ACROSS BIOTECH
MAKE A DIFFERENCE

Cultured Dextrose Q&A

1. Composition and active ingredient

"When talking about propionic acid, is it expressed as free propionic acid, as propionate, or as propionic acid equivalent?"

It's propionic acid equivalent. As cultured dextrose powder is its calcium salt or sodium salt.

"Is the organic acid content constant between batches? What range do you guarantee in the specification?"

Parameter	For Bakery Spec (min) (Calcium salt base)	For Other App Spec (min) (Sodium salt base)
Total organic acids salts	≥ 70 %	≥ 70 %
Propionate	≥ 50 %	≥ 40 %
Acetate	≥ 15 %	≥ 25 %
Lactate	≥ 6 %	≥ 6 %
Moisture	≤ 8 %	≤ 8 %

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2. Origin and process

"What is the fermentation substrate?"

For Cultured Dextrose, we use Food-grade dextrose monohydrate, derived from non-GMO corn starch. No allergenic substrate is involved (the dextrose is hydrolyzed corn starch — gluten- and dairy-free). Non-GMO certificate available per lot.

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"What type of fermentation is used?"

Submerged, anaerobic, batch fermentation in stirred-tank fermenters at 30 °C with controlled pH, run for xxx hours. No surface or solid-state fermentation. No solvents, no chemical extraction, no acid spiking at any stage.

"Does the product contain live microorganisms or is it completely inactivated?"

Completely inactivated. After fermentation the broth is thermally pasteurized (≥ 75 °C, sustained hold) before evaporation and spray drying. Total viable count on the finished powder is ≤ 1,000 cfu/g, with the producing organism not detectable. Safe for use without further heat treatment.

What strain or microbial family is involved in the process?

P-type: Propionibacterium Freudenreichii subsp. shermanii (FDA GRAS, GRN 128). The strain identity is disclosed in our technical documentation and may be declared in formulators' B2B specifications. It is NOT required to appear on the consumer label.

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3. Recommended applications

"What types of foods are they currently applying it to?"

Below is a category map.

Category	Typical products	Fit
Bakery	Sliced bread, buns, muffins, refrigerated dough	★★★★★
Tortillas & flatbreads	Wheat tortillas, flatbreads, naan, pita	★★★★★
Dairy	Sour cream, yogurt, cottage cheese, dips	★★★★☆
Plant-based dairy	Oat / soy yogurt, vegan cheese, plant dips	★★★★☆
Cheese	Surface treatment, processed cheese, slices	★★★★☆
Sauces & dressings	Salsa, hummus, mayonnaise, BBQ, dressings	★★★★★
Bakery fillings	Fruit fillings, custard, savoury fillings	★★★★☆
Intermediate-moisture	Cereal bars, fruit fillings, jerky, soft cookies	★★★★☆
Meat & deli (with vinegar)	Cured / refrigerated deli meats, fresh sausage	★★★★☆ (LAB-type preferred)

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"Do they have experience with dairy products, sauces, baking, fillings, cheeses or products with intermediate moisture?"

Yes

"What matrices do you consider most suitable for this ingredient?"

Cultured Dextrose performs best in intermediate-moisture, neutral-pH foods where mold, rope-forming bacteria or Listeria are the principal spoilage threats.

"Are there any applications where use is not recommended?"

Clear / transparent beverages — causes haze and turbidity.
Foods already below pH 3.0 — redundant; the acid environment already controls spoilage.
Infant formula and FSMP — regulatory exclusion in most jurisdictions.
Very plain, neutral-flavored items — where the mild fermented note cannot be masked (mineral water, very neutral mild dairy).

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4. Dosage of use

"What is the recommended dose according to application?"

