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# HYDROCOLLOIDS

Comprehensive product lines designed  
for real-world processing needs.



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# Cargill Advantage

## Why Cargill?

- **Trusted ingredient expert with a broad portfolio of products and services**
- **Deep R&D resources with expertise in regulatory, applications and product development**
- **Proprietary marketing data and unique insights to help create innovative product solutions**
- **Reliable and sustainable U.S. supply chain**

As a customer-focused supplier of ingredients for food, beverage, personal care, industrial and agricultural applications, Cargill is uniquely positioned to help develop exciting new solutions for our customers and consumers.



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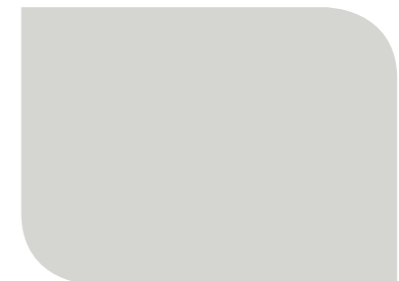
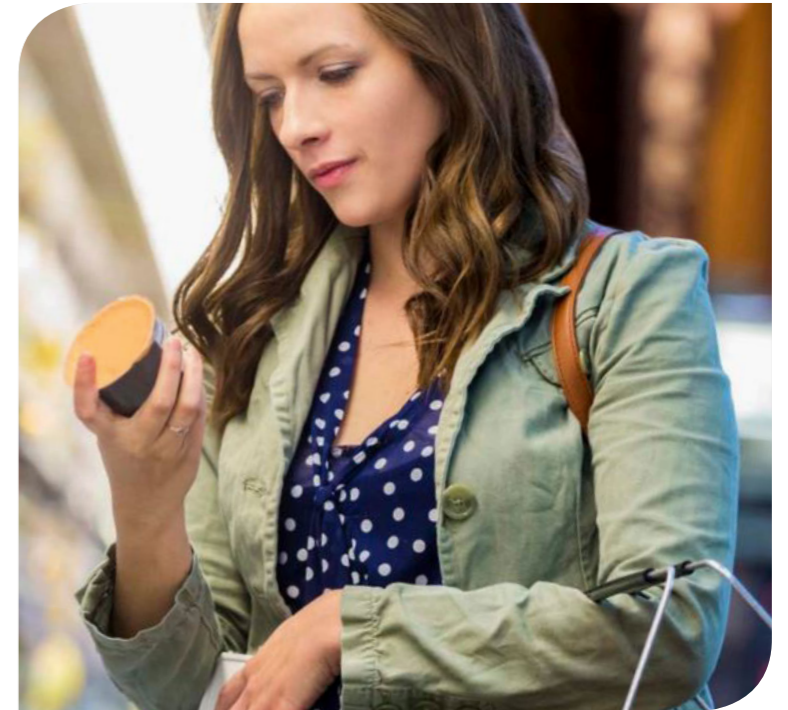
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PRODUCT PORTFOLIO

# Hydrocolloids

Cargill's deep hydrocolloid product line reflects our thoughtful approach to ingredient development. We listen to customers and refine our products to reflect their business needs. Our solutions are designed to work in the real world, formulated to perform across a wide range of processing environments. Our hydrocolloid portfolio includes:

- **Pectin**
- **Xanthan Gum**
- **Carrageenan**
- **Scleroglucan**



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# Pectin

Cargill's broad pectin portfolio helps manufacturers bring a wide range of consumer-pleasing products to market, from flavor-filled gummies to acidified dairy products. Sourced from apple pomace and citrus peel, this label-friendly hydrocolloid is an excellent thickener, gelling agent and stabilizer, even in low-sugar applications. To give manufacturers maximum flexibility in processing and product development, Cargill offers pectins with varying gel strengths, setting temperatures and rates, as well as viscosities.

- **Label-friendly**
- **Stabilizes proteins**
- **Prevents syneresis**
- **Performs well in low-pH applications**
- **Maintains decadent texture in reduced-sugar yogurts**
- **Provides body in reduced-sugar beverages**
- **Creates gelled texture in fruit preps**



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# Xanthan Gum

Derived from fermentation of bacteria found in cabbage, xanthan gum is a highly versatile hydrocolloid used to increase viscosity and stabilize emulsions in everything from salad dressings and soy sauces to frozen-ready convenience sauces and ice cream.

