Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

DETERMINATION OF FURANOCOUMARINS IN FRUIT JUICE

BACKGROUND

Scientific observations have revealed evidence that compounds in several common varieties of grapefruit juice impact the oral bioavailability of some prescription drugs. For example, the furanocoumarin bergamottin and the related compound 6,7-dihydroxybergamottin have been shown to inhibit intestinal CYP3A4, a phenomenon termed "the grapefruit juice effect." Studies have linked this inhibition primarily to fouranocoumains, the majority of which are analogues of bergamottin, 6'-7'-dihydroxybergamottin and 6'-7'-epoxybergamotting, including several dimmers of these compounds.

This report will describe the use of HPLC-UV identify furanocoumarins in grapefruit juice samples. Separations were performed utilizing XBridge™ Shield RP18 and XBridge C_8 columns.

EXPERIMENTAL CONDITIONS

Samples

The juice samples were obtained from white grapefruit. Samples were centrifuged and the furanocoumarins then extracted into ethyl acetate.

Chromatographic Conditions

Columns: XBridge Shield RP18, 4.6 x 150 mm, 5 µm
Part Number 186003009

XBridge C_8, 4.6 x 150 mm, 5 µm
Part Number 186003017

Mobile Phase A: 2% Acetic acid

Mobile Phase B: Acetonitrile

Gradient:

Time	Profile	
(min)	%A	%B
0.0	90	10
15.0	80	20
20.0	75	25
30.0	60	40
55.0	30	70
67.0	5	95
80.0	5	95
85.0	90	10
95.0	90	10

Flow Rate: 0.75 mL/min

Injection: 20 µL

Temperature: Ambient

Detection: UV @ 310nm

System: Waters Alliance® 2695 with a 996 PDA detector

RESULTS AND DISCUSSION

Figure 1 illustrates the reversed-phase HPLC chromatograms of furanocoumarins utilizing both the XBridge Shield RP18 and XBridge C_8. The early portions of the chromatograms consist primarily of flavonoids, hydroxycinnamates and their related compounds. The later portions of the chromatorams are dominated by furanocoumarins which demonstrate a distinctive UV spectra with sharp adsorption wavelength maxima near 310 nm and are easily detected using PDA analysis.

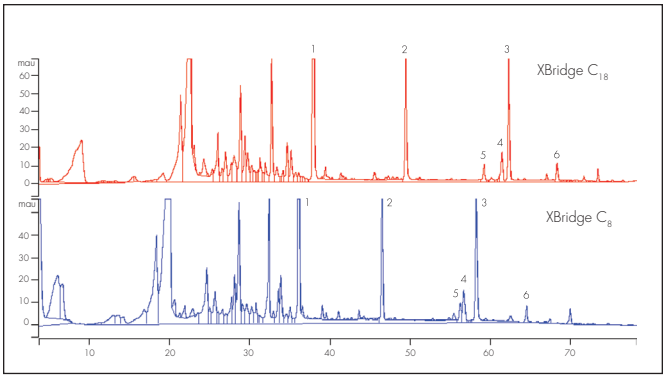

Figure 1. HPLC chromatograms of furanocoumarins in grapefruit juice

Compounds: (1) 6,7-dihydroxybergomottin; (2) 6',7'-epoxybergamottin; (3) bergamottin; (4) furanocoumarin dimer; (5) 7-geranyloxycoumarin; (6) furancoumarin dimer

CONCLUSION

A limiting factor in the analysis of the function of specific compounds in the grapefruit-drug interaction phenomenon ("the grapefruit juice effect") is the low level at which many of the active furanocoumarins occur and the ability to accurately identify them. In this study, HPLC analysis utilizing XBridge Shield RP18 and XBridge C_8 columns accurately identified these compounds of interest in a grapefruit juice extract.

REFERENCES

Chromatograms courtesy of tUSDA, Agricultural Research Service.

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

Waters, The Science of What's Possible, XBridge and Alliance are trademarks of Waters Corporation. All other trademarks are acknowledged.

©2008 Waters Corporation. Printed in the U.S.A.
April 2008 WA60198 VW-PDF

Waters Corporation
34 Maple Street
Milford, MA 01757 U.S.A.
T: 1 508 478 2000
F: 1 508 872 1990
www.waters.com