HPLC application note

Sugars and Alcohol in Food and Beverages

'...the resultant derivatives are very stable and highly fluorescent, offering assay sensitivity in the fmol range...'

Keywords:
Ethanol, Fructose, Glucose, Sucrose, Beer, Coca-Cola™, Honey, Liqueur, Molasses, Orange Juice, Whisky, Wine

Selection of the most appropriate method for the analysis of carbohydrates and their fermentation products usually depends on several factors:-

(i) Sample matrix — the presence of high MW species, *e.g.*, proteins and polysaccharides, may demand extensive sample pre-treatment prior to chromatographic analysis.

(ii) Detection sensitivity required - this is generally not a problem as the level of sugars in food and beverage samples are high.

(iii) Resolution desired — the performance of the various columns commercially available is optimised for specific applications.

(iv) Frequency of analysis — the run time will vary, depending on the type of chromatographic column selected.

The most popular HPLC method for the analysis of sugars and alcohols uses a column packed with a cation exchange resin in the calcium form, with water as the mobile phase. Separations are effected via a combination of mechanisms involving ligand exchange and size exclusion phenomena.

Complex samples containing polysaccharides as well as lower MW sugars and alcohols may be analysed in a single, isocratic run with excellent resolution. As the mobile phase is water, differential refractometers provide adequate sensitivity for detection, while safety and environmental concerns are minimal.

In Figures 1-10, typical separations are presented for a variety of food and beverage samples. Sample pre-treatment in most cases simply involved dilution and filtration. Carbonated beverages were digested prior to filtering.

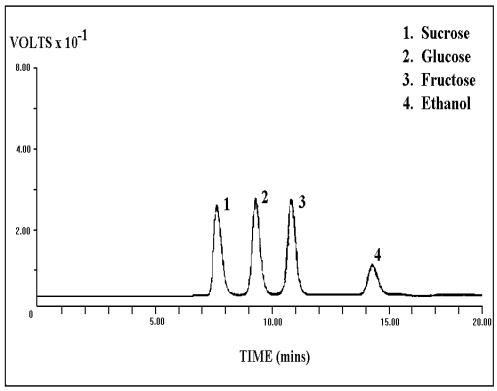

Figure 1 *Sugar amd Ethanol Standards*

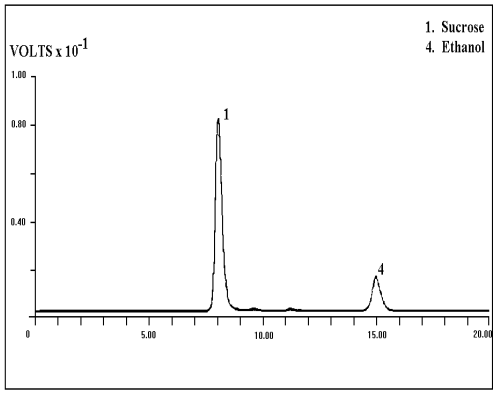

Figure 2 *Suntory Midori Melon Liqueur*

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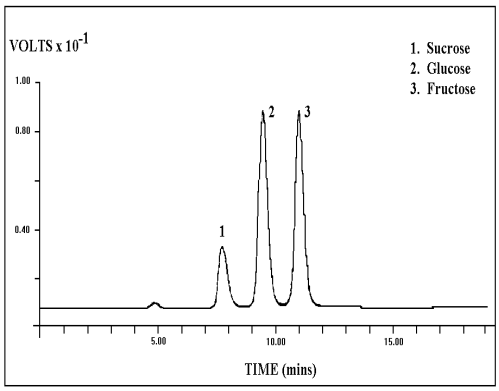


