SNIF-NMR 法檢定醋酸分子之(D/H)CH3及應用於米醋攙合之鑑定

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摘 要

食醋為亞洲地區常見的生活調味品之一，但市場中常見添加廉價合成醋酸及糖蜜酒精醋於釀造食醋中而宣稱為純釀食醋之製品，本研究之目的在於評估 SNIF-NMR 法 (site-specific natural isotopic fractionation by nuclear magnetic resonance) 應用於米醋攙合鑑定的潛力與可行性。實驗分兩部分，首先以萃取-蒸餾法提升醋酸濃度並利用直交實驗設計法找出最佳萃取條件，再探討萃取劑與樣品濃度對檢測所得 (D/H)CH3 參數的影響；其次則利用 SNIF-NMR 法實際鑑定米醋是否攙合有合成醋酸或糖蜜酒精醋。所得結果如下。 以直交實驗設計法所找出醋酸萃取的最佳條件為樣品：萃取劑 = 1 : 1 (v/v)、萃取次數為 7 次、每次萃取時間 15 分鐘。在最佳條件下以乙酸乙酯與乙醚為溶劑之醋酸萃取率分別為 93.65% 與 80.57%，萃取液經蒸餾後樣品中的醋酸濃度可由原來之 5 g/100 mL 提升至 33.84 與 51.65 g/100 mL。萃取劑本身對 (D/H)CH3 雖無顯著影響，但當醋酸濃度低時，所得參數結果則有顯著差異，顯示樣品的醋酸濃度為影響 (DH)CH3 值的主要因素，而濃度在 50 g/100 mL 以上為必要條件。 以 SNIF-NMR 檢測醋酸濃度均調整至同為 50 g/100 mL 之自製米醋、糖蜜酒精醋及合成醋酸時，(D/H)CH3 參數值分別為 98.45~98.62 (三種米醋幾乎等值)、108.46 與 131.58 ppm，此參數會因原料種類不同而有顯著差異 ($p < 0.05$)，米醋攙合糖蜜酒精醋及合成醋酸之模組試驗顯示，(D/H)CH3 值隨著攙合物添加量的增加而上升，且呈現良好線性關係 (R2 均大於 0.97)，顯示 SNIF-NMR 為一有效鑑定純米釀造醋的方法。

關鍵詞 : 萃取-蒸餾、米醋、攙合、SNIF-NMR

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