



**Xanthan Gum** is a polysaccharide used extensively as a thickening, stabilizing, and emulsifying agent in a variety of industries, including food, pharmaceuticals, and cosmetics. It is produced by the fermentation of glucose or sucrose using the bacterium *Xanthomonas campestris*. Xanthan gum is prized for its ability to form viscous solutions even at low concentrations and for its stability under varying conditions.

## Chemical Properties of Xanthan Gum:

1. **Molecular Structure:**

- Xanthan gum is a complex polysaccharide composed of a backbone of  $\beta$ -D-glucose units linked together by  $\beta$ -(1 $\rightarrow$ 4) glycosidic bonds. This backbone is substituted with side chains of  $\alpha$ -D-mannose and  $\beta$ -D-glucuronic acid.
- The repeating unit of xanthan gum has the formula  $(C_8H_{10}O_5)_n$ , where  $n$  represents the number of repeating units in the polymer.

2. **Physical Appearance:**

- Xanthan gum is typically a white to light yellow powder. It is odorless and tasteless, which makes it versatile for use in a wide range of products.

3. **Solubility:**

- Xanthan gum is highly soluble in water, forming a viscous, gel-like solution even at low concentrations (as low as 0.1% w/v). It can also be dispersed in cold water, where it swells and thickens the liquid.

4. **Viscosity:**

- Xanthan gum is known for its high viscosity. It increases the thickness of solutions and can create gels. Its viscosity is shear-thinning, meaning it becomes less viscous under shear stress (e.g., stirring or shaking) and returns to its original viscosity when the stress is removed.

5. **pH Stability:**

- Xanthan gum is stable across a wide range of pH values, typically from pH 4 to 10. This makes it suitable for use in both acidic and alkaline formulations without significant loss of its thickening properties.
- 6. **Temperature Stability:**
  - Xanthan gum is stable over a wide temperature range. It maintains its thickening and gelling properties even when exposed to high temperatures, although it may lose some viscosity if subjected to prolonged heating