**High Fructose Corn Syrup**

**Corn** is the primary source of high fructose corn syrup (**HFCS**) which is used as a liquid alternative sweetener to sucrose. HFCS is made by the chemical and enzymatic hydrolysis of corn starch containing **amylose** and **amylopectin** to corn syrup containing mostly **glucose** followed by the isomerization of the glucose in corn syrup to **fructose** to yield HFCS.

* **Commonly used HFCS**:
* **HFCS-90** (90% fructose and 10% glucose)
* **HFCS-42** (42% fructose and 58% glucose): HFCS-90 is blended with glucose syrup to yield
* **HFCS-55** (55% fructose and 45% glucose): HFCS-90 is blended with glucose syrup to yield
* **Food items that contain HFCS:** Grocery foods items and baked goods such as pastries; biscuits, breads, cookies, and shortcakes; soft drinks; juice drinks; carbonated drinks; jams and jellies; dairy products including ice creams, flavored milks, yogurts and frozen desserts; canned ready to eat foods including sauces and condiments; cereals and cereal bars; and many other processed foods.

**Advantages of HFCS over sucrose**:

* Comparatively cheaper
* Greater sweetness
* Better solubility
* Does not crystallize as sucrose
* HFCS is liquid and thus is easier to transport and use in soft drink formulations.
* Due to acidic nature, it has preservative ability that reduces the use of other preservatives.

**Limitations of using HFCS**:

* HFCS can cause **inobesity, cardiovascular disease,** and other **metabolic syndromes**.
* **Mercury contamination** of HFCS samples during production. Caustic soda used in HFCS production is typically made at chlor-alkali plants that use mercury cells. Thus manufacturers need to use processing methods that mitigate the presence of mercury (toxic to humans) in the finished HFCS product.
* HFCS is used as food for honey bees to promote brood production in the spring for commercial pollination as well as when sources of pollen and nectar are scarce. Presence of **Hydroxymethylfurfural (HMF)** in honey is an indication of its aging. HFCS begins to form **HMF, levulinic and formic acids** (byproducts of HMF) at high temperatures above 45°C from dehydration of fructose that are very toxic to bees. **Toxicity to honey bees** probably leads to colony collapse disorder (CCD) of honey bees and occurrence of dysentery-like symptoms in bees.