- **Performs in high solids, low-pH, high-salt applications and more**
- **Withstands demanding processing, including high temperature and shear stress**
- **Dissolves readily in hot or cold water**
- **Provides cling to hold sauce on pasta or meat**
- **Prevents oil separation by stabilizing emulsions**
- **Demonstrates excellent freeze/thaw stability**
- **Increases viscosity in beverages**



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# Carrageenan

Red seaweed is the source of carrageenan, which is used to make foods like yogurt, ice cream and chocolate milk smooth and creamy. Beyond its role of improving texture and mouthfeel, carrageenan is a gelling, thickening and binding agent.

- **Ideal for neutral-pH applications**
- **Maintains particle suspension**
- **Keeps fat emulsified in dairy applications**
- **Controls syneresis**
- **Produces decadent, spoonable texture in reduced-fat applications**
- **Melts quickly to create creamy mouthfeel**



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# Scleroglucan

Cargill is the only supplier of this hydrocolloid, which is produced from the fermentation of yeast. Because it stands up to extreme processing environments, scleroglucan is used in a wide range of industrial applications, from cleaning products to concrete. Its unique sensory characteristics make it a good fit for personal care products as well.

- **Withstands extreme processing, including high temperature and shear stress**
- **Dissolves in cold water**
- **Provides excellent cling and viscosity control across a wide pH range**
- **Delivers exceptional particle suspension**
- **Compatible with most surfactants**



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# Dairy

Texture and mouthfeel play critical roles in crafting decadent dairy desserts, creamy yogurts and smooth, satisfying dairy beverages. Hydrocolloids are the key, by stabilizing proteins and controlling syneresis—while at the same time, creating the creamy, melt-in-your-mouth textures that so often define the category.

| APPLICATION   | BENEFIT  | HYDROCOLLOIDS              |
|---|--|----------------------------|
| Acidified Dairy Beverages<br>Yogurt   | Mouthfeel<br>Particle suspension<br>Protein stability in low-pH<br>Syneresis control                                 | Pectin                     |
| Neutral Dairy Beverages <ul style="list-style-type: none"> <li>• Chocolate and flavored milks</li> <li>• High-protein milks</li> <li>• Protein/nutritional beverages</li> </ul> | Creamy mouthfeel<br>Fat mimetic<br>Homogenization stabilizer<br>Particle suspension                                  | Carrageenan<br>Xanthan Gum |
| Dairy Desserts <ul style="list-style-type: none"> <li>• Ice cream</li> <li>• Flan</li> <li>• Mousse</li> </ul>  | Creamy, spoonable texture<br>Enhanced meltability for<br>decadent mouthfeel<br>Gelled structure<br>Syneresis control | Carrageenan<br>Pectin      |



DAIRY



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# Convenience/Culinary

Hydrocolloids are sauces' and dressings' key to convenience. Culinary products rely on hydrocolloids to create the consistent, smooth textures consumers expect. In the convenience arena, these hard-working ingredients must stand up to a range of pH levels, numerous freeze-thaw cycles and demanding microwave cooking, while controlling syneresis and maintaining viscosity through it all. For dressings, hydrocolloids provide the “cling” needed to stick to salads.

| APPLICATION | BENEFIT   | HYDROCOLLOIDS                        |
|-------------|---|--------------------------------------|
| Dressing    | Cling<br>Flavor release<br>Particle suspension (spices)<br>Ideal for reduced-fat, sugar<br>or sodium applications   | Carrageenan<br>Pectin<br>Xanthan Gum |
| Sauces      | Cling<br>Flavor release<br>Freeze-thaw stability<br>Microwavability<br>Particle suspension (spices)<br>Ideal for reduced fat, sugar<br>or sodium applications | Xanthan Gum                          |



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# Beverages

In many ways, advances in hydrocolloids are responsible for much of the innovation exploding in the beverage aisle. They keep cocoa, protein and other ingredients in suspension. They stabilize flavors and protect proteins from high heat and acidic juices. In reduced-sugar applications, they can even replicate the mouthfeel of sugar.

