

**STARCH
INDUSTRY**



ENZYMES

Shortcuts to sweeteners



Bioluence



STARCH INDUSTRY

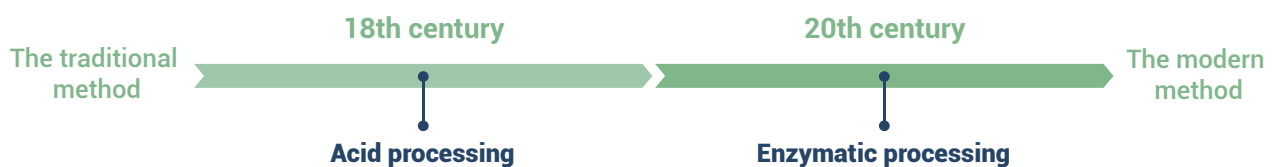


Sweeteners replaced sugar

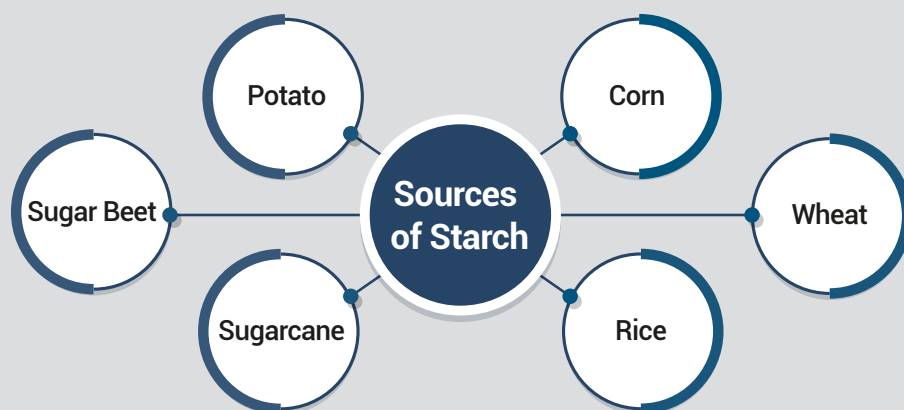
Benefits of sweeteners:

- Less harmful than sugar (sucrose) and a healthier source of artificial sweetener (do not generate large amounts of energy and some of them are excreted before entering the process of metabolism).
- long shelf life (do not crystallize) and keep food materials fresh and soft
- Prevent crystallization of syrups

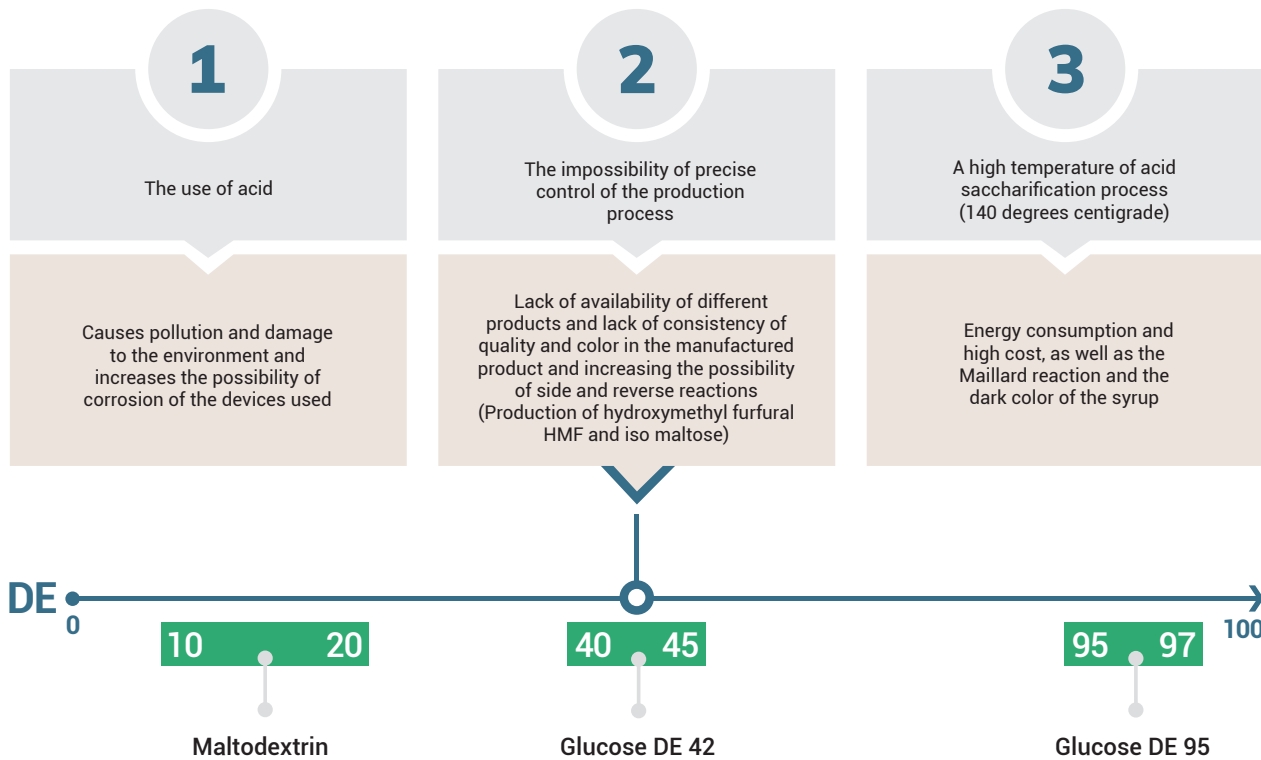
Starch processing pathway to become sweeteners:



