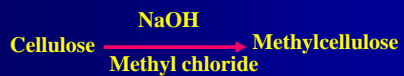


Food Gums-Lab 11

Food Chemistry
NUTR 45300

Methylcellulose

- A cellulose derivative



Methylcellulose structure

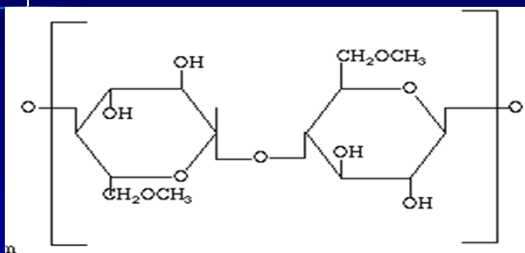


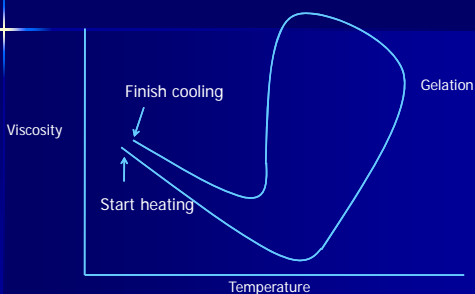
Image courtesy of www-fst.ag.ohio-state.edu/FST605/lectures/lect20.html

Methylcellulose

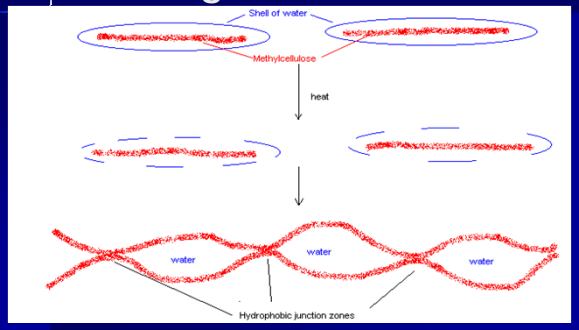
■ Properties

- DS = 1.64-1.92 provides maximum water solubility
- Dispersions are pseudoplastic; degree of pseudoplasticity is determined by length of chain (DP)
- Exhibits **thermogelation**

Thermogelation



Mechanism of thermogelation



Methylcellulose uses


- Baked goods
 - Promotes water retention
 - Provides resistance to oil absorption (doughnuts)
- Dietetic foods
 - Provides structure and texture in gluten-free products

Methylcellulose uses

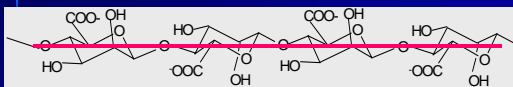
- Frozen foods
 - Syneresis inhibition (provides good freeze-thaw stability)
- Salad dressing
 - Emulsifier/stabilizer/thickener

Methylcellulose derivatives used this week

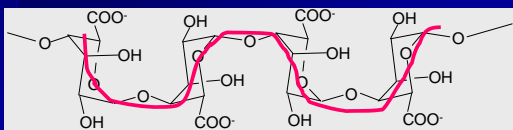
- A4M is a methylcellulose while K4M is a hydroxypropylmethylcellulose
- The designations indicate differences in optimal hydration temperature as well as differences in the temperature of gel formation and the texture of the gels formed



Alginate structures



Poly-D-mannuronic acid segment of alginate



Poly-L-guluronic acid segment of alginate

Alginate properties

- Good stability in the pH range 5-10
 - Maximum viscosity occurs between pH 6-8
 - Degradation occurs at low pH (1-4)
- Alginate is fairly resistant to microorganisms

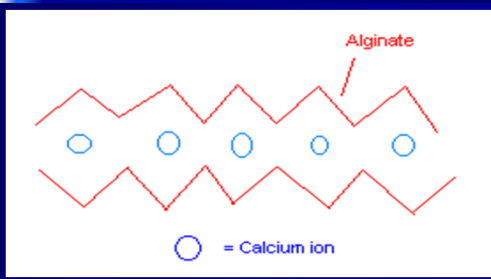
Alginate gelation

- Ca⁺⁺ gels
- Acid gels
- Combination gels
- These are all called **chemically set gels**

Alginate uses

- Food applications
 - Ice cream
 - Bakery icings
 - Bakery jelly
 - Meringues
 - Salad dressings
 - Pimento stuffed olives
 - Frozen reformed onion rings

Mechanism of alginate gelation



Ionic cross-linking between carboxylate groups and calcium ions

Alginate used this week

- We are using a low calcium alginate from Kelco called Keltone
- When it reacts with calcium chloride it forms an instant gel