| APPLICATION             | BENEFIT   | HYDROCOLLOIDS              |
|-------------------------|---|----------------------------|
| Dry Powdered Beverages  | Mouthfeel<br>Particle suspension<br>Rapid dispersion<br>Syneresis control     | Carrageenan<br>Xanthan Gum |
| Juices                  | Cloud homogenization<br>Mouthfeel<br>Particle suspension<br>Syneresis control | Pectin                     |
| Reduced-Sugar Beverages | Flavor stabilizer<br>Replicate mouthfeel of sugar                             | Pectin                     |
| UHT/Retort Beverages    | Mouthfeel<br>Particle suspension<br>Protect proteins from high heat           | Carrageenan<br>Pectin      |



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# Confectionery

For confectionery applications, pectin is the go-to solution. Made from citrus fruits, it is widely recognized and accepted by consumers. Cargill's extensive pectin product line includes options ready-made for a wide variety of processing conditions. They also partner well with other hydrocolloids, enabling manufacturers to create novel confectionery products with unique textures.

| APPLICATION                        | BENEFIT  | HYDROCOLLOIDS |
|------------------------------------|--|---------------|
| Gummies<br>Fillings<br>Fruit Paste | Resistant to melting in hot climates<br>Structure<br>Syneresis control | Pectin        |



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# Desserts

Hydrocolloids' functionality and versatility shine in dessert applications, giving water-gel desserts their unique structures, providing heat stability to bakery fillings, and ensuring glazes retain their mouthwatering appearances.

| APPLICATION        | BENEFIT  | HYDROCOLLOIDS         |
|--------------------|--|-----------------------|
| Bakery Fillings    | Excellent heat stability   | Pectin                |
| Glazes             | Prevent glaze weeping<br>Maintain shine                                  | Pectin                |
| Water-Gel Desserts | Good flavor release<br>Structure<br>Unique textures, from firm to creamy | Carrageenan<br>Pectin |



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# Personal Care Applications

In beauty applications, hydrocolloids control viscosity and stabilize emulsions. They're also responsible for many of the sensory properties that determine consumers' satisfaction with their personal care products, creating luxurious-feeling lotions and shampoos with rich lathers.

| APPLICATION   | BENEFIT   | HYDROCOLLOIDS                        |
|---|---|--------------------------------------|
| Hair Care <ul style="list-style-type: none"> <li>• Conditioners</li> <li>• Shampoos</li> </ul>                  | Cling<br>Lather (in shampoos)<br>Stabilize oils and<br>non-soluble particulates<br>Tame frizzy hair (pectin)<br>Viscosity | Carrageenan<br>Pectin<br>Xanthan Gum |
| Body Care <ul style="list-style-type: none"> <li>• Creams</li> <li>• Facial masks</li> <li>• Lotions</li> </ul> | Emulsion stabilizer<br>Decadent feeling<br>Good "play" time<br>Help maintain proper skin pH (pectin)                      | Carrageenan<br>Pectin<br>Xanthan Gum |

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# Industrial Applications

In industrial and agricultural applications, hydrocolloids are truly put to the test. Here, the unique rheological properties and high thermal stability of scleroglucan and xanthan gum provide reliable solutions in a wide range of applications, from cleaning products to drilling.

| APPLICATION         | BENEFIT   | HYDROCOLLOIDS               |
|---------------------|---|-----------------------------|
| Industrial Cleaning | Even suspension of active ingredients<br>Residence time (cling)<br>Surfactant friendly  | Scleroglucan<br>Xanthan Gum |
| Industrial Drilling | Anti-settling properties enable even distribution of actives and particles<br>High thermal stability, protecting drill bits from heat<br>High shear stability<br>High viscosity | Scleroglucan<br>Xanthan Gum |

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To learn more, contact your Cargill sales representative.

## Cargill

15407 McGinty Road West, MS 62

Wayzata, MN 55391

Phone: 877-SOL-UTNS (765-8867)

[www.cargillfoods.com/hydrocolloids](http://www.cargillfoods.com/hydrocolloids)

