

# Abstract for Glucose Production

*The abstract in hand provides the reader initial information about glucose production, glucose market and the chemical background*



# INTRODUCTION

Glucose,  $C_6H_{12}O_6$ , also known as D-glucose, dextrose, or grape sugar, is a simple sugar (monosaccharide) and an important carbohydrate in biology. Cells use it as the primary source of energy and a metabolic intermediate. Glucose is one of the main products of photosynthesis and starts cellular respiration.

Glucose exists in several different structures, but all of these structures can be divided into two families of mirror-images (stereoisomers). Only one set of these isomers exists in nature, those derived from the "right-handed form" of glucose, denoted D-glucose. D-glucose is often referred to as dextrose. The term dextrose is derived from *dextrorotatory glucose*. Solutions of

dextrose rotate polarized light to the right. Starch and cellulose are polymers derived from the dehydration of D-glucose. The other stereoisomer, called L-glucose, is hardly found in nature.

The name "glucose" comes from the Greek word *glukus* (γλυκύς), meaning "sweet". The suffix "-ose" denotes a sugar. The name "dextrose" and the 'D-' prefix comes from Latin dexter ("right"), referring to the handedness of the molecules.

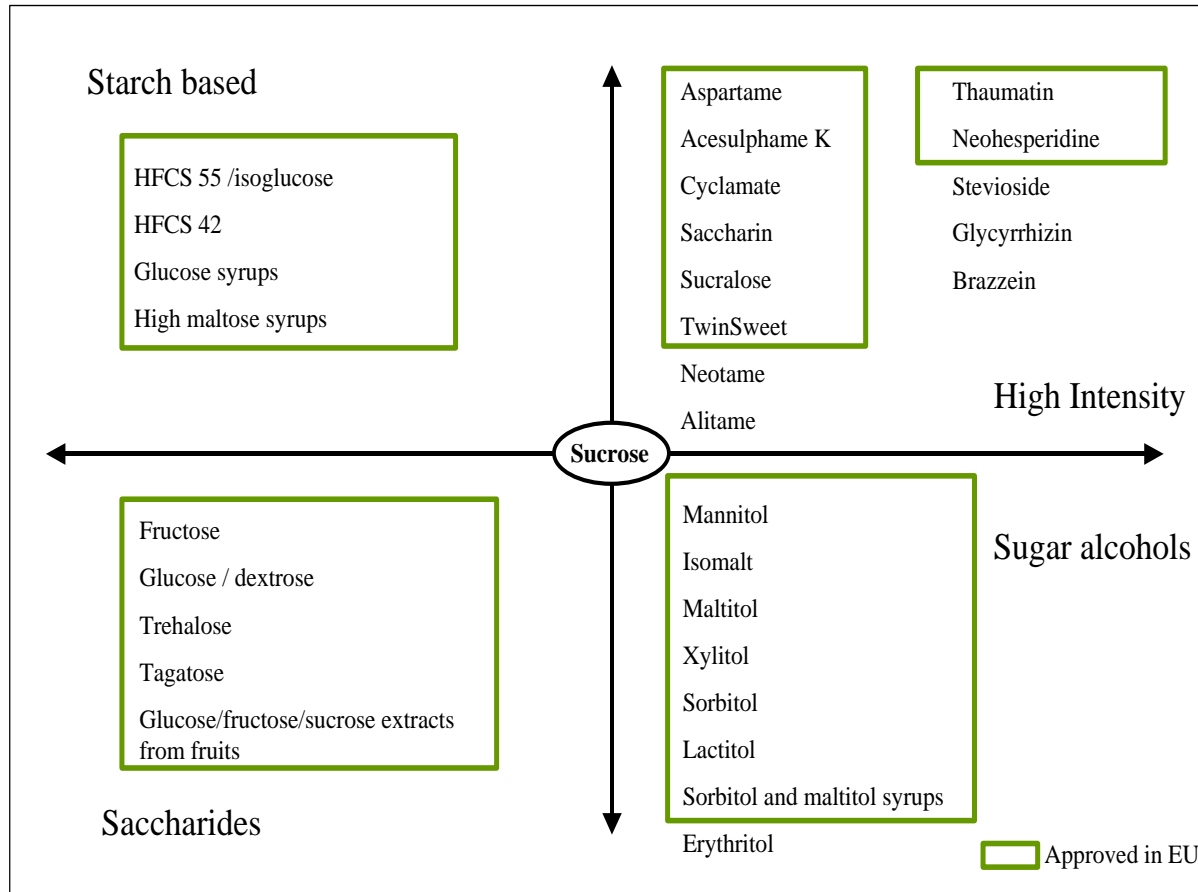
## Industrial Use

In industry, glucose is used as a precursor to make vitamin C in the Reichstein process, to make citric acid, gluconic acid, bioethanol, polylactic acid, sorbitol and using

as sweetener.



