.Y., Bockemuhl, J., Gheesling, L.L. 2004. Supplement 2002 (no. 46) to the Kauffmann-White scheme. Res Microbiol. 155(7):568-70. 24 . Purcifull, D. E., and D. L. Bstchelor. 1977. Immunodiffusion Test with Sodium Dodecyl Sulfate (SDS)-treated Plant Viruses and Plant Viral Inclusions. Florida Agric. Expt. Sta. Bull. No. 78, 39 pp. 25. Rijpens, N., Herman, L., Vereecken, F., Jannes, G., Smedt, J. D. and Zutter, L. D. 1999. Rapid detection of stressed Salmonella spp. in dairy and egg products using immunomagnetic separation and PCR. Int. J.Food Microbiol. 46:37-44. 26. Salehi, T.Z., Tadjbakhsh H, Atashparvar N, Nadalian MG, Mahzounieh MR. 2007. Detection and identification of Salmonella Typhimurium in bovine diarrhoeic fecal samples by immunomagnetic separation and multiplex PCR assay. Zoonoses Public Health. 54(6-7):231-6. 27. Shaw, S. J., Blais, B. W. and Nundy, D. C. 1998. Performance of the Dynabeads anti-Salmonella system in the detection of Salmonella species in foods, animal feeds, and environmental samples. J. Food Prot.61:1507-1510. 28. Skjerve, E. and Olsvik, O. 1991. Immunomagnetic separation of Salmonella from foods. Int. J. Food Microbiol. 14:11-17. 29. Wattiau, P., Weijers, T., Andreoli, P., Schliker, C., Veken, H.V., Maas, H.M., Verbruggen, A.J., Heck, M.E., 2008. Evaluation of the Premi Test Salmonella, a commercial low-density DNA microarray system intended for routine identification and typing of Salmonella enterica. 23(3):293-8. 30. Wannet, W.J., Imberechts, H., and Vos, P. 2008. Evaluation of the Premi (R) Test Salmonella, a commercial low-density DNA microarray system intended for routine identification and typing of Salmonella enterica. Int J Food Microbiol. 123(3):293-8. 31. Yang, H, Qu L, Wimbrow AN, Jiang X and Sun Y. 2007. Rapid detection of Listeria monocytogenes by nanoparticle-based immunomagnetic separation and real-time PCR. 15;118(2):132-8 32. Pfannebecker, Jens. and Frohlich, Jurgen.。 2008。International Journal of Food Microbiology 。 33. Neil A. Campbell。1999。Biology。