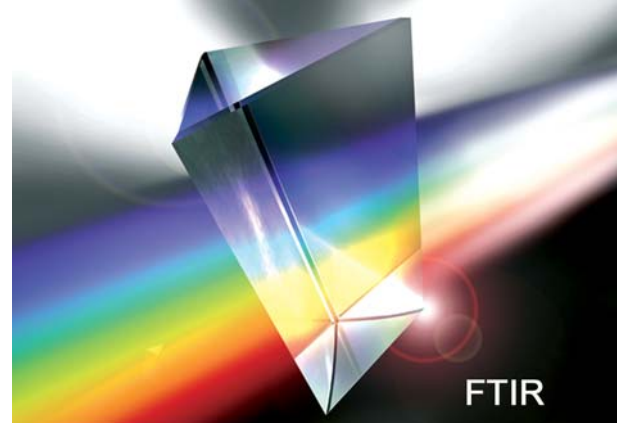


Application Note

Measurement of different Sugar based samples like Sugar, Honey, Syrup with FTIR Technique



These are three different samples of sugar which are under control of food analysis. The white crystalline sugar for the coffee is a nearly pure Saccharose prepared on technical control as refined sugar of industrial way.

Syrup, made from different sugar, is a mixture of Fructose, Glucose, Maltose, etc. And in this configuration the base of soft drinks ready for dilution and taste ingredients. The mixture is designed for a designer product.

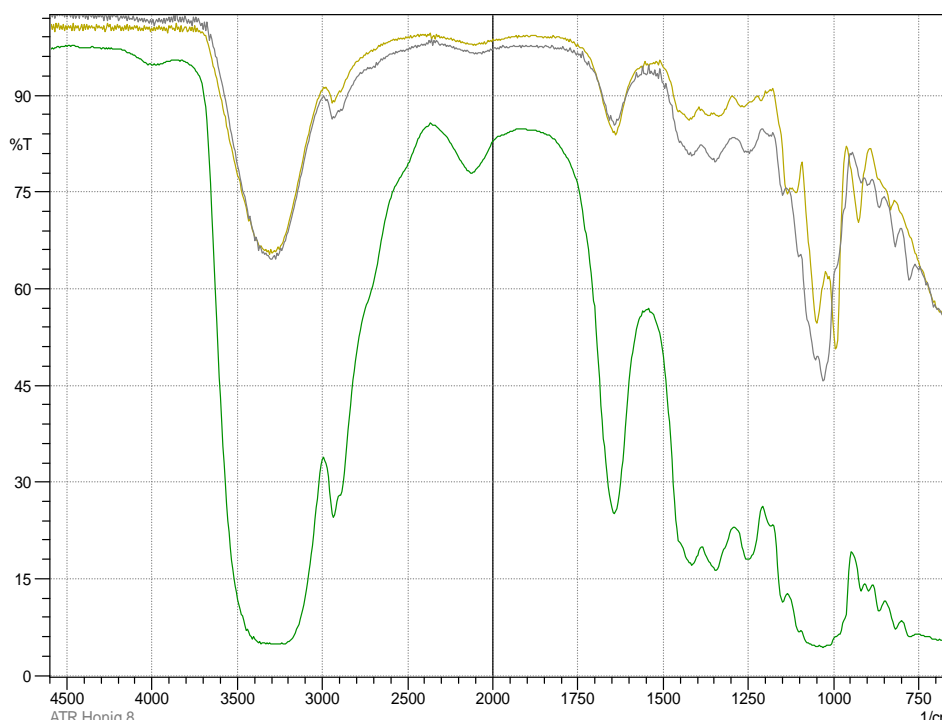


Fig. 1: Infrared transmission mode spectra prepared from crystalline sugar (light green-yellow line) like coffee sweetener, commercial honey (grey line) and syrup (green line) as base for soft drinks

Totally different is the honey which is in this case a sample from a natural product. Designed from bees for bees, Honey includes a lot of natural parts like polls, enzymes and

different sugars like maltose, turanose, glucose and fructose, partly also saccharose.

Discussion of results:

One trial to get more details from the syrup spectrum was the subtraction of a water spectrum to get more details about the remaining sugar. In fig. 2 is the result of a

subtraction of water from syrup and the sugar spectrum in one view.

