Analysis of sugars using the ACE NH2 and VWR Hitachi Chromaster

ACE Technical Note #002

Carbohydrates are one of the most important components of foodstuffs and beverages and contribute to taste and nutritional value. The determination of carbohydrates in beverages is important for nutritional information, quality control and can be useful in the detection of adulteration. The carbohydrate component of drinks is typically comprised of simple sugars including mono- and di-saccharides, which are readily analysed in HILIC mode using an amino bonded stationary phase. The ACE NH2 phase is an ultra-inert phase, bonded with a proprietary amino propyl ligand, which is ideal for the analysis of sugars. The high silica purity and proprietary bonding technology provides high robustness with excellent peak shape and column lifetime.

Figure 1 shows example separations of both monosaccharides (a) and disaccharides (b), the structures of the sugars analysed are presented in Figure 2. Full separation of both standard mixes was readily achieved on the ACE NH2 with excellent resolution of the sugar components obtained. One of the challenges associated with sugar analysis is the lack of a UV chromophore, thereby eliminating the use of the ubiquitous UV detector. In this application, detection is readily achieved using a VWR Hitachi Chromaster HPLC system equipped with a 5450 Refractive Index (RI) detector. The design of the detector provides a stable signal and minimal baseline drift which is often associated with this type of detector.

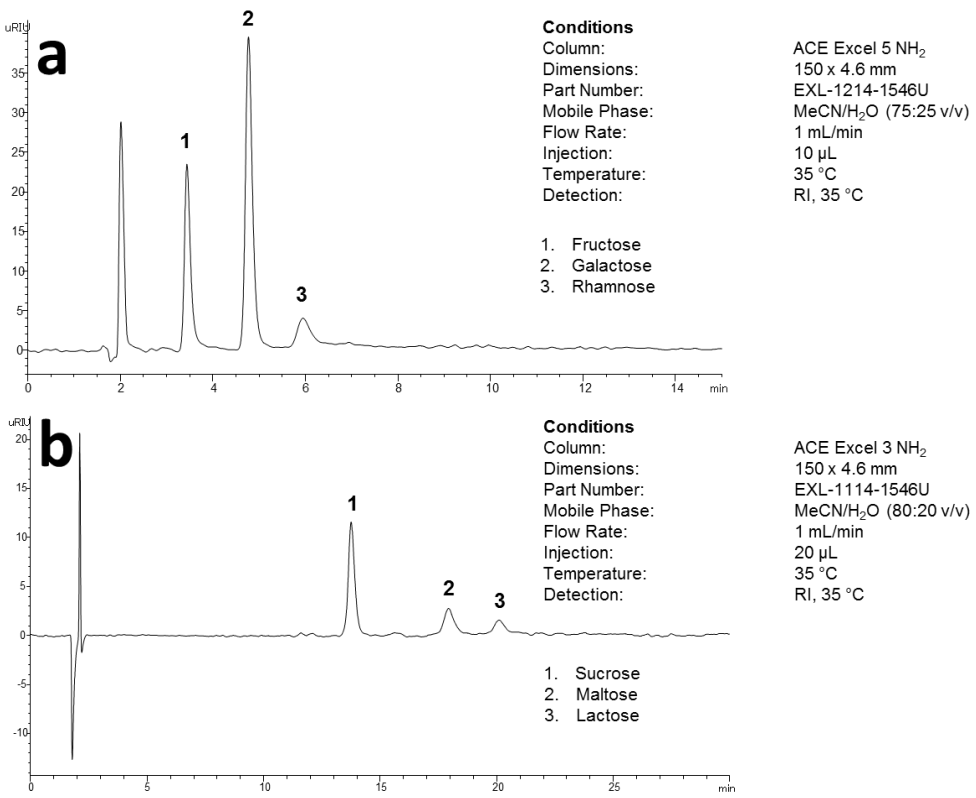

Figure 1: Separation of a) monosaccharides and b) disaccharides on the ACE NH2.

Figure 3 shows the application of the ACE NH2 and VWR Hitachi Chromaster HPLC system for the analysis of sugars in three soft drinks; orange juice, cola and diet cola. Fructose, glucose and sucrose are found naturally in fruit juices and are also commonly added to sweetened soft drinks. The cola and orange juice samples were shown to contain sucrose as the main sugar component, along with its constituent monosaccharides glucose and fructose. These analytes were then demonstrated to be absent in the diet cola sample. This simple method is useful for routine screening of food and beverage samples for carbohydrate components and may also be used as a good starting point for the determination of other mono- and disaccharides.

