

洛神花萃取物添加於米醋、米酒中色澤安定性之研究

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摘要

本研究將洛神花萃取物與蘿蔔紅色素分別添加於米醋及米酒中，並在室溫下進行室內外放置及UV照射下其色澤變化與安定性探討。由實驗結果得知，若含有4.0mg/mL洛神花萃取物之米醋及米酒之紅色色素(OD530)在儲存前14天內逐漸下降至穩定狀況，其色澤由原紅色澤易於轉變為米黃色澤；其L值(明亮度)較原液(米醋及米酒)為低，但隨著儲存時間而趨於穩定，但b值較原液為高，亦隨儲存時間而漸略增加至定值，但a值先行增高而後逐漸下降並趨於原液，E值(彩度)在儲存前7天內有逐漸增加趨勢，而後下降且趨於穩定。含有蘿蔔紅色素或其添加於含有洛神花萃取物之米醋(0.8mg/mL蘿蔔紅色素)及米酒(1.6mg/mL蘿蔔紅色素)的紅色色澤或L、a、b、E值在儲存前28天內幾乎毫無變化，並且呈現相當安定性；其L與E值較原液為低，但隨著儲存時間而趨於定值，但其a與b值較原液為高，亦隨儲存時間而趨於定值。由此可知，蘿蔔紅色素較洛神花萃取物更有助於米醋或米酒添加天然紅色色素之色澤安定性。

關鍵詞：洛神花萃取物；蘿蔔紅色素；米酒醋；色澤安定性

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1. 王俊民。2000。洛神花色素成分及其抗氧化活性之分析。私立中山醫學院生物化學研究所碩士論文。
2. 李秋菊。1996。本局有關米酒糟再利用之研究概況。製酒科技專論彙編。18:311-324。
3. 李宜娟。2003。洛神花多酚酸及花青素萃取物對含有突變粒線體DNA之人類腫瘤細胞生長之研究。
4. 吳鳴鈴。2001。甜酒釀及其相關食品之研發近況。食品工業。33(3):7-12。
5. 吳鳴鈴。2002。米酒、穀類酒製造之簡介。食品工業。33(1):8-13。
6. 施國琛。1997。色差分析之分析原理與應用。食品科學文摘。5(1):32-36。
7. 京華堂實業股份有限公司。2005。淺談食品著色劑。食品資訊。209:60。
8. 林俊宏。1999。果醋的產量。國立屏東科技大學食品科學系實務專討。
9. 邱紀良。1993。紫外光可見光光譜儀的組件—一個使用者的剖析。科儀新知。14(4):4-15
10. 段盛秀。1985。人工合成色素之淺介。食品工業。17(1):26-29。
11. 馬自超。龐業珍。1994。天然食用色素化學及生產工藝學。第1-56頁。中國林應出版社。
12. 許嘉彬。2005。台灣健康醋飲料市場與發展性概談。食品資訊。205:30。
13. 陳俊成。2002。食用天然色素。食品資訊。187:50-57。
14. 陳淑芳。2004。酒類。食品產業年鑑。85-92。
15. 劉益善、倪德銓、黃季芳。1981。米酒製造改進法之研究。酒試所研究年報。3:72-79。
16. 劉益善。1993。中國傳統酒精飲料製造技術之特性。製酒科技專論彙編。公賣局專刊。15:71-91。
17. 劉桂郁。1997。中國米類酒之釀造。食品工業。29(9):26-32。
18. 範龔健、韓永斌、顧振新、朱洪梅、劉曉駿、王正康。2006。江蘇農業學報。2。
19. Ali BH, Mousa HM, El-Mougy S. 2003. The effect of a water extract and anthocyanins of hibiscus sabdariffa L on paracetamol-induced hepatotoxicity in rats. Phytother. Res. 17:56-59.
20. Adegunloye BJ, Omoniyi JO, Owolabi OA, Ajagbonna OP, Sofola OA, Coker HA. 1996. Mechanisms of the blood pressure lowering

