

Waters

# Lab Highlights

LAH 0228 3/85  
AN/FA/MD/CH/SG

## RADIAL COMPRESSION

### "THANKS FOR MAKING A GOOD PRODUCT"

Carla Clayton just received a reprint she recently requested of an article entitled, "Sugar Determination in Foods with a Radially Compressed High Performance Liquid Chromatography Column" (1).

Attached to the reprint was the following handwritten note from Martin G. Ondrus, the principal author:

8/20/84

"Enclosed is the reprint you requested. If given the chance to rewrite this paper, I would certainly make a few changes. However, the overall procedure has worked well for us for the 3 1/2 years that we have had our Waters HPLC.

"Silica Radial-PAK<sup>TM</sup> cartridges (no longer called Radial-PAK B) last unbelievably long when used intermittently as in a student laboratory course.

"I've been surprised by the large number of reprint requests from all over the world. Thanks for making a good product!"

M.G.O.

Some of the separations they used are shown below.

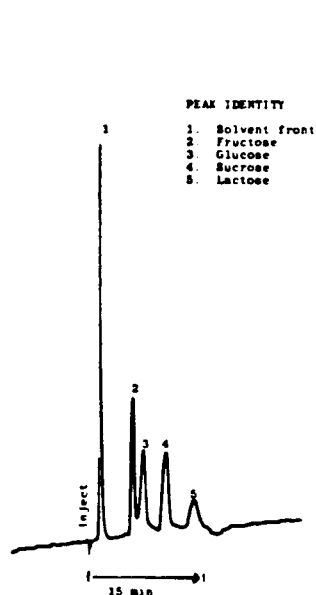


Figure 1. Separation of Standard Carbohydrate Mixture. Injection Volume, 10  $\mu$ L; Mobile Phase, 76%  $\text{CH}_3\text{CN}-\text{H}_2\text{O}$  v/v (0.02% TEPA, pH = 9.0); Flow Rate, 2.0 ml/min; Detector Attenuation, 8X.

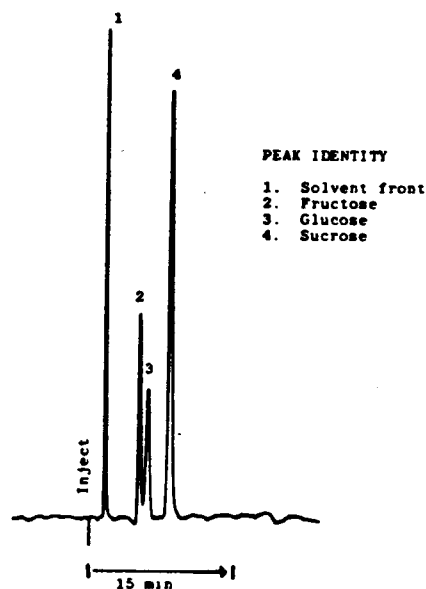


Figure 2. Separation of Carbohydrates in Coca Cola<sup>®</sup>. Injection Volume, 2.5  $\mu$ L; Mobile Phase, 76%  $\text{CH}_3\text{CN}-\text{H}_2\text{O}$  v/v (0.02% TEPA, pH = 9.0); Flow Rate, 2.0 ml/min; Detector Attenuation, 8X.

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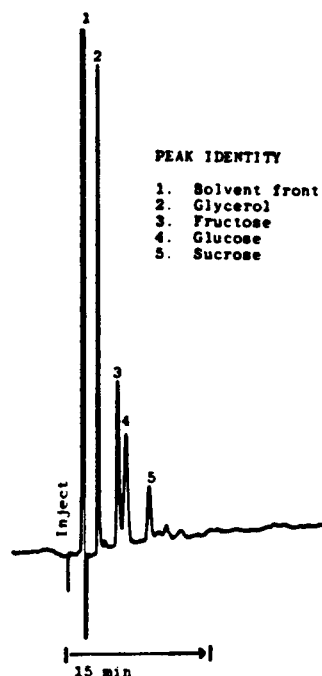


Figure 3 Separation of Carbohydrates in Burgundy Wine. Injection Volume, 10  $\mu$ L; Mobile Phase, 76%  $\text{CH}_3\text{CN}-\text{H}_2\text{O}$  v/v (0.02% TEPA, pH = 9.0); Flow Rate, 2.0 ml/min; Detector Attenuation, 8X.

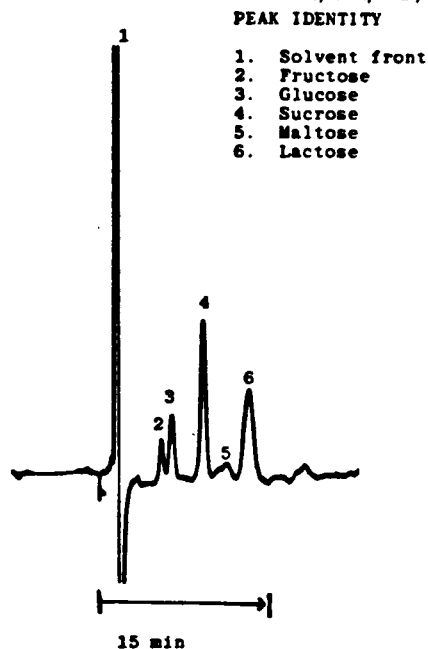


Figure 4 Separation of Carbohydrates in Ice Milk. Injection Volume, 10  $\mu$ L; Mobile Phase, 76%  $\text{CH}_3\text{CN}-\text{H}_2\text{O}$  v/v (0.02% TEPA, pH = 9.0); Flow Rate, 2.0 ml/min; Detector Attenuation, 8X.

A mobile phase composition of 75% acetonitrile/25% water, v/v was generally satisfactory but occasionally required slight adjustments. Resolution and retention times increased with increasing acetonitrile concentration. Impurities in injected samples reduced resolution (after several weeks of constant use) due to column contamination. To a great degree this was overcome by appropriately increasing the acetonitrile concentration up to a maximum of about 85%. The amine modified column described in this experiment can be regenerated somewhat by reversing the column and treating with 0.1% TEPA (tetraethylenepentamine) as in the initial pretreatment step (see Ref. 1).

Results on real products are shown below.

Perhaps it is worthy to note that the initial development of a tentative method for the use of TEPA for sugar analysis using the RCM-100 was initiated in Waters Applications Laboratories by U. Neue and W. R. Day.

Student Determined Sugar Percentages in Selected Food Products

Food Products	Fructose (%)	Glucose (%)	Sucrose (%)	Lactose (%)	Total (%)
<b>Soft Drinks</b>					
Sprite®	4.4	4.4	1.5	0.0	10.3
Rondo®	9.0	6.1	0.0	0.0	15.1
Coke®	2.5	2.8	7.6	0.0	12.9
<b>Wines</b>					
Chateau LaSalle®	6.4	5.6	0.0	0.0	12.0
Lambrusco®	3.5	3.2			6.7
Rhine	1.1	0.8	0.1	0.0	2.0
<b>Juices</b>					
Apple Juice (unsweetened)	7.4	3.0	0.0	0.0	10.4
Grapefruit Juice (unsweetened)	3.0	2.6	1.3	0.0	6.9
<b>Ice Milk</b>	1.5	3.2	7.0	12.0	23.7
<b>Cereal</b>					
Sugar Frosted Flakes®	2.0	1.0	41.0	0.0	44.0
Lucky Charms®	0.0	5.0	36.0	0.0	41.0
Sugar Smacks®	1.0	13.0	42.0	0.0	56.0
Cheerios®	0.0	0.0	5.0	0.0	5.0