Studies on antioxidant ability and functional components of Yam yoghurt

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ABSTRACT

Yam(Tainung No.2).was homogenized and filtrated to make yam juice and added milk by different ratios as raw materials for yoghurt making. The yam juice : milk mixture was inoculated with the mixed cultures of Lactobacilus acidophilus、Bifidobacterium longum、L.bulgaricus and Streptococcus thermophilus and incubated at37°C for 4-6hr and cooled for analysis. The physicochemical characteristics and sensory properties, antioxidant activity and the functional components were investigated. The results were showed in the follows: Curd tension, viscosity and acidity of yoghurt increased with increasing added amount of yam juice The properly added amount of the yam juice can improve the acceptability of yoghurt to the test panelists. The acidity, flavor of the products were also preferred by the test panelists.The functional components of yam yoghurt exo-polysaccharides, organic acid content of increased with increasing added amount of yam juice; however, polyphenol content was not increased remarkably. And the patterns of SDS-PAGE electrophoretogram of the protein of the yoghurt samples were not significant different from the control.Antioxidant activity of the yam yoghurts had higher free radical scavengering ability, but reducing power was not affected remarkably.

Keywords : yam、antioxidant activity、yoghurt

Table of Contents

REFERENCES

1.丁懷謙。2000。益生菌與腸胃功效。食品工業32 (10) :1-7。 2.方于甄。2009。利用花生乳開發機能性酸酪乳。大葉大學生物產業科技研究所碩士學位論文。 3.文野出版社。2005。食品檢驗分析技術士技能檢定完全寶典(乙丙級)。文野出版社。 4.王宗燦。2001。乳酸菌與人體健康。Taiwan Food News (183):93-96。 5.周儉。2002。保健食品。九洲圖書公司 台北 pp.113~117。 6.林?郁。2001。乳酸菌和雙叉乳桿菌益生特性之探討。中興大學畜產研究所碩士論文。台中市。 7.林俊義、盧煌勝、劉新裕。1998。山藥之生產與食譜。pp5-15。

