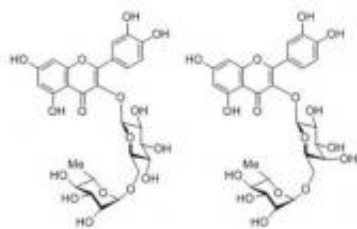


Spot the chemical difference

June 27 2012, By Geoffrey Kite and Nigel Veitch



Spot the difference: a subtle difference in structure makes these flavonoid glycosides difficult to tell apart.

(Phys.org) -- Scientists at Kew have devised a method to distinguish similar flavonoids when chemically profiling plant extracts.

Flavonoids are ubiquitous [chemical](#) constituents of plants. Their potential health-promoting properties have received much publicity, and they continue to be the subject of numerous studies in [human nutrition](#). Key to understanding the potential human benefits of flavonoids is the ability to analyze and identify them in plant extracts.

Traditionally, the chemicals in plant extracts are identified by purifying each individual component and then determining its structure, usually by [nuclear magnetic resonance spectroscopy](#) (NMR). This is time consuming, so for many common plant constituents alternative methods have been devised to identify them within the mixture of compounds

present in a plant extract, thus eliminating the need for purification.

The technology for analyzing mixtures of compounds has advanced tremendously over the past 20 years. One of the most important techniques to emerge in this research area is liquid chromatography-mass spectrometry (LC-MS).

Analyzing flavonoids by LC-MS

Our ability to analyze mixtures of flavonoids by LC-MS is more established than for most other classes of compounds found in plants. Nevertheless, relatively few flavonoids can be identified completely by LC-MS at present, and it is likely that novel or particularly complex flavonoids will always need to be isolated to determine their structures. Particularly problematic are [flavonoids](#) with sugars attached – the so-called flavonoid glycosides.

Although flavonoid glycosides are very common in plants, attempts to identify even relatively straightforward examples in mixtures have been frustrated by the very minor structural differences in the sugar part of the molecules; the two ‘simple’ flavonoid glycosides pictured above differ only in the orientation of one hydroxyl (OH) group. Tired of this bottleneck in flavonoid analyzes, scientists at Kew have now come up with a new method to identify some of the common flavonoid glycosides using LC-MS.

Kew scientists turn established methods around

Established LC-MS methods for flavonoid glycoside analysis can be used to identify the flavonoid part of the molecule by obtaining a diagnostic mass spectral fingerprint of this part. Up to now these methods did not routinely obtain a fingerprint of the sugar part alone,

and so the two flavonoid glycosides pictured above would not be distinguished.

The Kew scientists managed to turn the established LC-MS methods around and obtain a mass spectral fingerprint of the sugar part alone and no fingerprint of the flavonoid part. Surprisingly they found that the fingerprints of the sugar parts differed, even where their structures were similar. Thus, combining the established and new methods, common flavonoid glycosides could be identified in [mixtures](#) with confidence.

Researchers at Kew can now employ these methods when chemically profiling [plant extracts](#) to correctly identify traded herbal material and in their search for new uses for plants.

More information: Kite, G. C. & Veitch, N. C. (2011). Identification of common glycosyl groups of flavonoid O-glycosides by serial mass spectrometry of sodiated species. *Rapid Communications in Mass Spectrometry* 25: 2579-2590.

Provided by Royal Botanic Gardens, Kew

Citation: Spot the chemical difference (2012, June 27) retrieved 25 April 2024 from <https://phys.org/news/2012-06-chemical-difference.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.