胡蘿蔔於冷藏和冷凍乾燥後抗氧化物質及物理性質之相關分析

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ABSTRACT

ABSTRACT The process of foodstuff treatment was studied in this research. The processing and preservation method were used to evaluate the value changing of the antio- xidant (vitaminC , carotenoid) and physical property (electronical conductivity, color). The regression analysis was employing to figure out the relationship of antio- xidant and electronical conductivity and was demonstra- ted by electrical microscope result. Carrot was preserved at 25 ° C~27 ° C and cold store (0 ° C, 7 ° C) for one day. The result showed that moisture contents for the temperature 25 ° C~27 ° C, 0 ° C and 7 ° C were 81.03%, 83.28% and 86.33% which proved that the cold store treatment is better than the treatment under temperature 25 ° C~27 ° C. According to the result that showed vitamin C and caro- tenoid contents after the processing and preservation method decreased, however they didn ’ t change a lot and diminished while the time became longer. The initial elec- tronical conductivity of the fresh sample was 0.00325. After presserving for one day ，the electronical conduct- ivity decreased with the increasing time. The sample appearance at the temperature 25 ° C ~27 ° was evidently shrink and found out from the pictures from the electronic microscope. The food structure at cold stored were not destroyed clear. The cellural tissue that stored at 7 ° C was smaller than the sample that preserved at 0 ° C. As to the color result, the L value of carrot at the temperature 25 ° C~27 ° and cold store 0 ° C, the color became faint with the increasing time. A value was still red. B value from dark yellow turned to canary yellow. The sample dehydrate rate at freeze-dried was 85.87% and the rehydration rate reached 84.92% and the electronical conductivity increased tenfold. There weren ’ t any chan- ges for the vitamin C. The carotenoid changed a lot after the freeze- dried and rehydration. There weren ’ t any clear differences were showed for the L value, a value and b value during freeze-dried and rehydration. However, the carrot turned to red after the rehydration. Scanning elect- ronic micrograph during rehydration showed the cell-wall broken. The carotenoid content by using electronical conductivity and vitamin C was explored as the regression analysis got high value which meant both electronic conductivity with vitamin C and carotenoid contents have direct relation- ship. Key words: vitamin C, carotenoid, food structure, electr- onical constivity

