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FOOD & NUTRITION

SENSE THE DIFFERENCE

Cellulosics

Brenntag Food & Nutrition
North America

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Cellulosics

Cellulose, a linear polysaccharide is the most common organic compound on earth, derived from cotton and wood pulp. Cellulosics are universally used in food products for their unique functional attributes including; water binding, film forming, encapsulation, suspension, thermo-gelation and as a source of dietary fiber. The following list of cellulose ethers provides food and nutrition formulators with rheological and performance benefits in an array of applications from beverages and bakery items to confectionery and frozen products.

CELLULOSE ETHER	SOLUTION CLARITY	GRADES	DEGREE OF SUBSTITUTION		SOLUBILITY	GEL STRENGTH	GEL TEMPERATURE RANGE	PH RANGE	ACID STABILITY	VISCOSITY	RECOMMENDED DISPERSION AND HYDRATION TECHNIQUES*	KEY FUNCTIONAL PROPERTIES	POTENTIAL APPLICATIONS
Carboxymethyl-cellulose (CMC)	Excellent	Multiple	0.7-1.2		Cold or hot	N/A	N/A	4.0-10.0	Good	10-10,000 cps	Direct addition into water (added to vortex, under vigorous agitation); added to other dry materials at a 7:1 ratio (to physically separate gum particles); dispersed into oil or other non-solvents.	Thickening, water-binding, texture modification, prevention of ice & sugar crystals, foam stabilization, & protein stabilization	Beverages, bakery products, sauces, frozen desserts, syrups, icings & frostings, candies
Ethylcellulose (EC)	Excellent	N7-N200	1.25-2.6		Water insoluble (hydrophobic); soluble in many polar solvents, fats, and oils	Firm	Dependent on system	3.0-10.0	Good	3-350 cps (5% EC in 80:20 toluene: ethanol)	Ethylcellulose disperses readily in a variety of polar solvents.	Excellent film forming with stability to water, pH and light	Primarily microencapsulation for flavor masking, stabilization against active interactions, hydrolysis, oxidation and/or retard release of active ingredients
Hydroxypropyl-cellulose (HPC)	Excellent	GF, JF, LF, EF	Molar Substitution		Cold	Firm	Insoluble >104°F	3.0-10.0	Good	150 cps @ 10% - 1000 @ 1% solution	Pre-slurrying HPC in a non-solvent such as hot water or glycerin. Direct addition to water should be avoided unless under good agitation and < 95°F. Dry blending with other inert, soluble materials helps to avoid lumping.	Excellent secondary emulsification properties, film forming, water, alcohol, PEG & PG soluble, foam promotion	Whipped toppings, confectionery coatings & glazes, films (breath strip mints)
			3.4-4.4										
Methylcellulose (MC)	Excellent	A	OCH_3 Content	HP Content %	Cold	Firm	122°F-131°F	3.0-10.0	Good	15-3600 cps @ 2% solution	Direct addition into water (added to vortex, under vigorous agitation); added to other dry materials (to physically separate gum particles); dispersed into oil or other non-solvents. MC is hot water insoluble. It can be dispersed into hot water. Hydration will be achieved upon cooling.	Thermal stability, texture modification, boil out control, binding	Meat analogues, sauces, fillings
			27.5-37.51	0									
Hydroxypropyl-methylcellulose (HPMC)	Excellent	E	28.0-30.0	7.0-12.0	Cold	Semi-firm	136°F-147°F	3.0-10.0	Good	50-100,000 cps @ 2% solution	Direct addition into water (added to vortex, under vigorous agitation); added to other dry materials (to physically separate gum particles); dispersed into oil or other non-solvents. HPMC is hot water insoluble. It can be dispersed into hot water. Hydration will be achieved upon cooling.	Thermal stability, texture modification, binding, adhesion, reduced oil pick-up, volume, structure, foam promotion & stabilization	Sauces, fillings, extrusion, batters & breadings, gluten-free breads, whipped toppings
		F	19.0-30.0	3.0-12.0		Semi-firm	143°F-155°F						
		K	20.0-24.0	7.0-12.0		Soft, mushy	158°F-194°F						

* Further information on specific dispersion techniques are available from the Brenntag North America Food & Nutrition Team

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