Determination of Mono-, Di-saccharides, and Sugar Alcohols

- Consistently reliable results
- Operator-friendly design
- Exceptional reproducibility
- ASTM E1758-24 and UOP 780-92

With improvement in living standards and income, sensory (taste) quality and sugar content which are often related to internal attributes, have become significant quality parameters in consumer perception of quality and value of fresh and processed horticultural food products. Sweetness in many fruits and vegetables is a desirable attribute that is often governed, in part, by sugar concentration. Therefore, the determination and quantification of sugars and sweetness is of great importance in many fields of plant food sciences research[1].

Carbohydrates comprise a variety of sugars, mainly lower-molecular carbohydrates which share certain traits regarding chemical structure and reactivity. Carbohydrates form the largest portion of the organic matter in plants and feed materials, so are of great importance as storage compounds, structure elements, and energy sources. They can be assigned to different groups based on certain traits, such as chemical structure (e.g., mono-, di-, oligo-, and polysaccharides, sugar alcohols, sugar phosphates), physico-chemical properties (e.g., redox potential, hydrolytic stability, solubility in different solvents), and function (e.g., storage or matrix/cell wall carbohydrates)[2].

The separation and quantitative analysis of sugars are challenging for several reasons. To find a proper technique, column, mobile phases and detector for the separation and quantitative detection of sugars is challenging. Liquid chromatography (LC) is most widely used to separate sugars due to the availability. However traditional reversed phase columns cannot be used for underivatized sugars, as the stationary phase will not provide the required retention and specialized columns are necessary. Detection of sugars faces troubles as their structure contains no chromophores. Detection by UV-Vis, as commonly used in HPLC, is not possible in sugar analysis. Detection techniques such as evaporate light scattering (ELSD), refractive index (RI) and mass spectrometry (MS) can be used[3].

The Sugar Analyser from ISS is a specialized system based on HILIC system coupled with a RID detector to determine mono-, di-saccharides, and sugar alcohols in water. In Figure 1, an example of sugar analysis by one of Shodex's column can be seen. Also, you can find elution volumes of some saccharides using seven different Shodex columns in chromatography document 01.

[1] Scientia Horticulturae 184 (2015) 179
[2] Fermentation 3 (2017) 36
[3] Der Pharma Chemica 6 (2014) 320

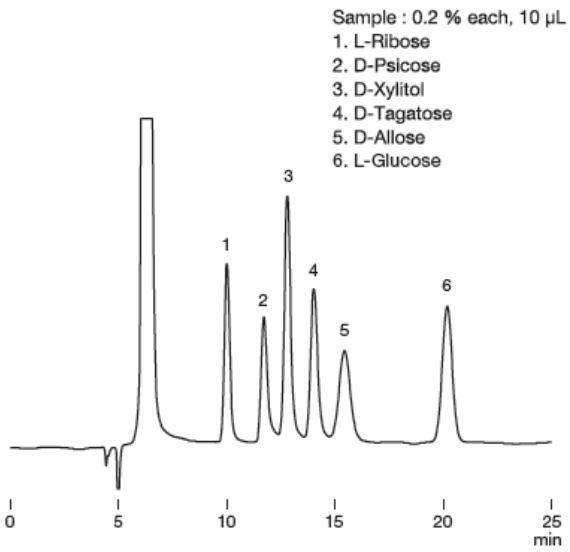

Fig.1 Analysis of Rare Sugar by HILIC-RID