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REFERENCES

參考文獻 1. 野村孝一、中溝公明、中島正利、?根康伸、松本清及?島豐 (1981) 。電導測定法?基礎?置?柑橘果汁中?糖含量測定法。日食工誌，28:381-386。 2. 木村 進 (1984) 乾燥食品事典。 3. 徐進財(1987) 冷凍食品學。復文書局。台南，台灣。pp．96-97。 4. 邱建人（1988）食品乾燥。復文書局。台南，台灣。pp．101-120。 5. 洪登村(1988) 蓮霧果實寒害乙烯生合成行為之研究，國立台灣大學園藝學研究所博士論文。 6. 劉金昌(1988) 果品的選購與貯藏，五洲出版社。p305-p329。 7. 農學社(1988) 果品貯藏與加工，武陵出版社。p2-p14。 8. 施益民、呂峰洲（1989）自由基與各種疾病。當代醫學。16：401-405。 9. 賴茲漢、金安兒、柯文慶（1992）食品加工學保藏篇。pp.329－337，pp.301－310。 10. 謝江漢、鍾克修(1992)園產處理與加工，地景企業股份有限公司出版，p32-p42。 11. 叢欣滋(1992) 輕度加工甘藍褐變之研究，國立台灣大學園藝 學研究所碩士論文。 12. 陳如茵(1993)台灣蔬菜的儲存。食品工業發展研究所，pp.7-8。 13. 鍾忠勇（1993）冷凍食品支原理與加工。食品工業發展研究所， pp．40-47。 14. 洪玉梅 (1994) 蜂王漿在儲存過程中物化性質的變化與品質分級之建立。大葉大學食品工程研究所碩士論文。 15. 劉富文(1995)園產品採後處理及貯藏技術，行政院農委會臺灣省政府農林廳，p1-p6。 16. 張為憲等(1997) 食品化學。國立編譯館，華香園出版社，pp.271。 17. 趙強營 (1997) 自由基與抗氧化物質。美食天下。64:p.116. 18. 錢明賽（1998）蔬果中之抗氧化物質。食品工業月刊，30（8）:24－26。 19. 陳惠英、顏國欽（1998）自由基、抗氧化防禦與人體健康。Nutr．Sci．J．23（1）：105-121。 20. 石正中(1999)溫度管理對新世紀哈蜜瓜耐低溫性之影響，中國園藝，46(1):73-82。 21. 黃博雅、林慧玲、謝慶昌、李國權(1999)蓮霧果實之寒害症狀與乙烯合成，興大園藝，24(1)1-11。 22. 王前輝 (2000) 發展電導法快速檢測奶品抗生素殘留量。中國文化大學應用化學研究所碩士論文。 23. 賴昭友(2000)調氣包裝之研究及其於草莓包裝之應用，碩士論文，國立台灣大學食品工業研究所。 24. 周慧娜，區少梅，倪正柱(2000)台灣獼猴桃果實貯藏期間成分變化之研究。中國園藝。46(2):157-172。 25. 李惠蓮（2001）省產青花菜之抗氧化性研究。碩士論文，大葉大學，彰化，台灣。pp.49－50. 26. 施嘉禾（2003）不同加工方式與乾燥方法對胡蘿蔔抗氧化性之影響。碩士論文，大葉大學，彰化，台灣。pp.4-5. 27. 林文?（2004）松葉之抗氧化性研究。碩士論文，大葉大學，彰化，台灣。pp．9。 28. Arouma, O.I. (1994) Natrition and health aspects of free radicals and antioxidants. Food Chem. Toxic. 32:671-683. 29. Astorg, P.(1997)Food carotenoids and cancer prevention: Anoverview of current research. Trends Food Sci. Technol.8(12):406-413. 30. Brown, R.H. and Perry, J.S. (1966) The electrical properties of apple and potatoes. Paper NO. 66-336. ASAE, St. Joseph. Mich. 31. Burton GW，In gold KU.1984. s-carotene: an unusual type of liquid antioxidant . Sci 224:569573. 32. Cancalon, P.F. and Bryan, C.R. (1993) Use of capillary electrophoresis for monitoring citrus juice composition. J. Chrom. A. 652:555-561. 33. Chen BH. 1992. Studies on the stability of carotenoids in garland chrysanthemum as affected by microwave and conventional heating. Food Proc 55:296300. 34. Dzledak，J.D.（1986）Antioxidants：the ultimate answer to oxidation．Food technol.40（9）：94-102. 35. Edge R, McGarvey DJ, Truscott TG. (1997) The carotenoids asanti-oxidants-a review. J Photochem Photobiol B: Biol 41:189-200. 36. Huber, D. J. 1992.The role of cell wall hydrolases in fruitsoftening. Hort. Rev. 5:169219. 37. Jacob，R，A.（1994）Nutrition，health and antioxidants：INFORM．5：1271-1275. 38. Klein, B. P. Perry, A.K. (1982) Ascorbic acid and vitamin A activity in selected vegetables from different geographical areas of the United States. J. Food Sci. 47: 941-945. 39. Koyama Y, Hosomi M, Miyata A Hashimoto H, Reames SA. 1988. Supplementary and revised assignment of the peaks of the 7,9-,9,9-,13,13-,9,13-dicis and 9,9’, 13tricis isomers of β-carotene in highper formances liquid chromatography using a column of calciu- m hydroxide. J Chromatogr 439:417422. 40. Larson, R. A. (1988) The antioxidants of higher plants . Phytochemistry. 27:969-978. 41. Latreille, B and Paquin, p. (1990) Evaluation of emulsion stability by centrifugation with conductivity measurements. J. Food Sci. 55:1666-1668,1672. 42. McNeal, B.L., Oster, J.D. and Hatcher, J.T. (1970) Calculation of electrical conductivity from solution composition data as an aid to in-situ estimation of soil salinity. soil salinity. Soil Sci. 110:405-414. 43. McCollum, T.G. and McDonald, R.E. (1991) Electrolyte leakage, respiration, and ethylene production as indices of chilling injury in grapefruit. Hort. Sci. 26:1191-1192. 44. Monotoya, M.M., De La Plaza, J.L. and Lopez-Rodriquez, V. (1994) Relationship between changes in electrical conductivity and ethylene production in avocado fruits. Lebensm-Wiss. U.-Technol. 27:482-486. 45. Morris, L. L. 1982.Chilling injury of horticultural crops: anoverview. Hort Science. 17:161162. 46. Namiki, M. (1990) Antioxidants/antimutagens in food. Crit. Rev.Food Sci. Nutr. 29:213-300. 47. Six, P. (1994) Current research in natural food

antioxidants.INFORM. 5(6): 679. 48. Simic，M.G.1988．M echanisms of inhibition of free-radical processes in mutageneisi and carcinogenesis．Mutat．Res．202：377-386． 49. Shahidi，F.Wanasundara，P．K．J．P．D.（1992）Phenolic antioxidants.Crit.Rev.Food.Sci.Nutr.32：67-75. 50. Stevenson, N.D. and Daniels, J. (1971) Screening methods for large clonal populations of sugar cane. Int. Sugar J. 73 (870) :163-166. 51. Taylor, J. E. 1993.Annona species. In:Seymour, G. B., Taylorand G. A. Tucker(eds). Biochemistry of fruit ripening.p166169. 52. Tee ES. 1992. Carotenoids and retinoids in human nutrition. Crit Rev Food Sci Nutr 31(1/2):103163. 53. Worrell, D. B., C.M.C. Carrington. And D. J. Huber. 1994.Growth, Maturation and ripening of soursop fruit. Sci.Hort.57(1):715. 54. Wang, W. C. and Sastry, S. K. (1997a) Starch gelatinization in ohmic heating. Journal of Food Engineering, 34:225-242. 55. Wang, W. C. and Sastry, S. K. (2002).Effect of moderate electrothe- rmal treatments on juice yield from cellular tissue. Innovative Food Science and Emerging Technologies., 3, 371-377. 56. Yang CM, Chang KW, Yin MH and Huang HM:Methods for determination of the chlorophylls and their derivatives. Taiwania 43:116-122, 1998.