

HPLC-ESI-MS와 HPLC-DAD에 의한 배추 품종들의 Flavonoid 분석

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Analysis of flavonoid content in varieties of Chinese cabbage using HPLC-ESI-MS and HPLC-DAD

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Objectives

The purpose of this study was to identify the major flavonol conjugates and quantify the flavonoids (aglycones) from several Chinese cabbage varieties using high-performance liquid chromatography coupled with online electrospray ionization mass spectrometry (HPLC-DAD/ESI-MSⁿ). Recently, the National Academy of Agricultural Science, Republic of Korea, developed Chinese cabbage that was genetically modified to tolerate glufosinate. Thus, the flavonoid content of Chinese cabbage was compared to that from a transgenic Chinese cabbage containing the *bar* gene (TS22 line) for determination of the degree of substantial equivalence.

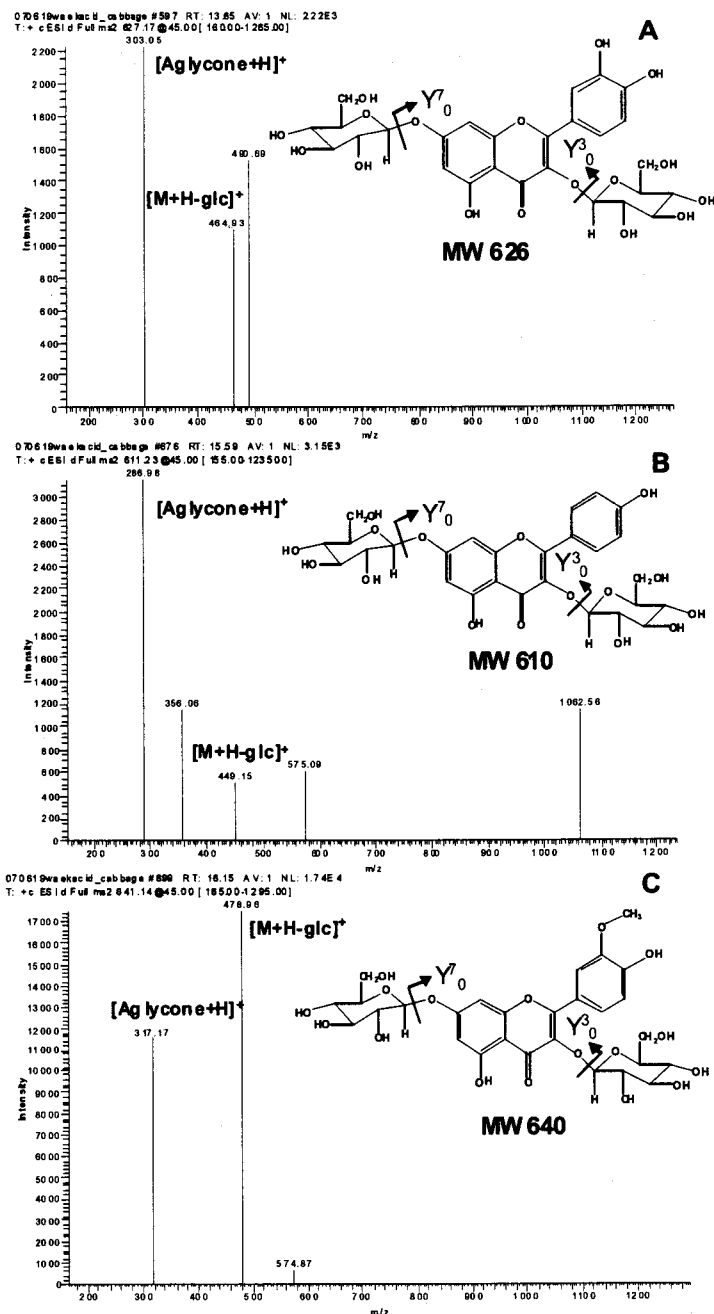
Materials and Methods

- Materials: Non-genetically modified (GM) crop (24 cultivar of Chinese cabbage) and GM crop (Chinese cabbage containing the *bar* gene)
- Sampling: The youngest leaves after 60 days
- Plant extraction: Acid hydrolysis
- Flavonoid analysis: LC/MS and HPLC-DAD analysis

Results

Three major flavonol conjugates, quercetin-3,7-di-*O*-glucoside, kaempferol-3,7-di-*O*-glucoside, and isorhamnetin-3,7-di-*O*-glucoside, were identified by the positive m/z values $[M+H]^+$ of the detected molecular masses and main fragments MSⁿ of the identified compounds and their occurrence in the Chinese cabbage leaves. The HPLC analysis of Chinese cabbage extracts results in a complex chromatogram before acid hydrolysis due to the presence of several flavonoid glycosides that are difficult to quantify. The simplified profile of the chromatogram

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after acid hydrolysis offers a way to quantify individual flavonoid aglycones. Luteolin (15.8–145.4 mg/kg), quercetin (11.9–92.8 mg/kg), and kaempferol (10.7–770.2 mg/kg) were found in 24 varieties. Furthermore, the flavonoid content of Chinese cabbage that had been genetically modified to tolerate glufosinate fell within the range of values detected for several traditional Chinese cabbage varieties.

Fig. 1. MS/MS product ion spectra generated in positive ion mode. Products of m/z 627, Quercetin-3,7-di-*O*-glucoside (A); products of m/z 611, kaempferol-3,7-di-*O*-glucoside (B); products of m/z 641, isorhamnetin-3,7-di-*O*-glucoside (C) extracted from Chinese cabbage leaf.