Sources of starch

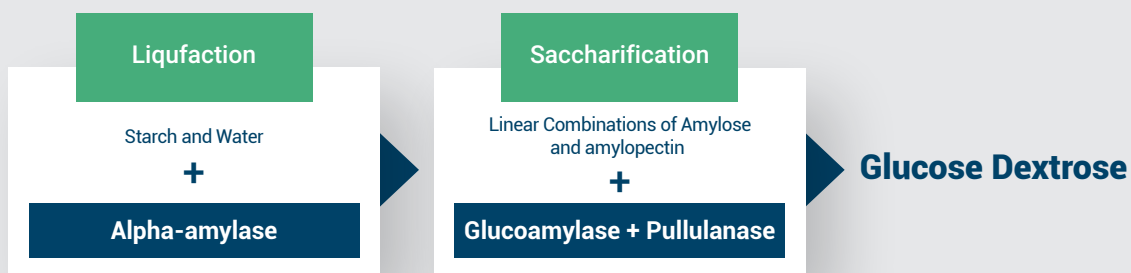


Using acid to covert various types of starch into sweeteners



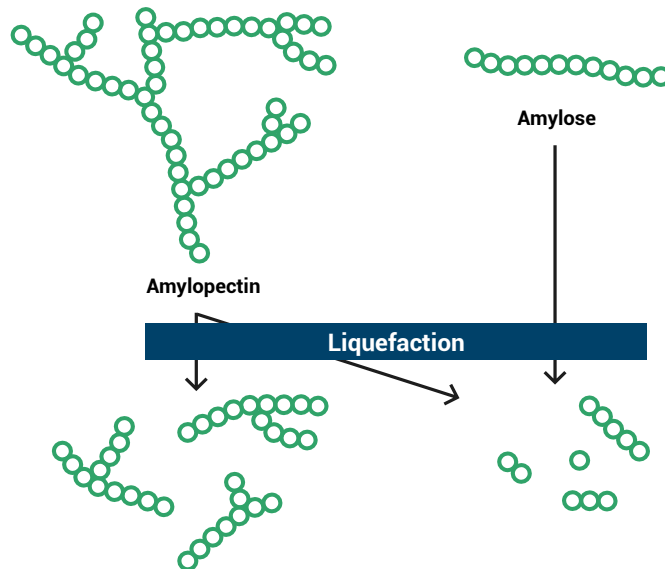
The miracle of enzyme

Modern shortcut



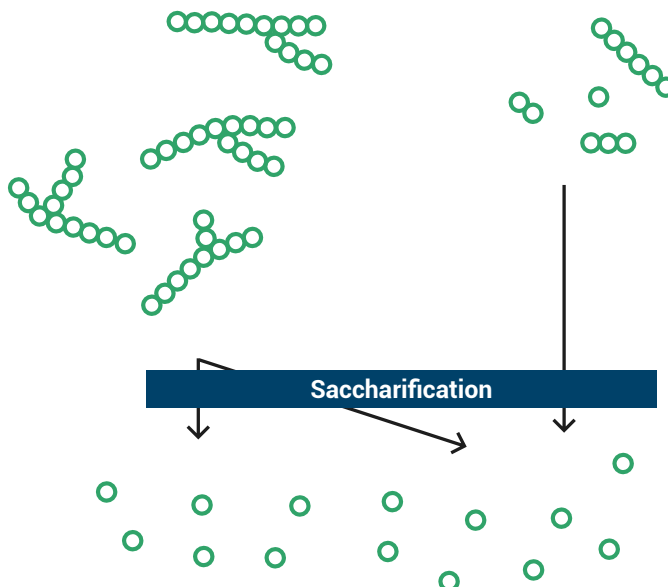
The mechanism of Alpha-Amylase action

Alpha-amylase attacks and breaks down α 4-1 bonds inside polysaccharide chains.



The mechanisms of action of Glucoamylase and Pullulanase

Glucoamylase hydrolyzes α 4-1 bonds from the end of the chain and pullulanase hydrolyzes α 6-1 bonds from the end of the chain thus eliminating the oligosaccharide branches.



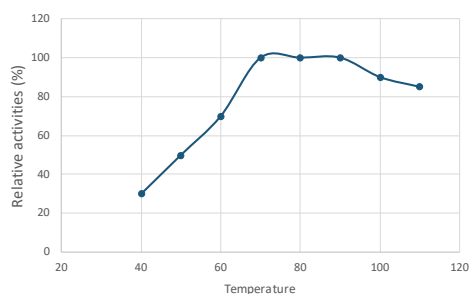
ENZYME

BONAMYL GL

The best process control tools

Properties of BONAMYL GL:

- Heat stable α -Amylase from a strain of *Bacillus licheniformis*



