

WHY MEASURE INVERT SUGAR ? - BACKGROUND

Inverted sugar syrup, also called invert syrup is essentially sugar in water. Invert sugar is a mixture of the monosaccharides glucose, and fructose, that is made by hydrolytic saccharification of the disaccharide sucrose. This mixture's optical rotation is opposite to that of the original sugar, which is why it is called an invert sugar. Invert sugar is a very common material used to sweeten food and has many advantages such as easy of transportation and long shelf life.

MANUFACTURE AND COMMODITIZATION OF INVERT SUGAR

Manufacture of invert sugar is relatively easy compared with some other food processes and the amount of invert sugar used industrially is very large meaning invert sugar has become highly commoditized. Profit margins are relatively low thus manufacturing efficiently is incredibly important to the organization's bottom-line profitability.

THEORY

Test of invert sugar has traditionally been performed with a polarimeter. A modern polarimeter is fast, less than 60 seconds for a measurement and simple to use for a non-chemist.

The polarimeter reading is combined with a refractometer reading. The refractometer is used to measure the amount of total sugar present (Brix), the polarimeter is then used to determine how much of that total sugar has been inverted. The chemistry is relatively simple; sucrose, a right rotating sugar is broken down into a combination of glucose and fructose which are, net, left rotating. This change from right rotation to left rotation on a polarimeter (inversion of the + to a -) is where invert sugar gets its name.



$$[\alpha]_D = + 66.5^\circ$$



$$[\alpha]_D = 52.5^\circ \quad [\alpha]_D = 92.4^\circ$$

INVERT SUGAR MEASUREMENT OFFERINGS FROM RUDOLPH

The Autopol I Polarimeter and the J57HA refractometer are the ideal pair of instruments for invert sugar measurement. They are easy to measure with and easy to clean. The instruments use optical rotation and BRIX measurements to determine the percent invert. Both instruments are calibrated in a way that is traceable to ISO 17025 and meet the requirements of GLP/GMP. Traceability in the food and beverage industries is very important so you know your products are made to the intended specifications and verifiable to an accredited third party.

As of June 2022, all Rudolph Research polarimeters come with built in, software driven invert sugar calculations simplifying operations even further. Samples can be measured quickly, accurately and the instruments do all required calculations for you.

TYPICAL RUDOLPH USERS

■ C & H SUGAR

C&H is a very large sugar refinery making a large range of sugar products in crystalline, powder, and liquid form. Invert sugar is one of these many products.



■ CSC SUGAR

CSC Sugar is a company with a wide network of smaller facilities positioned close to users.



■ SAN MIGUEL GROUP

San Miguel Group is a large consumer of invert sugar and by bringing the inversion process in house has seen significant cost savings.



SAN MIGUEL
FOOD AND BEVERAGE, INC.

