Xanthan gum

- Source
  - *Xanthomonas campestris*, a bacteria

- Structure
  - Basically a derivatized cellulose
  - Introduced in food in 1963
Xanthan molecular network

Xanthan gum properties

- Xanthan is a very stiff rod (double helix) in dispersion
- Extraordinary stability to heat, acid, and alkali
- Average molecular weight is on the order of 2 million
- Xanthans that have the most pyruvic acid content have the highest viscosities and thermal stabilities

Xanthan gum properties

- Acetyl groups stabilize the ordered helix, pyruvate groups destabilize it
- Due to stiffness, molecules in solution are quite extended
- This leads to high viscosity and highly pseudoplastic dispersion rheology (may even behave as weak gels)
- Dispersions may have a Newtonian plateau at low shear
Xanthan viscosity

- Newtonian plateau
- Pseudoplastic thinning

Shear stress (dynes/cm²)

- About 10
- About 100

Xanthan interactions

- Interacts with
  - Guar
  - Locust bean gum
- Commercial xanthan tends to be contaminated with cellulase. Hence, you can’t use xanthan in systems with CMC

Xanthan-LBG synergism

Graph showing the effect of Xanthan-LBG at different ratios on viscosity.
Xanthan-LBG interaction

Viscosity behavior

Selected xanthan uses

- Stabilizes aqueous dispersions, suspensions, and emulsions
- Pourable dressings
- Gravies
- Frozen dessert stabilizers
- Cream cheese
- Syrups (Mrs. Butterworths)
- Chocolate syrup
Selected xanthan uses

- Salad dressings
  - Thickens and stabilizes
  - Suspends particles (spices)
  - Very often used in conjunction with propylene glycol alginate (PGA)
  - Xanthan:PGA = 1:2
  - \([\text{xanthan}] = 0.3\%, \ [\text{PGA}] = 0.6\%\)
- For more uses, see Bemiller, Table 10.1

Labeling

- Xanthan
- Xanthan gum