Advantages of BONAMYL GL:

- Reduction of viscosity
- Stability of the quality and color of the manufactured product



Reduce energy and time consumption in the production process



Increase efficiency and productivity of production



BONAMIX GL

Enzyme mixture

Properties of BONAMIX GL:

An appropriate combination of glucoamylase and pullulanase

Advantages of BONAMIX GL:

- Higher dextrose yield, due to lower reversion rate
- Stability in high-temperature conditions
- Increasing the degree of purity of the final product

Reducing the speed of the
saccharification process
(55 to 60 hours)



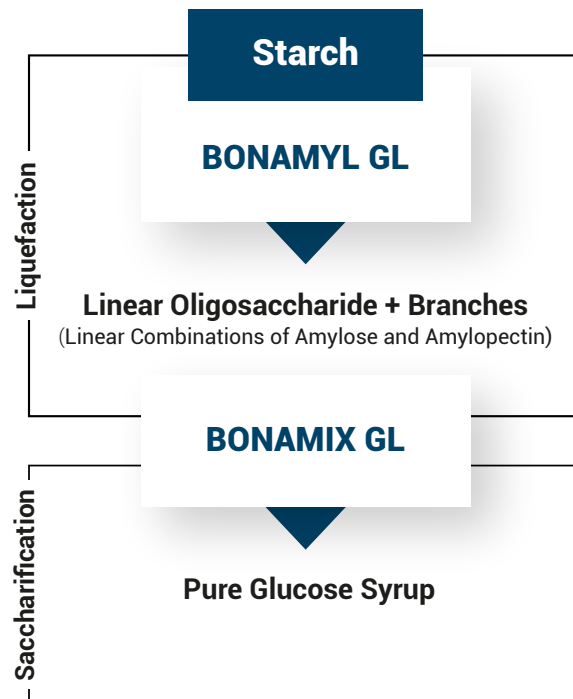
FOREIGN SAMPLE



BONAMIX GL



Overview of the stages of processing glucose syrup from starch





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