effect of the calyx extract of *Hibiscus sabdariffa* in rats. *Afr. J. Med. Med. Sci.* 25: 235-238. 21. Chen Chang-Che, Hsu Jeng-Dong, Wang San-Fa, Chiang Huei-Ching, Yang Mon-Yuan, Kao Erl-Shyh, Ho Yung-Chyan and Wang Chau-Jong. 2003. *Hibiscus sabdariffa* extract inhibits the development of atherosclerosis in cholesterol-fed rabbits. *J. Agric. Food Chem.* 51:5472-5477. 22. Chen Chang-Che, Chou Fen-Pi, Ho Yung-Chyan, Lin Wea-Lung, Wang Chin-Pin Erl-Shyh, Huang An-Chung and Wang Chau-Jong. 2004. Inhibitory effects of *Hibiscus Sabdariffa* L. extract on low – density lipoprotein oxidation and anti-hyperlipidemia in fructose-fed and cholesterol-fed rats. *J. Sci. Food Agric.* 84:1989-1996. 23. Chang Yun-Ching, Huang Hui-Pei, Hsu Jeng Ding, Yang Shun-Fa and Wang Chau-Jong. 2004. *Hibiscus* anthocyanins rich extract-induced apoptotic cell death in human promyelocytic leukemia cells *Toxicol Appl Pharmacol.* In press. 24. Chewonarin T, Kinouchi T, Kataoka K, Arimochi H, Kuwahara T, Vinitketkumnuen U, Ohnishi Y. 1999. Effect of roselle (*Hibiscus sabdariffa* Linn.) a Thai medicinal plant on the mutagenicity of various known mutagens in *Salmonella typhimurium* and on formation of aberrant crypt foci induced by the colon carcinogens azoxymethane and 2-amino-1-methyl-6-phenylimidazo (4,5-b) pyridine in F344 rats. *Food Chem. Toxicol.* 37:591-601. 25. Haji Faraji M, Haji Tarkhani A. 1999. The effect of sour tea (*Hibiscus sabdariffa*) on essential hypertension. *J. Ethnopharmacol.* 64:231-236. 26. Ho CT. 1992. Phenolic compounds in food: an overview *Am. J. Chem. Soc.* 27. Hirose Y, Tanaka T, Kawamori T, Ohnishi M, Makita H, Mori H, Satoh K, Hara A. 1995. Chemoprevention of urinary bladder carcinogenesis by the natural phenolic compound protocatechuic acid in rats. *Cancer Res.* 55:2337-2342. 28. Kathleen Mahan L., Sylvia Escott-Stump. 2000. *Food, Nutrition, and Diet Therapy.* W.B. Saunders company. 29. Kawamori T, Tanaka T, Kojima T, Suzui M, Ohnishi M, Mori H. 1994. Suppression of azoxymethane-induced rat colon aberrant crypt foci by dietary protocatechuic acid. *Jpn. J. Cancer Res.* 85:691-696. 30. Lin Wea-Long, Hsieh Yu-Jin, Chou Fen-Pi, Wang Chau-Jong and Tseng Tsui-Hwa . 2003. *Hibiscus* protocatechuic acid inhibits lipopolysaccharide-induced rat hepatic damage *Arch. Toxicol.* 77:42-47. 31. Lin Hui-Hsuan, Huang Hui-Pei, Huang Chi-Chou, Chen Jing-Hsien, and Wang Chau-Jong. 2004. *Hibiscus* polyphenol-rich extract induces apoptosis in human gastric carcinoma cells via p53 phosphorylation and p38 APK/FasL cascade pathway. *Mol. Carcinogenesis.* In press. 32. Lee Miao-Jane, Chou Fen-Pi, Tseng Tsui-Hwa, Hsieh Ming-Hsun, Lin Ming-Cheng, Wang Chau-Jong. 2002. *Hibiscus* protocatechuic acid or esculetin can inhibit oxidative LDL induced by either copper ion or nitric oxide donor. *J. Agric. Fd. Chem.* 50:2130-2136. 33. Newmark HL. 1992. Plant phenolic compound as inhibitors of mutagenesis and carcinogenesis. 48-52. *Am. Chem. Soc.* 34. Tseng Tsui-Hwa, Kao Ta-Wei, Chu Chia-Yih, Chou Fen-Pi, and Wang Chau-Jong . 2000. Induction of apoptosis by *hibiscus* protocatechuic acid in human leukemia cells via reduction of RB phosphorylation and BCL2 expression. *Biochem. Pharmacol.* 60:307-315. 35. Tseng TH, Kao ES, Chu CY, Chou FP, Lin Wu HW, Wang CJ. Protective effects of dried flower extracts of *Hibiscus sabdariffa* L. against oxidative stress in rat primary hepatocytes. 1997. *Food Chem. Toxicol.* 35:1159-1164. 36. Tseng TH, Wang CJ, Kao ES, Chu HY. 1996. *Hibiscus* protocatechuic acid protects against oxidative damage induced by tert-butyl hydroperoxide in rat primary hepatocytes. 1996. *Chem. Biol. Interact.* 101:137-148. 37. Tseng TH, Hsu JD, Lo MH, Chu CY, Chou FP, Huang CL, Wang CJ. 1998. Inhibitory effect of *Hibiscus* protocatechuic acid on tumor promotion in mouse skin. *Cancer Lett.* 126:199-207. 38. Tanaka T, Kawamori T, Ohnishi M, Okamoto K, Mori H, Hara A. 1993. Chemoprevention of diethylnitrosamine-induced hepatocarcinogenesis by a simple phenolic acid , protocatechuic acid in rats. *Cancer Res.* 53:2775-2779. 39. Tanaka T., Kawamori T., et al. 1994. Chemoprevention of 4-nitroquinoline-oxide-induced oral carcinogenesis by dietary protocatechuic acid during Initiation and post-initiation phase. *Cancer Res.* 54:2359-2365. 40. Tseng Tsui-Hwa, Wang Chau-Jong, Kao Erl-Shyh and Chia Chu Yih. 1996. *Hibiscus* protocatechuic acid protects against oxidative damage induced by tert-butylhydroperoxide in rat primary hepatocytes. *Chem-Biol Interact.* 101:137-148. 41. Tanaka T, Kojima T, Kawamori T, Mori H. 1995. Chemoprevention of digestive organs carcinogenesis by natural product protocatechuic acid. *Cancer.* 75:1433-1439. 42. Wang Chau-Jong, Wang Jin-Ming, Lin Wea-Lung, Chu Chia-Yih, Chou Fen-Pi, and Tseng Tsui-Hwa. 2000. Protective effect of *Hibiscus* anthocyanins against tert-butylhydroperoxide-induced hepatic toxicity in rats. *Fd. Chem. Toxicol.* 38:411-416. 43. Wang CJ, Wang JM, Lin WL, Chu CY, Chou FP, Tseng TH. 2000. Protective effect of *Hibiscus* anthocyanins against tert-butyl hydroperoxide-induced hepatic toxicity in rats. *Food Chem. Toxicol.* 38:411-416.