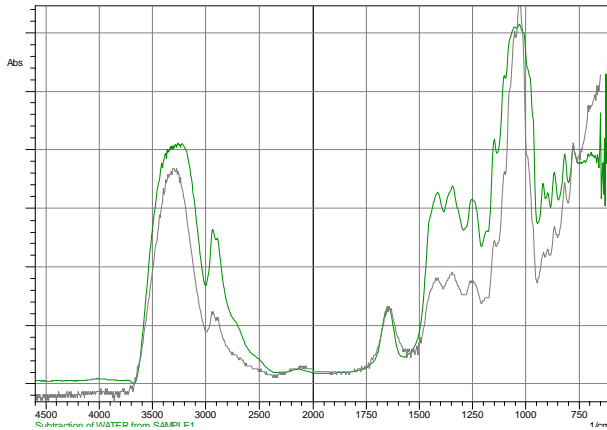


Fig. 2: Shown are absorbance mode infrared spectra from different sources green is syrup minus water and grey is the honey spectrum, they are looking not so different in the fingerprint range, only small details are different

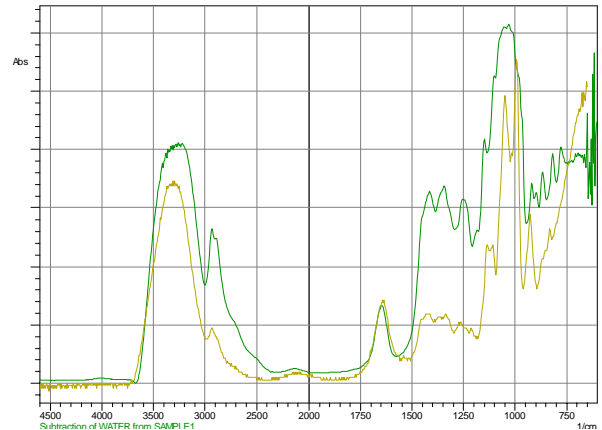


Fig. 3: Shown are absorbance mode spectra from different sources green is syrup minus water and yellow-green is simple sugar spectrum, they are looking different in the fingerprint range

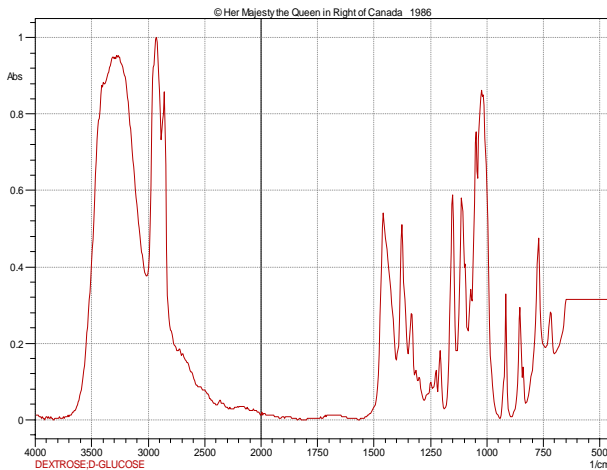


Fig. 4: Spectrum from commercial library.

All three samples have their specific spectrum. Just in the fingerprint range are to see a lot of differences in the individual spectra. One chance to visualize these specialities is for example the derivative spectroscopy. The syrup spectrum is influenced by the water signal. Subtraction of water is one possibility to get more information about the content of the syrup. Another possibility is to use pure sugar spectra for the subtraction activity. Fig. 4 contains Dextrose, Glucose spectrum from powder measured with KBr-Pellet technique. It seems comparing the pure spectrum with the crystalline sugar they have more similarities.

Instrumentation

Instruments in charge were the FTIR-8000Series and IRPrestige-21. To be able to measure the samples different accessories were used and commercial library from Sadtler, the Canadian Forensic.

1. Condition for syrup sample

FTIR-8000 Series, H-ATR with ZnSe crystal trough style. The sample was filled into the trough and immediately measured.

2. Condition for honey sample

IRPrestige-21, Miracle with ZnSe crystal
One drop sample was simply transferred to the crystal.

3. Condition for sugar

IRPrestige-21
Miracle with ZnSe crystal

Agate mortar and pestle

A piece of sugar was grinded to represent a very fine sugar particle. The powder was brought under the anvil of the pressure device from Miracle accessory. Sample was pressed to the ZnSe crystal.