# STARCH SUGARS



Starch can be hydrolyzed into simpler carbohydrates by acids, various enzymes, or a combination of the two. The resulting fragments are known as dextrins. The extent of conversion is typically quantified by *dextrose equivalent* (DE), which is roughly the fraction of the glycosidic bonds in starch that have been broken. These starch sugars are by far the most common starch based food ingredient and are used as sweetener in many drinks and foods. They include:

- Maltodextrin, a lightly hydrolyzed (DE 10–20) starch product used as a bland-tasting filler and thickener.
- Various glucose syrups (DE 30–70), also called corn syrups in the US, viscous solutions used as

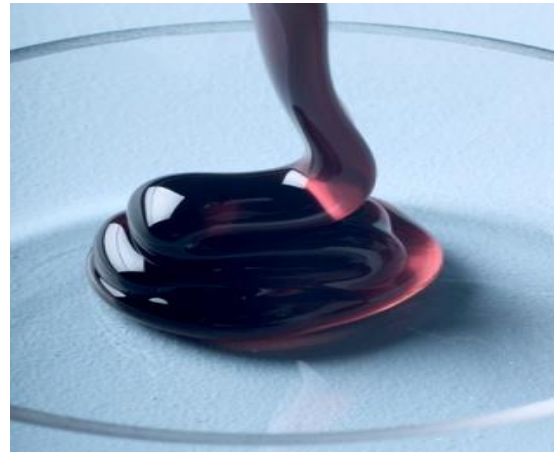
# STARCH SUGARS

sweeteners and thickeners in many kinds of processed foods.

- Dextrose (DE 100), commercial glucose, prepared by the complete hydrolysis of starch.
- High fructose syrup, made by treating dextrose solutions with the enzyme glucose isomerase until a substantial fraction of the glucose has been converted to fructose.
- In the United States, high fructose corn syrup is the principal sweetener used in sweetened beverages because fructose has better handling characteristics, such as microbiological stability, and more consistent sweetness/ flavor. One kind of high fructose corn syrup, HFCS-55, is typically

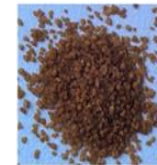
sweeter than regular sucrose because it is made with more fructose, while the sweetness of HFCS-42 is on par with sucrose.

- Sugar alcohols, such as maltitol, erythritol, sorbitol, mannitol and hydrogenated starch hydrolysate, are sweeteners made by reducing sugars.



## The Sucrose-based family

*Beet sugars*  
*Cane sugars*  
*Invert sugar*  
*Fructose*

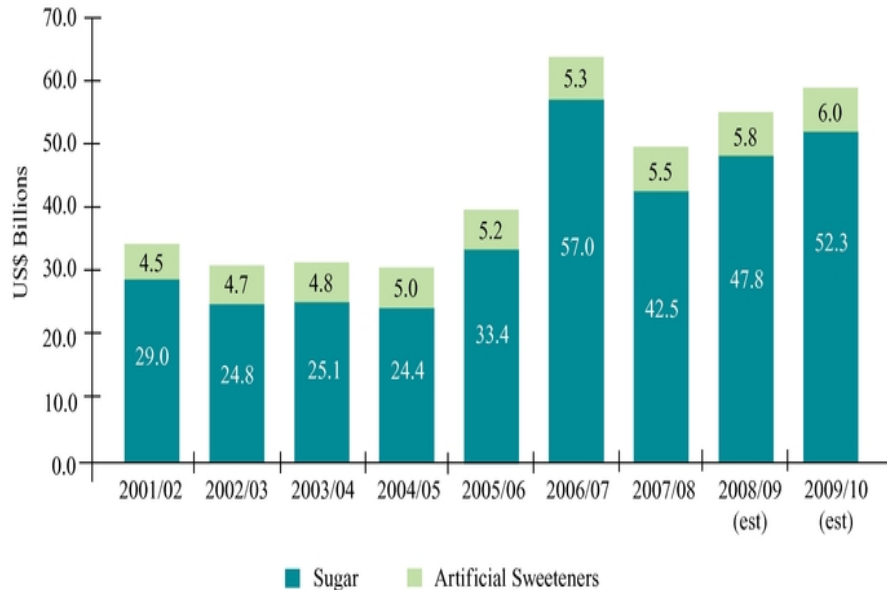


## The Starch-based family

*Glucose syrups*  
*Glucose/dextrose*  
*High Fructose Corn Syrup*  
*Isoglucose*



