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Development of a column switching LC with electrochemical detection system for determining phenylethanoid glycosides from Magnoliae officinalis cortex

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[Introduction] Magnoliae officinalis cortex (MOC) is the dried stem bark of *Magnolia officinalis* Rehd. et Wils. and its variation *M. officinalis* Rehd. et Wils. var. *biloba* Rehd. et Wils. Recently, phenylethanoid glycosides (PhGs) were found to be existed in MOC. In addition, total PhGs were shown to have the evident efficacy in the model of gastrointestinal dysfunction, which may reveal the material foundation relevant to its traditional medical function (data not published). Although an LC with electrochemical detection (LC-ECD) would be a sensitive and specific method to evaluate the quality of MOC based on the content of PhGs, the determination of PhGs under isocratic elution conditions takes time due to their wide-range of hydrophobicity. To shorten the measurement time in LC-ECD analysis, a novel two-channel column switching LC-ECD system (2LC-ECD) is developed to determine six active PhGs from MOC samples. **[Methods]** A 2LC-ECD system consisting of two isocratic elution flow channels $_{1\text{-}2}$, one switching valve, one C_{30} column and two detectors $_{1\text{-}2}$ was established to determine the six magnolosides A, B, D, E, F and L. The ratios of 12:88:0.6 and 20:80:0.6 of acetonitrile-water-formic acid mixtures were used as the mobile phases in channels$_1$ and $_2$, respectively. **[Results and Discussion]** Using isocratic LC-ECD without a switching valve, the elution of PhGs required a 480 min analysis. Through alternately rotating switching valve at 60 min to change the elution flow way in 2LC-ECD, magnolosides A, F and L, and ethyl gallate (IS_1) were detected in detector$_1$ at +0.8 V, while magnolosides B, D and E, and hyperoside (IS_2) were detected in detector$_2$ at +0.8 V within 85 min. Resolutions between the peaks of PhGs and their close peaks from MOC sample were more than 1.3. The detection limits of PhGs were less than 60 nM. Therefore, the present 2LC-ECD has sufficient specificity and sensitivity for determining PhGs from MOC samples.