Figure 3 *Coca Cola*

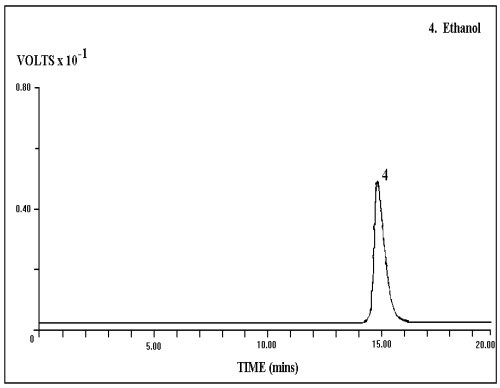


Figure 4 *Scotch Whisky*

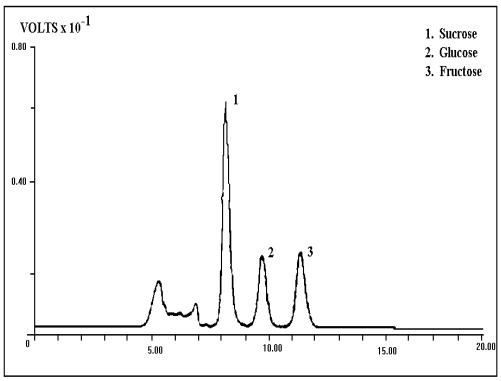


Figure 5 *Orange Juice, freshly squeezed*

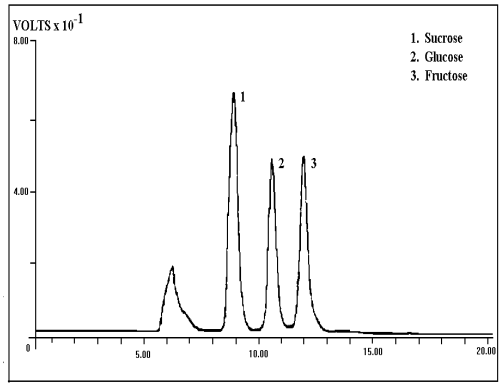


Figure 6 *Orange Juice, commercial brand*

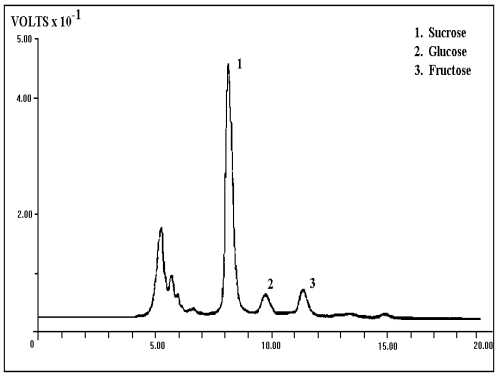


Figure 7 *'C Molasses' from Sugarcane Mill*

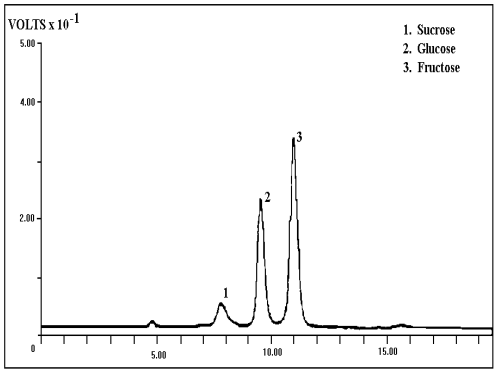


Figure 8 *Honey*

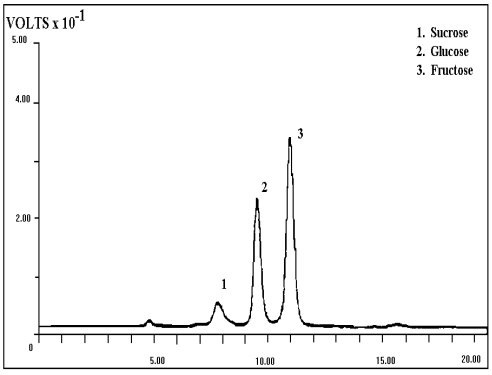


Figure 9 *Australian Beer*

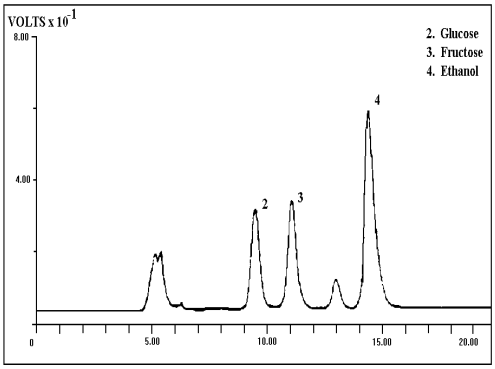


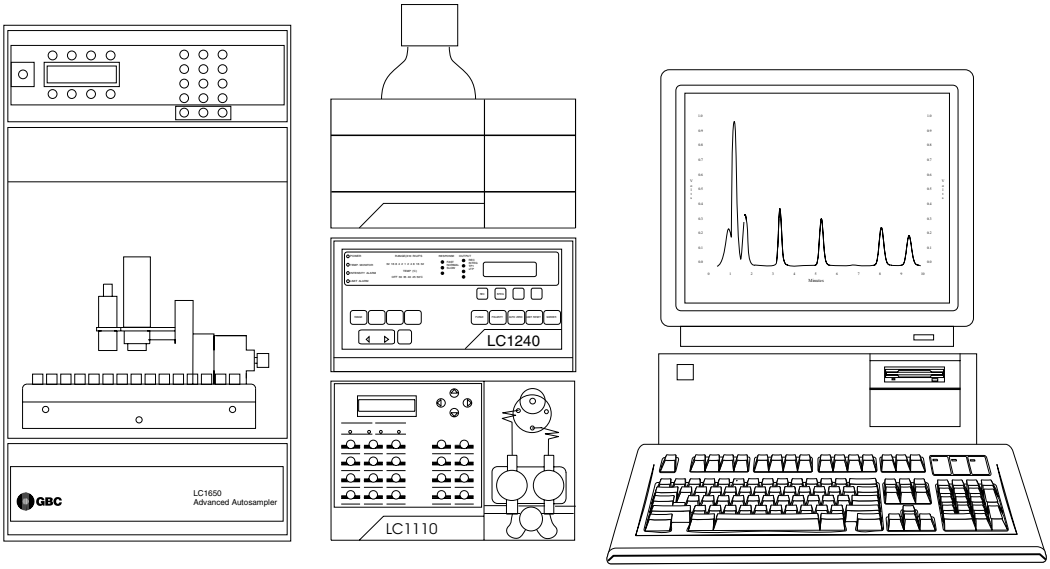
Figure 10 *Australian White Wine (Moselle)*

GBC HPLC Instrumentation

LC1110 Dual Piston HPLC Pump
Timberline Column Heater
LC1240 Refractive Index Detector
LC1650 Advanced Autosampler
WinChrom Chromatography Data Management System

Conditions

Column:	Intesaltion CHO-620 Carbohydrate Column
Guard Column:	Spherisorb S5 ODS2, 50 x 4.6 mm ID
Mobile Phase:	Water (distilled)
Flow Rate:	0.5 ml/min
Column Temp.:	80°C
RI Temp.:	50°C



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