台灣省農業試驗所。台中。 8.林慶文。1993。乳製品之特性與機能性。第51-58頁。長何出版社。 9.邱致穎。2002。熱處理對紫玉山藥的抗氧化性之影響。靜宜大學食品營養研究所碩士學位論文。 10.徐煇妃、黃鵬。1997。山藥的營養價值與食用法介紹。農業世界161:63-65。 11.高美丁、黃延君、張碧霞。2002。不同山藥品種山藥對脂質代謝之影響。保健植物產品開發與藥理機能性研討會。 12.陳惠添。2004。龍根菌於不同培養基中之生長和對酸與膽鹽之耐受性及其抗氧化活性。國立中興大學食品科學系碩士論文 13.陳智強。2004。培養條件對乳酸菌胞外多醣生產及抗氧化性之影響。台灣大學食品科技研究所碩士學位論文。 14.陳詩詩。2001。以免疫調節及細胞再生觀點探討山藥生物活性之研究。國立陽明大學生物藥學研究所碩士學位論文。臺北。 15.黃建榕。2002。添加各種膠質對牛乳酸酪乳品質及其理化特性之影響。中國畜牧學會會誌35(4):351~356。 16.黃堅。1998。太平經惠方中抗衰延壽方藥研究。貴陽中醫學院學報。20:7-8。 17.黃貴豪。1996。把新鮮、營養及保健的山藥帶回家-訪省農試所農藝系[山藥新品種台農二號]育種專家-劉新裕博士。豐年雜誌，46:10-11。 18.黃鵬。1997。常形山藥栽培管理。農業世界164:85-89。 19.楊雅露。2006。橋麥芽抗氧化及降血脂活性之研究。弘光科技大學生物科技研究所碩士論文。 20.廖啟成。1998。乳酸菌之分類及應用。食品工業。30(2): 1-10。 21.劉凱崴。2002。山藥酸乳酪之發酵技術與抗氧化性及抗致突變性之探討。國立台灣海洋大學食品科學系碩士學位論文。基隆。 22.劉新裕、林義恭、賴瑞聲、胡敏夫、高瑞隆、王昭月。2001。 日本山藥之發展現況。農業世界214:74-78。 23.劉新裕、張同吳、林義恭、王昭月。2000。優良保健植物山藥之開發與利用。行政院農業委員會農業試驗所編印。臺中。 24.劉新裕、盧煌勝、林俊義。2000。2000年山藥之生產與藥膳利用。pp6-21。台灣省農業試驗所。台中。 25.劉德賢。2009。加工條件對豆渣及大豆乳清的物化特性及機能性之影響。大葉大學生物產業科技研究所碩士學位論文。 26.潘子明。2004。機能性發酵食品乳酸菌製品。生技專題報導(23) :2-13。 27.蔡宛汝。2009。牛奶、乳清粉和乳糖對豆奶酸酪乳特性的影響。大葉大學生物產業科技研究所碩士學位論文。 28.蔡英傑。1998。乳酸菌與益生菌。生物產業。 29.盧訓、蔡金川、李世滄、高美丁。2002。山藥之預防保健-藥理及機能性評估。 30.鍾耀慶。2004。功能性食品。化學工業出版社。第343~369頁。北京。 31.龔財立、姜金龍。1993。身具潛力的作物-山藥栽培管理。豐年43:25-32。 32.AOAC. 1995. Cereal foods. In: Doris B, editor. Official methods of analysis of the association of official analytical chemists. 16th ed. Washington, D.C. 33.Bouzar, F.,J. Cerning and M. Desmazeaud. 1997. Exo-polysaccharide product- ion and texture-promoting abilities of mixed-strain starter culture in yoghurt production. J. Dairy Sci. 80: 2310-2317 34.Catherine A. Rice-Evans, Nicholas J. Miller and George Paganga. 1997. Antio- xidant properties of phenolic compounds.nutrition. Treds in Plant Sci. 2: 152-159. 35.Chang, S.J., Lee, Y.C., Liu, S.Y., Chan,T.W. Chinese yam Dioscorea alata cv. Tainung No.2 36.Collins, J.K., Thornton, G. and Sullivan. G.O. 1998. Selection of probiotic strains for human application. Int Dairy J. 8: 487-490. 37.De Vuyst L., Degeest B. 1999. Heteropolysaccharides from lactic acid bacteria. FEMS Microbiol Rev 23: 153-177. 38.Deeth, H. C. 1984. Yoghurt and cultured products. Aust. J.Dairy Technol. 39: 111-113. 39.Denter, J., and B. Bisping. 1994. Formation of B-vitamins by bacteria during the soaking process of soybeans for tempe fermentation. Int. J. Food Microbiol. 22:23-31. 40.Dibois, M., Gilles, K. A., Hamilton, J. K., Reber, P. A. and Smith F. 1956. Col- orimetric method for determineation of sugars and related substances. Analytic- al Chem. 28(3): 350-356. 41.Dinis, T.C.P., Madeira, V. M.C. and Almeida, L.M. 1994. Action of phenolic derivatives (acetaminophen, salicylate, and 5-amino salicylate) as inhibitors of membrane lipid peroxidation and as peroxyl radical scavengers. Arch. Biochem. Biophys. 315:161-169. 42.Duboc, P., and Mollet, B. 2001. Application of expolysaccharides in the dairy industry. International Dairy Journal, 11: 759-768. 43.Farombi E. O., Nwankwo J. O. & Emerole G.O. 1997. Possible modulatory effect of browned yam flour diet on chemically-induced t oxicity in the Rat. Food. Chem. Toxicol. 35: 975-979. 