Dose by application (% on total finished-product weight)

Application	Min	Typical	Max (sensory)
Sliced bread, buns	0.3 %	**0.5 %**	0.8 %
Wheat tortillas, flatbreads	0.5 %	**0.8 %**	1.2 %
Gluten-free tortillas	0.6 %	**1.0 %**	1.5 %
Cakes, muffins, dough	0.3 %	**0.5 %**	0.8 %
Sour cream, yogurt, dips	0.2 %	**0.4 %**	0.8 %
Cheese (surface / interior)	0.5 %	**1.0 %**	2.0 %
Salad dressings, sauces	0.3 %	**0.5 %**	1.0 %
Salsas, hummus, fillings	0.4 %	**0.7 %**	1.2 %
Meat (deli / refrigerated)	0.5 %	**0.8 %**	1.5 %

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“Do you have a minimum effective dose and a maximum recommended dose due to sensory or regulatory impact?”

0.2%-2%

“Is the dose calculated on the final product or on the aqueous phase?”

Dose is calculated on total finished-product weight (% w/w), not on aqueous phase. This matches the FDA GRAS framework (≤ 2 % w/w upper bound). For very-high-fat systems (> 50 % fat) we provide a separate aqueous-phase calculation on request.

“What factors raise or lower the dose: pH, aw, salt, sugar, fat, protein, heat treatment?”

Increase dose if

pH > 5.5 ·
aw > 0.95 ·
high initial microbial load ·
low salt and low sugar ·
long ambient shelf life targeted ·
high fat content (active partitions into aqueous phase only)

Reduce dose if

pH < 4.5 ·
aw < 0.85 ·
paired with other hurdles (refrigeration, modified atmosphere, vinegar) ·
high salt / high sugar ·
short cold-chain shelf life

5. pH range and effectiveness conditions

“In what pH range does it work best?”

≤4

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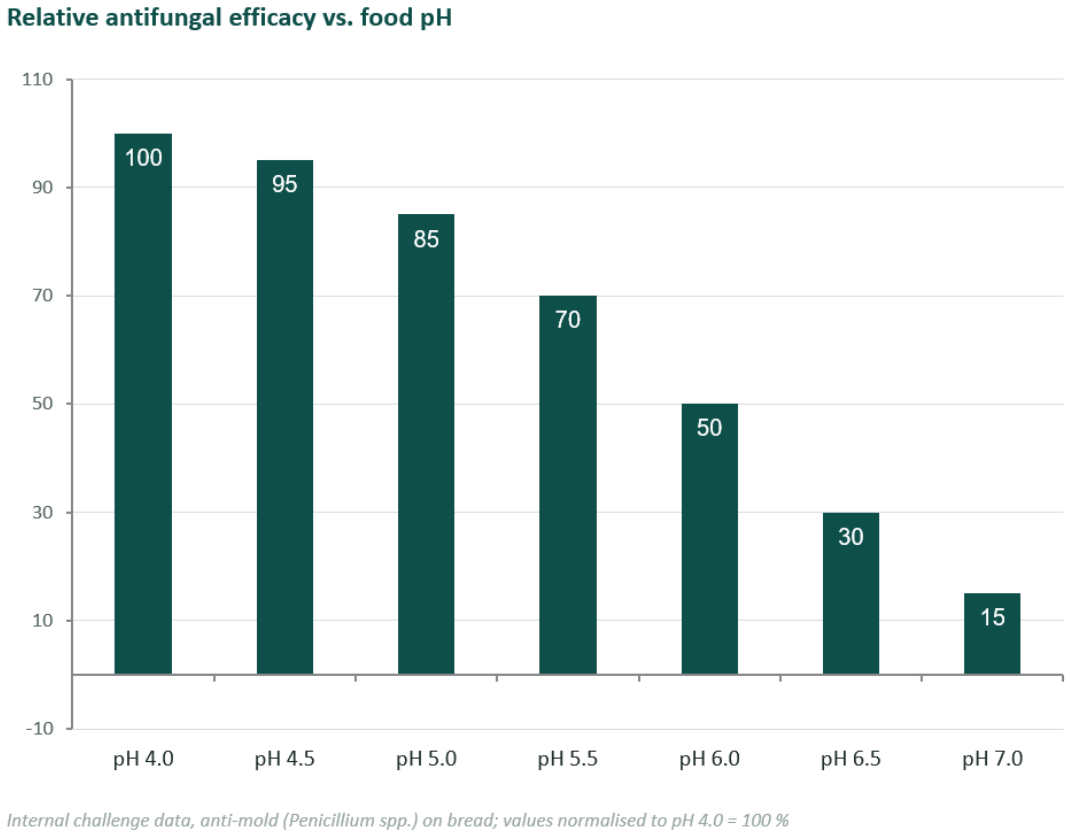

