Creating a Ubiquitous Sweetener

Corn syrup is found in many food products, including "all-natural products." Though demonized by many as a leading cause of obesity in the United States, evidence suggests that it may be no different than the refined sugar it often replaces. Although the components of high-fructose corn syrup occur naturally in foods, it takes a number of mechanical and chemical processes to turn corn into it.

Corn to Cornstarch  A corn kernel is roughly 80% starch. The extraction of its starch is largely a mechanical process.

Preparing corn for processing  Dry kernels are cleaned and then steeped in water. Once softened, the corn is coarsely ground to break apart the germ.

Separating corn's components  After a cyclone separator removes the corn's oil-rich germ, fine grinding releases starch from the fiber, which is then caught in screens. A centrifuge separates the gluten (protein) from the starch.

Purification and preparation  The starch is further purified and hydrated for processing.

Cornstarch to High-Fructose Corn Syrup  Cornstarch is a complex carbohydrate composed of very long chains of glucose sugars. Chemical processing is needed to convert the starch to fructose and glucose, the main components of high-fructose corn syrup.

Processing with enzymes  The hydrated cornstarch goes through three enzyme processes that break down the long chains of starch into simple glucose. The last enzyme changes some of the glucose into fructose, making 42% high-fructose corn syrup.

Separation and blending  The fructose is separated from the glucose. Blending the two creates a 55% fructose solution.

Sources: Corn Refiners Association, United States Department of Agriculture