44.Gerster, H. 1996. Intermediate cancer biomarkers and their use in carotene studies in humans. Int. J. Vitam. Nutr. Res. 66:3-18. 45.Halliwell, B. and Gutteridge, J.M.C. 1989. Free radicals, ageing and disease. In “ Free Radicals in Biology and Medicine ” , Znd Ed. B. Halliwell, and J.M.C. Gutteridge, Chart. 8. p484-487. Clarendon Press,Oxford. 46.Halliwell, B., Murcia, M.A. Chirico, S. and Aruoma, O.I. 1995. Free radicals and antioxidants in food and in vivo : What they do and how they work. Crit. Rev. Food Sci. Nutr. 35:7-20 47.Harlow, E. and Lane, D. 1988. Antibodies. pp636-69, pp685. Cold Spring Har- bor Laboratory, New York, USA. 48.Hollenberg, M.D., 1994. Tyrosine kinase pathways and the regulation of smooth muscle contractility. Trends in Pharmacological Sciences 15: 108-114. 49.Homma, N. 1988. Bifidobacteria as a resistance factor in human beings. Bifid- obacteria Microflora 7(1): 35. 50.Hose, H. and T. Sozzi (1991) J. Chem. Technol. And Biotech. 51: 540-544. 51.Hsu, C.L., Weng, Y.M., Tseng, C.Y.2003. Chemical compostition,physical properties, and antioxidant activities of yam flours as affected bydifferent drying methods. Food Chemistry.83:85-92 52.Hu K., Dong A., Yao X.S., Kobayashi H., Iwasaki S. 1996. Antineoplastic agents. I. Three spirostanol glycosides from rhizomes of Dioscorea collettii var. hypoglauca. Planta Med 62: 573-575. 53.Hughes, D.B. and Hoover, D.G. 1991. Bifidobacteria: Their potential for use in American dairy products. Food Technology 45(4): 74-83. 54.Kneifel, W., jaros, D. and Erhard, F. 1993. Microflora and acidification propert- ies of yoghurt and yoghurt-related products fermented with commercial- ly available starter cultures. Int.J. Food Microbiol. 3:277-291. 55.Kroger, M. 1976. Quality of yoghurt. J. Dairy Sci.59: 344-350. 56.Labropoulos, A.E., Collins, W.F. and Stone, W. K. 1984. Effects of ultra-high temperature and vat processes on heat-induced rheological properties of yoghurt. J. Dairy Sci. 67:405-409. 57.Lindahl, T. 1993. Instability and decay of the primary structure of DNA. Nature 362:709-715. 58.Liu S.Y., Chang T.W., Wang J.Y., Shyu Y.T., Hu M.F. 1997. Production impr- oveement of yam variety Tainung No.2. J Agric Res China 46:249-261. 59.Liu S.Y., Wang J.Y., Shyu Y.T., Hu M.F., Yang H.R., Ho C.C. 1996. The developme- nt of yam new varity Tainung No. 2. J Agric Res. China 45: 260-284. 60.Liu S.Y., Wang J.Y., Shyu Y.T., Song L.M. 1995. Studies on yams (Dioscorea spp.) in Taiwan. J. Chin. Med. 6: 111-126. 61.Liu S.Y., Wang J.Y., Song L.M., Kao CC. 1993. Studies on the selection, culti- vation, and quality of yam (Dioscurea alata L.) line 7W04. J.Agric Res. China 42: 265-279. 62.Liu, S.Y., Wang, J.Y., Shyu, Y.T., Hu, M.F., Yang, H.R., Ho, C.C. 1996. The de- velopment of yam new varity Tainung No.2. J Agric Res China 45:260-284 63.Liu, S.Y., Wang, J.Y., Shyu, Y.T., Song, L.M. 1995. Studies on yams (Dioscorea spp.) in Taiwan. J Chin Med 6:111-126. 64.Liu, S.Y., Wang, J.Y., Song, L.M., Kao, C.C. 1993. Studies on selection, cultiv- ation, and quality of yam (Dioscurea alata L) line 7W04. J Agric Res

