

**University module; Communication Techniques and English Expression (TCE 02)**

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**TD 04**

## **The difference between Glucose and Fructose**

Glucose is a simple sugar and one of the most important carbohydrates. It is a primary source of energy for living organisms, including humans. Glucose is produced during the process of photosynthesis in plants and is a major product of carbohydrate metabolism in animals.

In biochemistry, glucose is often referred to as blood sugar, as it circulates in the bloodstream and is used by cells as a source of energy. When we eat carbohydrates, such as bread, rice, or fruits, our digestive system breaks them down into glucose, which is then absorbed into the bloodstream.

Glucose is crucial for providing energy to cells and tissues in the body. Excess glucose can be stored in the liver and muscles as glycogen or converted into fat for long-term energy storage.

In addition to its role as an energy source, glucose also serves as a precursor for the synthesis of other important molecules in the body, such as amino acids, nucleotides, and fatty acids.

The metabolism of glucose is a complex process that occurs in several steps within cells, primarily through a series of biochemical pathways. The overall process involves the

breakdown of glucose molecules to release energy, which is used to fuel cellular activities, and the conversion of glucose into other molecules for various cellular functions.

Glucose and fructose are both simple sugars (monosaccharides) with the same chemical formula,  $C_6H_{12}O_6$ , but they have different molecular structures and properties. Here are some key differences between glucose and fructose:

1. **Structural Difference:** Glucose and fructose have different structural arrangements. Glucose is a six-carbon sugar with a linear structure, whereas fructose is also a six-carbon sugar but has a five-membered ring structure.
2. **Natural Occurrence:** Glucose is found in many foods, including fruits, vegetables, grains, and honey. It is a primary source of energy for living organisms and is commonly referred to as blood sugar when it circulates in the bloodstream. Fructose is also found in fruits, honey, and some vegetables. It is the sweetest naturally occurring sugar and is often used as a sweetener in processed foods and beverages.
3. **Sweetness:** Fructose is significantly sweeter than glucose. Due to its sweeter taste, fructose is often used as a sweetening agent in food products and beverages.
4. **Metabolism:** Glucose and fructose are metabolized differently in the body. Glucose is readily absorbed into the bloodstream and transported to cells where it is used for energy production. Fructose is primarily metabolized in the liver, where it is converted into glucose, glycogen, lactate, and fatty acids. Excessive consumption of fructose, especially in the form of high-fructose corn syrup, has been linked to metabolic disorders such as insulin resistance, obesity, and fatty liver disease.
5. **Effects on Blood Sugar:** Glucose has a significant impact on blood sugar levels, as it is the primary sugar transported in the bloodstream and utilized by cells for energy. Fructose has a relatively lower impact on blood sugar levels compared to glucose, as it is primarily metabolized in the liver and does not stimulate insulin secretion to the same extent.

6. **\*\*Absorption:\*\*** Glucose is absorbed directly into the bloodstream through the intestinal wall, whereas fructose is absorbed more slowly and may require transport mechanisms for absorption.

In summary, while glucose and fructose are both simple sugars with the same chemical formula, they have distinct structural, functional, and metabolic differences that contribute to their roles in the body and their effects on health.

**Question** ; analyze the text by extracting. scientific terminologies and the main ideas (using taking notes method) supported by images illustrating both **Glucose and Fructose** structure.

**Note** ; "Work in groups (3-4 Students) and use communication Tools (Google Translate and Chat GPT application - is optional-).