# MARKET

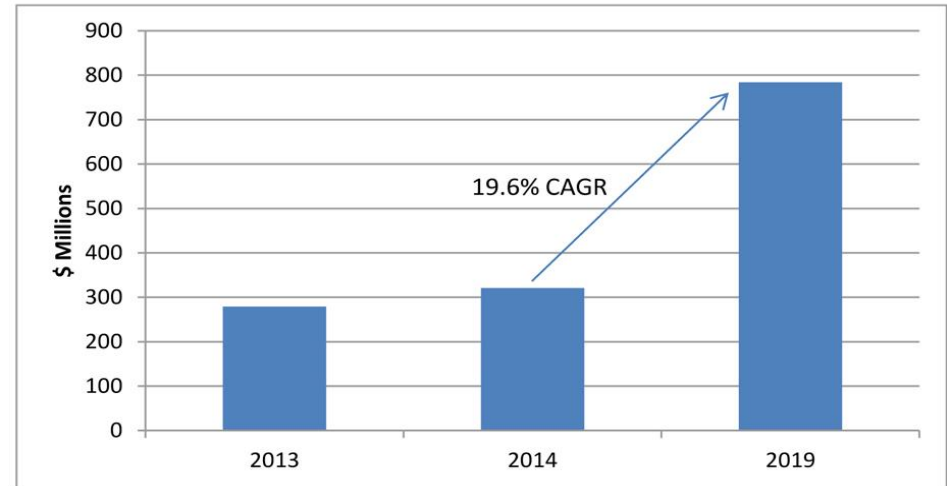


The bar chart above indicates a continuously growing sweetener market. Around 10 % of entire sweetener market belongs to the artificial sweeteners. But this group seems to increase its market share year by year. The generally growing

market can get traced back to globally changing nutrition habits and a growing world population.

The total market of Glucose is forecasted to reach \$783.9 million by 2019. The overall compound an-

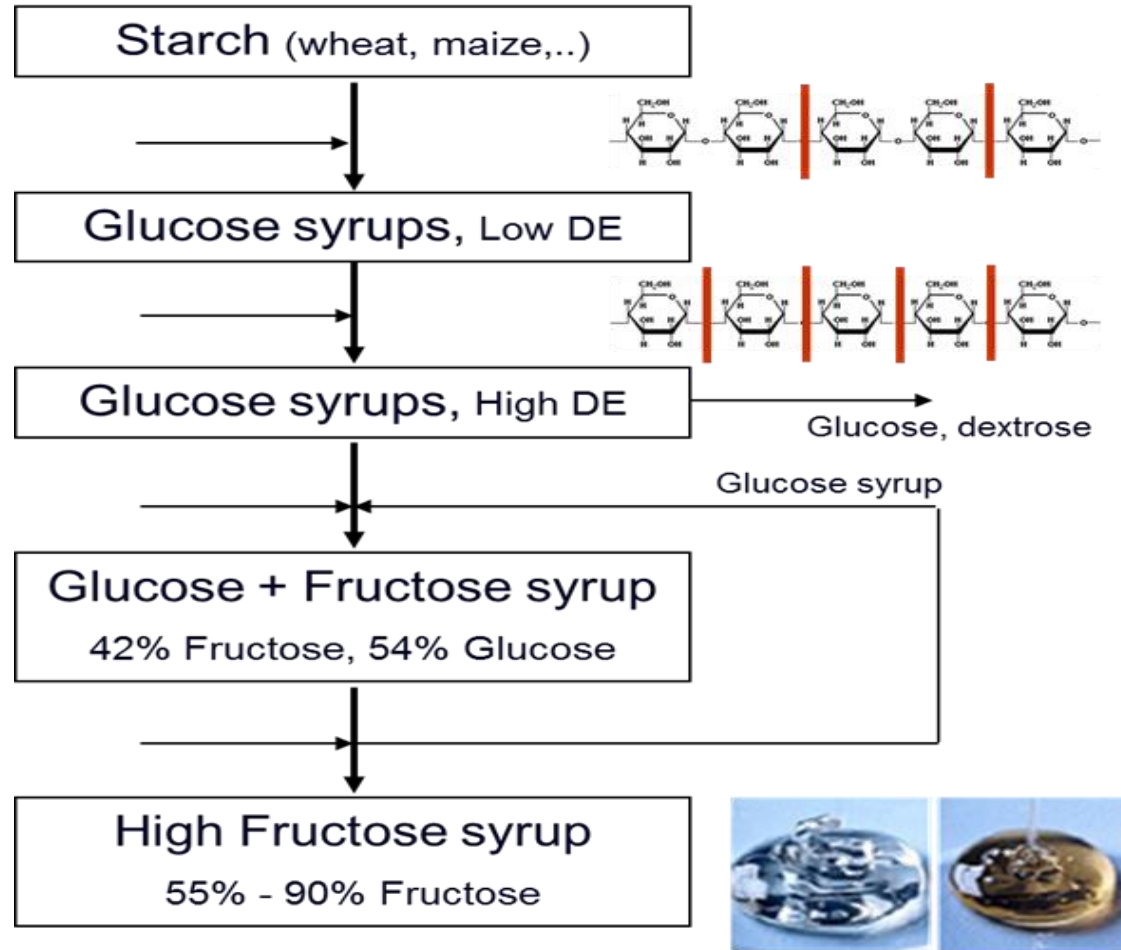
## Continuous Glucose Monitoring Market



Source: BCC Research (HLC102B), November 2014

nual growth rate for this market from 2014 to 2019 is expected to reach 19.6 %.

# PRODUCTION PROCESS



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