Internal challenge data, anti-mold (Penicillium spp.) on bread; values normalised to pH 4.0 = 100 %

"Does it maintain effectiveness in products close to neutral pH?"

Yes

"Does the product need the food to be below a certain pH to work properly?"

Optimal range — pH 4.0 to 5.5

Propionic acid pKa = 4.87. Below this pH most of the acid is undissociated — the active form that penetrates microbial cell walls. Typical bakery and dairy products at pH 4.0 – 5.5 show full efficacy at standard dose.

Near-neutral pH — 5.5 to 6.5

Still effective and widely used. Most sliced bread, tortillas, sour cream and dressings operate here. Use the higher end of the recommended dose. No hard pH cutoff — efficacy declines gradually, not abruptly.

Above pH 6.5 — reduced efficacy

Either increase dose (up to 2× standard) or pair with a mild pH-adjusting acid such as buffered vinegar, lactic acid or lemon juice extract. We have data correlating pH, dose and shelf-life extension — happy to share on request.

"Do you have data relating pH, dosage and shelf life?"

No.

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6. Antimicrobial spectrum

"Against what microbiological groups have the efficacy been validated?"

We have characterized the antimicrobial profile through internal challenge studies and published literature. Sensitivity is rated on a 1-to-5 scale; the values below assume our standard dose range in a typical food matrix.

Organism group	Sensitivity	Representative species	Best-suited type
Molds	★★★★★	*Penicillium spp., Aspergillus spp., Rhizopus, Mucor*	P-type
Rope-forming Bacillus	★★★★★	*B. subtilis, B. licheniformis (bread rope)*	P-type
Listeria & Gram-positive	★★★★☆	*Listeria monocytogenes, Staphylococcus aureus*	LAB-type
Lactic spoilage organisms	★★★★☆	*Leuconostoc, heterofermentative LAB*	LAB-type
Yeasts (osmotolerant)	★★★☆☆	*Zygosaccharomyces rouxii, Saccharomyces cerevisiae*	P-type
Gram-negative (low pH)	★★★☆☆	*E. coli, Salmonella below pH 5.0*	Either
Gram-negative (neutral pH)	★★☆☆☆	*Pseudomonas spp., Salmonella above pH 6.0*	Use with vinegar

Choosing P-type vs LAB-type. Both types share the cultured-dextrose declaration. P-type is the stronger anti-mold and anti-Bacillus choice (bakery, tortillas, refrigerated dough). LAB-type is the stronger anti-Listeria choice (refrigerated deli meats, dairy, RTE foods). They can be blended for broad-spectrum control under a single "cultured dextrose" label.

LAB-type is from lactobacillus fermentation
P-type is from propionibacterium fermentation