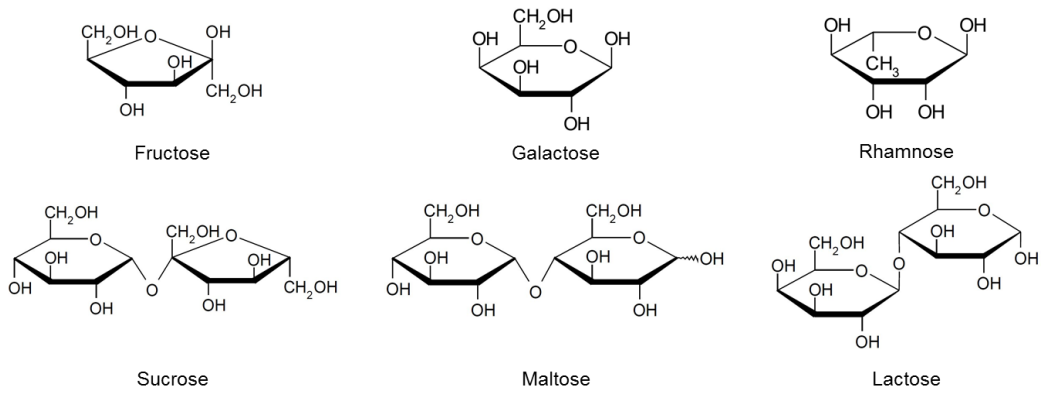

Figure 2: Structures of mono- and di-saccharides chromatographed in Figure 1.

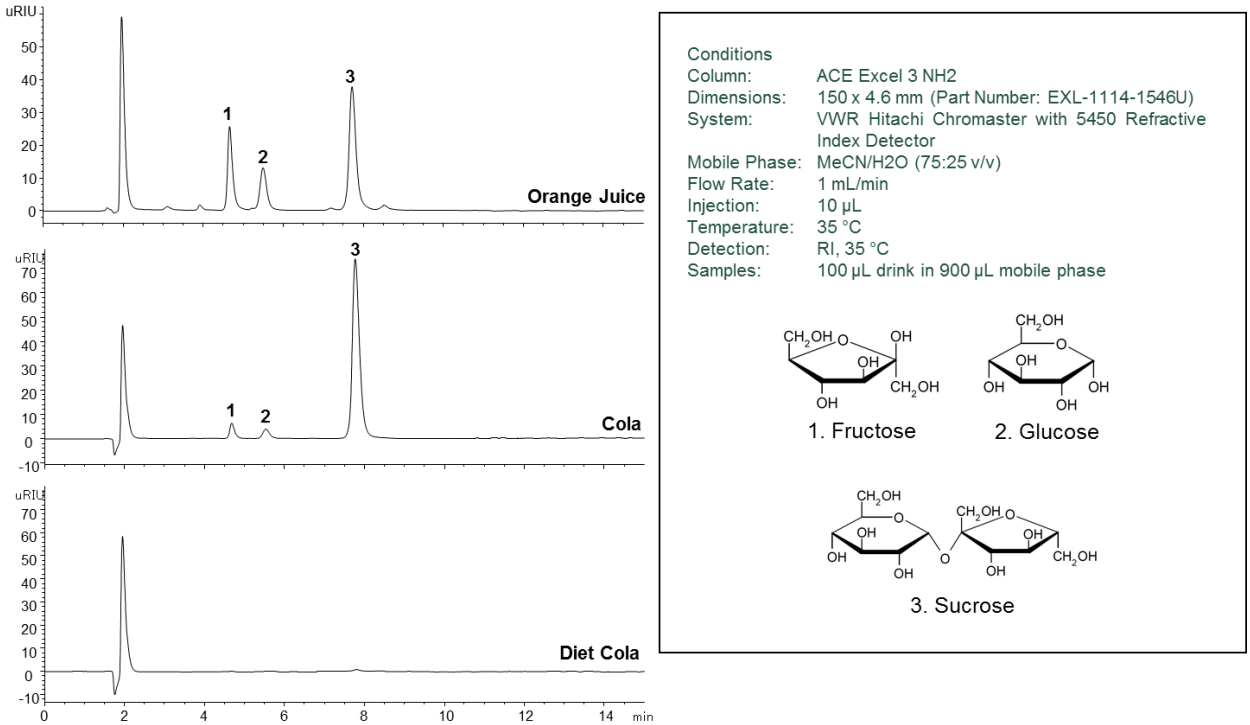

Figure 3: Separation of sugars in different soft drinks on the ACE 3 NH2.

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