FURCELLARAN BASIC PROPERTIES

Product	Furcellaran	Kappa carrageenan	Agar-agar	Alginate	Gelatine
Dissolution of:					
In pure water	Soluble > 75 ^{0}C Sodium salt is soluble in cold water	Soluble > 70^{0}C… Sodium salt is soluble in cold water	Soluble > 90^{0}C	Potassium and sodium salts are soluble in cold and hot water. Calcium salts are insoluble at neutral pH	Soluble >40^{0}C
In milk	Soluble > 75 ^{0}C	Soluble > 70^{0}C	Soluble > 90^{0}C	Insoluble.. Partly soluble in hot mik if calcium is fixed	Soluble > 40^{0}C
In sugar solutions	Soluble > 90^{0}C	Soluble in hot	Soluble > 90^{0}C	Soluble in hot	Soluble > 40^{0}C
In salt solutions	Insoluble	Insoluble	Soluble > 90^{0}C	Insoluble	Soluble > 40^{0}C
In alcohol solutions	Insoluble > 35%	Insoluble > 20%	Insoluble > 20%	Insoluble > 40%	Insoluble > 20%
Other factors influencing the solubility	Increasing > low potassium Increasing > low potassium Increasig > low calcium Increasing > increasing temperture	Increasing > low sodium Increasing > low potassium Increasig > low calcium		Increasing > low carboxyl Increasing > higher pH Increasing > low calcium	Increasing with at low MW
Viscosity of solution:	Low	Low	Low	Low at pH > 5,5 High at pH < 5,5	Low
Optimal pH of solution:	6 – 9 Heating in acidic media pH<5 will cause hydrolysis and degradation	4 - 10	2,5 - 10	2,8 – 10 pKa = 3,4 – 4,4	4,5 – 10 Iso – pH (acid)= 6,0 – 9,5
Optimal soluble matter:		0 – 40%	0 – 80%	0 – 80%	0 – 80%
Gelling condition:	Potassium, calcium present in solution. Sodium prevents gel setting. Temperature below jellification temperature (40^{0}C).	Potassium, sodium or calcium present in solution. Temperature below jellification temperature.	Temperature below 32 - 39^{0}C	pH < 4…and a calcium content of 20 – 70 mg/gr. alginate	Temperature below gelling temperature
Gel characteristics					
- Texture	Strong and brittle. Increasing with increasing content of potassium and calcium. Addition of sugar affects the gel texture from a brittle to a more elastic texture. Thermo reversible.	Strong and brittle. Increasing with increasing content of potassium and calcium. Thermo reversible.	Strong and brittle. Increasing with increasing sugar content. Thermo reversible.	Acidified gel is soft, coherent and thixotropy. Calcium gel is strong and brittle. Thermo irreversible	Soft increasing to strong. Rubber like gel. Coherent. Thermo reversible.
- Gel temperature	Increasing with increasing concentration and content of potassium and calcium. Decreasing with increasing content of sugar.	Increasing with increasing content of potassium, sodium, calcium and sugar	constant	none	Increasing with increasing MW
- Gel strength	Increasing with increasing concentration, pH and concentration of potassium and calcium.	Increasing with increasing concentration of potassium, calcium and Locust Bean Gum (LBG)	Increasing with increasing concentration. Increasing with increasing sugar concentration and pH value.	Increasing with increasing concentration of calcium, and decreasing at pH values until > 3,6.	Increasing with increasing concentration and low salt content.
Effect: Milk in neutral environment:	Increasing gel strength depending of ions exchange and ions in milk	Increasing gel strength because of ion exchange.	No effect	No effect. Insoluble	No effect
Effect: Milk and other proteins in acid environment:		Sedimentation below iso-pH value	No effect	No effect	No effect
Incompatibility:	Water soluble alcohols and ketones	Water soluble alcohols and ketones	Water soluble alcohols and ketones	Water soluble alcohols and ketones, milk, gum arabic	Water soluble alcohols and ketones, gum arabic below iso-pH value.