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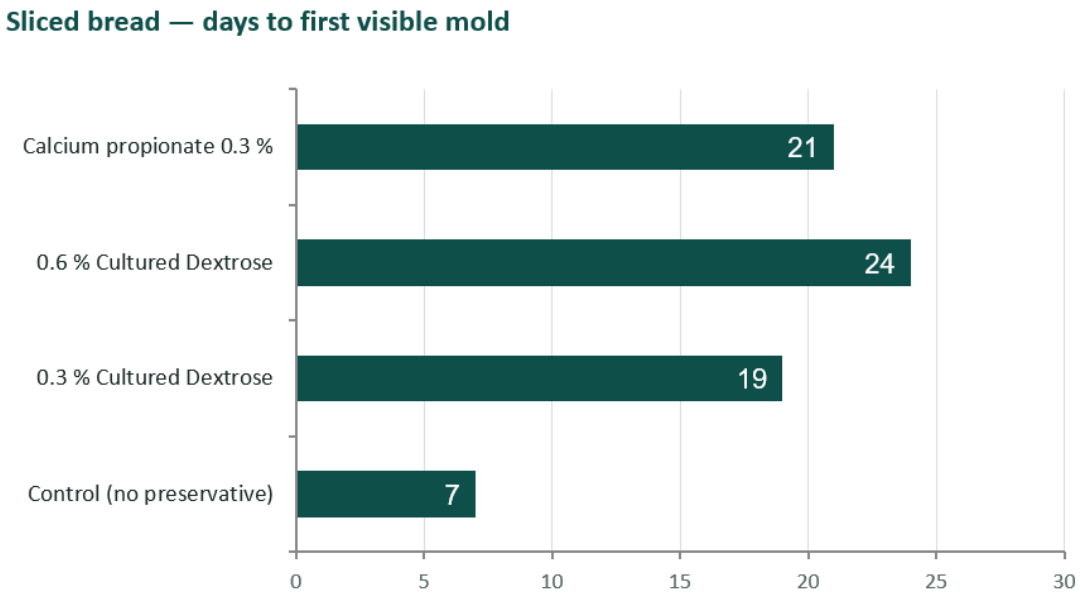
"Do you have data against molds and yeasts?"



"Which microorganisms are more sensitive to the product and which are more resistant?

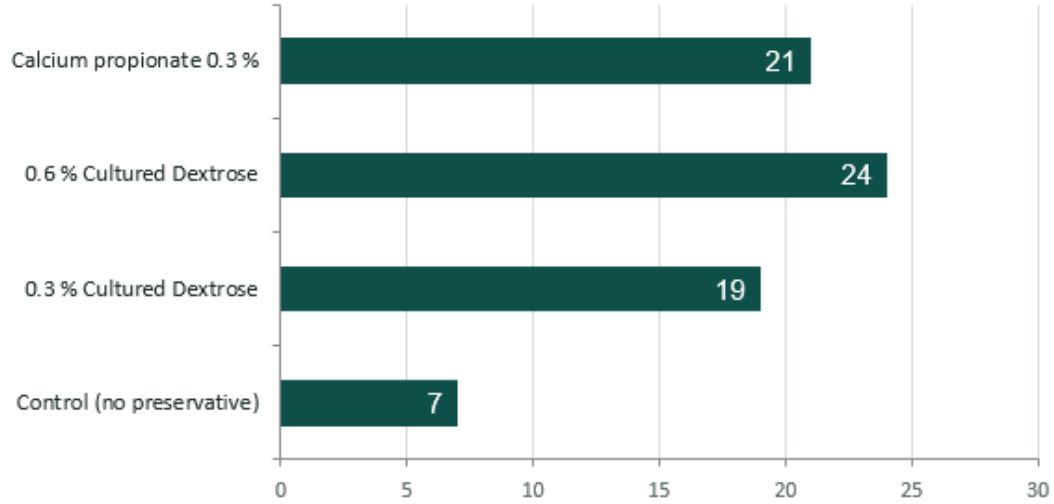
Molds and Rope-forming Bacillus is most sensitive, Gram-negative (neutral pH) is most resistant.

