Analysis of Quercetin and Kaempferol in Gingko Extract and Tablets (*Gingko Bilboba*) by HPLC

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The extract of *Gingko biloba* contains bilobaloides, ginkoloides and other glucosides of flavones, for example, quercetin, isoquercetin, kaempferol, luteolin and sitosterole glucosides. The extract increases blood circulation and energy metabolism of the brain. It also increases the blood sugar and shows some vasodilatory effects. The ginko extract or tablets are used in treating blood circulation problems of the brain, arms and legs.

Figure 1 shows the separation of quercetin and kaempferol in the extract and tablets of *Gingko biloba* using gradient analysis on a reversed phase column and UV detection. The autosampler temperature was set to 4 ºC to avoid decomposition of the samples.

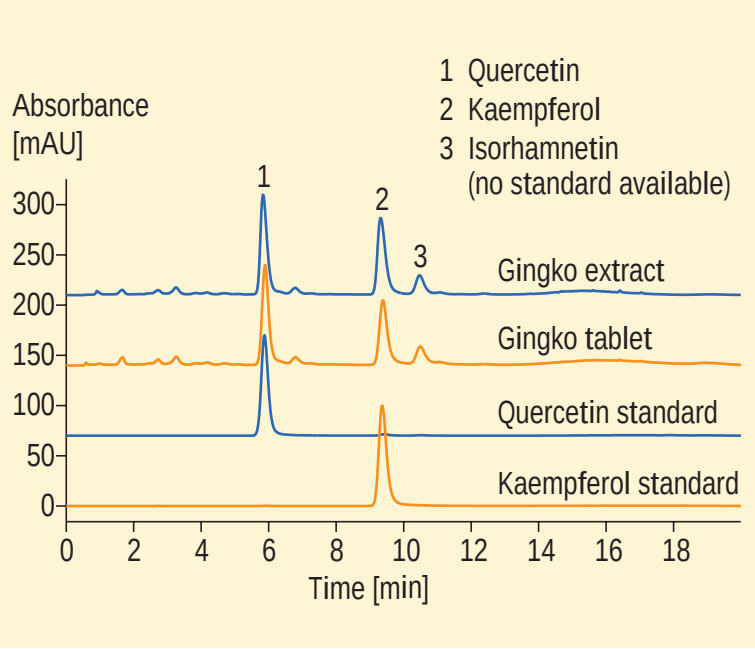

Figure 1
Analysis of quercetin and kaempferol

Conditions

Column
4 x 125 mm Hypersil ODS, 5 µm
Mobile phase
A = 0.5 % H_3P0_4 in water,
B = methanol
Flow rate
2.0 ml/min
Gradient
at 0 min 38 % B
at 12 min 48 % B
Column wash
at 17 min 100 % B
at 20 min 38 % B
UV detector
variable wavelength detector
370 nm, standard cell
Column compartment temperature
25 °C
Stop time
20 min
Post time 5 min
Injection volume 10 µl

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Extraction

4 g of *Gingko biloba* extract (from *Caesar & Loretz GmbH, Germany*) were refluxed for 30 min in 70 ml methanol and 10 ml 25 % HCl. After cooling to room temperature the mixture was filtered and the filter washed with approximately 100 ml methanol. The solvent was partly removed *i. vac.* and diluted with methanol to 100 ml in a volumetric flask. 5 ml of this solution were filtered through a C18 disposable cartridge. The cartridge was washed with 4 ml methanol and the filtrate diluted to 10 ml in a volumetric flask. The same procedure was used to extract 10 gingko tablets ('Promod Gingko biloba L.', 40 mg *Gingko biloba* extract per tablet, *Sine Laboratories', Shanghai, China*)

Method and extraction from:
A. Hasler, O. Stichler, *J. Chromatogr. 508* (1990), 236-240

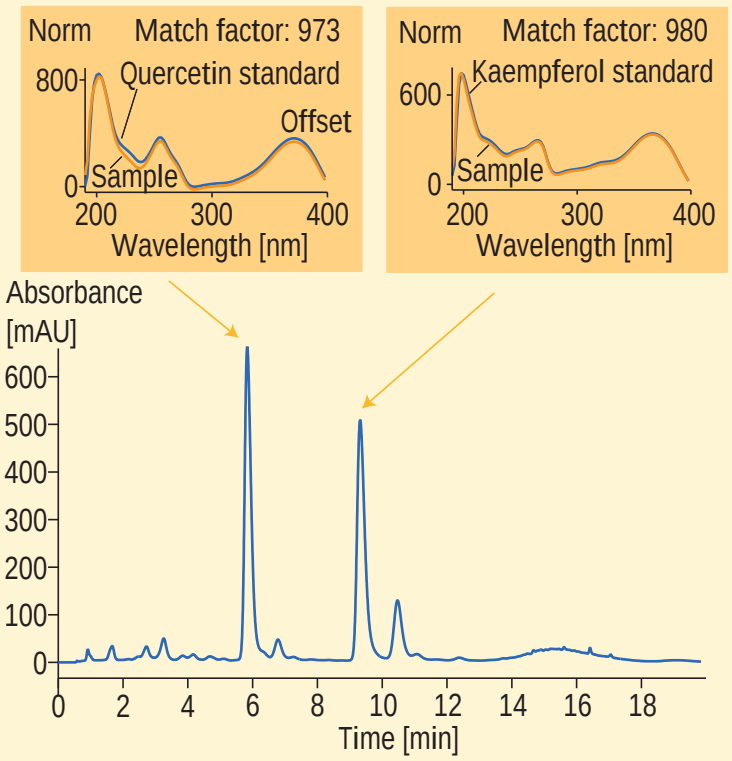

Figure 2
Comparison of sample and standard spectra

The HPLC method presented shows an easy but reliable and precise analysis of quercetin and kaempferol in the extract and tablets of *Ginko biloba*.

Equipment

Agilent 1100 Series

- Quaternary pump (includes vacuum degasser)
- Thermostatted autosampler
- Thermostatted column compartment
- Variable wavelength detector, standard flow cell 10-mm path length, 13-µl cell volume

Alternative:

- Binary pump
- Vacuum degasser
- Diode array detector standard flow cell 10-mm path length, 13-µl cell volume
- Agilent ChemStation + 3D software

Columns

- Hypersil ODS, 5 µm, 4 x 125 mm (Agilent part number 7992618-564)
- *Recommended:* Guard cartridges Hypersil ODS, 5 µm, 4 x 4 mm (Agilent part number 7992618-504, 10/pk)

Note:
Since the method was specifically developed on the Agilent 1100 Series system you might not be able to reproduce this analysis on an older system or even on a new system with lower performance. To avoid sample decomposition it is necessary to use a cooled autosampler, for example, the Agilent 1100 Series thermostatted autosampler.

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