China 42:265-279. 65.Loft, S. and Poulsen, H.E. 1996. Cancer risk and oxidative DNA damage in man. J. Mol. 74:297-312. 66.Majamaa, H., Isolauri, E., Saxelin, M., and Vesikari, T. (1995). Lactic acid bacteria in the treatment of acute rotavirus gastroenteritis. J. Pediatric Gastroe- nterol. Nutr. 20, 333-338. 67.Marshall, V.M. 1996. Bioyogurt: How healthy? Dairy Industries International 61(1): 28-29. 68.Marsili, R.T., Ostapenko, H., Simmons, R. E. and Green. European Journal of Biochemistry. 216, 639-651 69.Mitsuoka, T. 1990. Bifidobacteria and their role in human health. J. Ind. Microbiol. 6: 263-268. 70.Moncada, S. and Higgs, A. 1993. The L-arginine-nitric oxide pathway. N. Engl. J. Med. 329:2002-2011. 71.Navder, K.P., Huang, R.S., Fryer, E.B. and Fryer, H.C. 1990. Effect of fermentation and storage on the concentration of orotic acid and uric acid in skim milk. J. Food Sci. 55:585-586. 72.Oyaizu, M. 1986. Studies on products of browning reaction: Antioxidative activity of products of browning reaction prepared from glucosamine. Jpn. J. Nutr. 44: 307-315. 73.Rybka, S. and Kalasapathy, K. 1995. The survival of culture bacteria in fresh and freeze-dried AB yoghurt. The Australian Journal of Dairy Technology 50(2): 51-57. 74.Schiffrin, E. J., Brassart, D., Servin, A.L., Rochat, F. and Donnet-Hughes, A. 1997. Immune modulation of blood leukocytes in humans by lactic acid bacteria: Criteria for strain seclection. Am. J. Clin. Nutr. 66:515-520. 75.Segnini S, Dejmek P, ?零te R. 1999. Reproducible texture analysis of potato chips. J Food Sci 64(2):309-312. 76.Shimada, K., Fujikawa, K., Yahara, K. and Nakamura, T. 1992. Antioxidative properties of xanthan on the autooxidation of soybean oil in cyclodextrin emulsion. J. Agric. Food Chem.40:945-948. 77.Simic, M.G. 1988. Mechanisms of inhibition of free-radical processes in mutagenesis and carcinogenesis. Muta. Res. 202:377-386. 78.Speck, M. L. 1984. Compendium of methods for the microbiological examinat- ion of food. pp.184-202. American Public Health Association. Washington, D.C.,U.S.A. 79.Stile, M. E., and W.H. Holzapfel. 1997. Lactic acid bacteria of foods and their current taxonomy. International Journal of Food Microbiology 36: 1-29. 80.Taga, M.S., miller, E.E. And Pratt D.E. 1984. Chia seeds as a source of natural lipid antioxidants. J. Am. Oli Chem. Soc. 61:928-931. 81.Tango, M.S.A. and A.E. Ghaly. 1999. Effect of temperature on lactic acid prod- uction from cheese whey using Lactobacillus helveticus under batch conditions. Biomass Bioenergy 16: 61-78. 82.Tripathi, A.K., Misra, V.K., Batish, and H. Chander. 2002. Perfermance of lacti cstarter cultures adapted to varied pH in Elliker ' s broth. Res. Article 55: 17-21. 83.Wanasundera JPD, Ravindran G. 1994. Nutritional assessment of yam (Diosc- orea alata) tubers. Plant Foods Hum Nutr 46:33-39. 84.Wang J.Y., Liu S.Y., Son L.M., Kao C.C. 1993. Genetic and agronomic variation among yam genotypes. J Agric Res China 42:280-291. 85.Wang, M.Y. and Liehr, J.G. 1995. Lipid hydroperoxide-induced endogenous DNA adduct in hamster: possible mechanism of lipid hydroperoxide-mediated carcinogenesis. Arch. Biochem. Biophys. 316:38-46.