7. Studies and tests

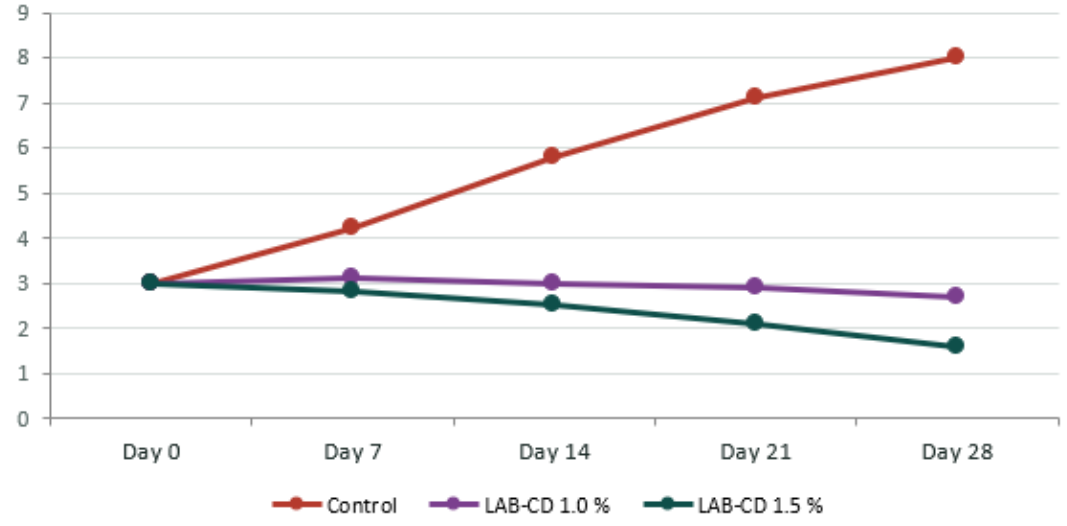
"Do you have shelf-life studies on real foods?"

Below are two representative internal challenge studies.

Sliced bread — days to first visible mold



RTE deli turkey — Listeria growth at 4 °C



"Can you share any comparative study with us, even if it is anonymized?"

Yes. Full anonymized data sets for all studies listed are available; raw data and protocols can be shared once an NDA is in place.

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8. Sensory impact

"At what dose does it start to be noticeable in taste or smell?"

2%

"Does it provide acidic, fermented, dairy, propionic or cheese notes?"

P-type. Mild Swiss-cheese / cultured cream note from propionic acid.
LAB-type. Buttery, cultured-dairy note from diacetyl. Both read as "fermented", not as "chemical / preservative".

"Do you have sensory panel data?"

Matrix-by-matrix sensory map

Matrix	Threshold (panel)	Maskability	Notes
White sliced bread	~ 0.8 %	Moderate	*Works well at 0.4 – 0.6 %; toast masks further.*
Whole wheat / multigrain bread	> 1.0 %	Excellent	*Grains carry the note — typically undetectable at use rate.*
Tortillas (wheat or corn)	> 1.2 %	Excellent	*Corn especially — primary application globally.*
Sour cream, yogurt	~ 0.8 %	Moderate	*Cultured-dairy note is matrix-compatible.*
Cheese, processed cheese	> 1.5 %	Excellent	*Naturally cultured matrix — flavour synergistic.*
Spiced salsas, BBQ, garlic sauces	> 2.0 %	Excellent	*Strong flavours dominate.*
Plain mayonnaise / mild dressing	~ 0.5 %	Excellent	*Limited flavour exposed*
Plain crackers, very neutral dough	~ 0.6 %	Limited	*Pair with herbs / spices to mask.*

"In which matrices is best masked and in which can it be most noticeable?"

Sauce and other strong-tasted products are best masked. Plain crackers, bread is most noticeable.

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9. Solubility and factory use

"Does it cause caking, hygroscopicity or dispersion problems?"

Hygroscopic — mildly. Keep packaging sealed; once opened, use within 12 months. No special anti-caking needed if storage RH < 65 %.

Dispersion. Disperses readily in water; partially soluble. Fully dispersible in dough, slurries, batters, dressings.

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“Can it be added before pasteurization, cooking, baking or UHT?”

Yes. Cultured Dextrose tolerates standard food-process thermal loads with minimal active loss.

Pasteurization (65–85 °C). Add before or after; no measurable loss of activity.

Baking (up to 220 °C, 15–30 min). < 5 % loss in typical bread baking. Add with the dry ingredients.

UHT (135–145 °C, 4 s). Minimal degradation; suitable for UHT dairy and plant-based drinks.

Autoclave / retort (121 °C, 15–30 min). Tolerates with < 10 % loss; recommended for canned and retort products.

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10. Stability

“What stability does it have against temperature?”

⩽ 10 % loss across all standard food thermal processes

“Does it lose activity with pasteurization, baking, autoclaving or prolonged storage?”

Pasteurization (65–85 °C), 0% loss
UHT (135–145 °C, 4 s), < 3 % loss
Bread baking (220 °C int.), < 5 % loss
Autoclave (121 °C, 30 min), < 10 % loss

SHELF LIFE OF THE POWDER

24 months
in original sealed packaging, < 25 °C, < 65 % RH. No refrigeration required.
Active retention at 24 months ⩾95%
No browning / oxidation, spray-dried matrix is stable

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IN-PRODUCT STABILITY

Full shelf life, no progressive efficacy loss observed in 6-month trials on bread and tortilla at ambient.
Bread, ambient — 6 months, no efficacy loss
Tortilla, ambient — 6 months, no efficacy loss
Sour cream, chilled — 4 months, no efficacy loss

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11. Labeling and regulation

Cultured Dextrose is a food ingredient produced by traditional fermentation. It does not carry an E-number and is not required to be declared as a "preservative" on the consumer-facing label.

“Declaration on the label within the EU?”

Reg. (EC) 1333/2008
Defines preservatives as additives with assigned E-numbers (e.g. calcium propionate = E282). Cultured Dextrose falls outside this regulation because the organic acids are produced in situ by the microbial culture from a food-grade substrate — they are not added as purified chemical actives.

“Do you have a regulatory opinion or labeling letter?”

ACCEPTED DECLARATIONS On the ingredient list
Cultured dextrose
Fermented dextrose
Cultured sugar
Fermented sugar

“Is it authorized for all food categories or are there restrictions per application?”

Cultured Dextrose is not permitted in infant formula or in "foods for special medical purposes" in most jurisdictions.

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“Is there a dosage limit per food category?”

In EU, No specific limit; quantum satis principle (lowest level needed to achieve technological effect).

In USA, ⩽ 2 % w/w in listed categories: cheese, sauces, dressings, sausages, soups, deli salads, salsas, pasta, tortillas, muffins, cereal bars, sour cream, yogurt, hash browns.

“Can it be declared as fermented dextrose / cultured dextrose / fermented ingredient?”

fermented dextrose / cultured dextrose

''In any case should it be declared as an additive or preservative?

No.

Approved declarations and category coverage by region

Region	Status	Acceptable label declaration	Category / dosage limits
USA (FDA)	GRAS (basis GRN 128)	*"Cultured Dextrose", "Cultured Sugar"*	≤ 2 % w/w in listed categories: cheese, sauces, dressings, sausages, soups, deli salads, salsas, pasta, tortillas, muffins, cereal bars, sour cream, yogurt, hash browns.
European Union	Food ingredient under Reg. (EC) 178/2002	*"Cultured dextrose" or "Fermented dextrose"*	No specific limit; quantum satis principle (lowest level needed to achieve technological effect).
China (NHC / GB)	Approved fermentation product	*"发酵糖" / "Cultured Dextrose"*	Follow GB 2760 general food-ingredient principles; no specific limit.
Australia / NZ (FSANZ)	Acceptable food ingredient	*"Cultured Dextrose" or "Fermented Sugar"*	No specific limit; general food-ingredient framework applies.
MERCOSUR	Accepted	*"Cultured Dextrose" / "Dextrosa fermentada"*	No specific limit; member-state ingredient regulations apply.
Japan	Food ingredient (Food Sanitation Act)	*"発酵デキストロース"*	No specific limit.
GCC / MENA	Accepted under regional frameworks	*"Cultured Dextrose"*	No specific limit; halal certification available on request.

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