WHEY FERMENTATE POWDER

A cultured whey-based solution for clean-label food preservation

APPLICATIONS

- Meat and prepared foods
- Dairy products
- Bread and bakery
- Flour-based foods

Supports spoilage control and shelf-life management

Product description

This food ingredient is produced by fermentation from glucose, whey powder, and yeast extract using Propionibacterium freudenreichii subsp. shermanii and Lactiplantibacillus plantarum. It is designed for use in meat, dairy, bakery, and flour-based foods to help reduce spoilage risk and support a longer best-quality window. The ingredient is intended for formulations pursuing a clean-label positioning.

Use level and labeling must be validated for the specific food matrix, process, and destination market.

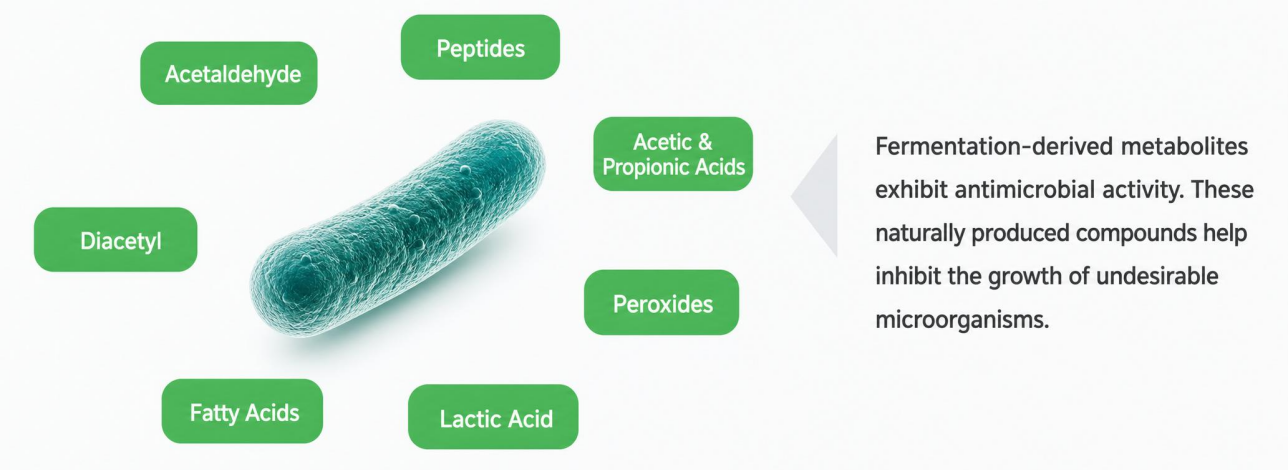
Product features

- Produced with food-grade fermentation cultures described in the source material as having GRAS status for their intended uses.
- Broad antimicrobial activity that can help manage common spoilage bacteria and molds, including risks associated with secondary contamination.
- Good formulation compatibility, with straightforward incorporation into common food-processing systems.

Mode of action

Why can the fermentate inhibit microbial growth?

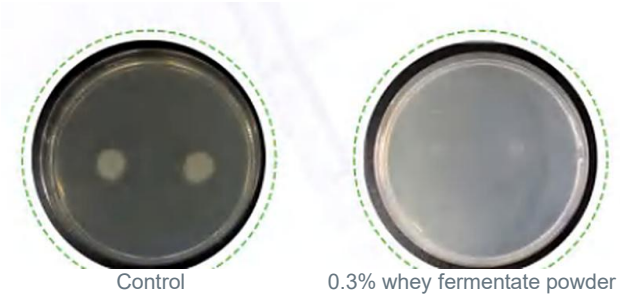
Fermentation-derived bacteriocins, organic acids, and other low-molecular-weight metabolites can create multiple hurdles that suppress microbial growth and help extend product shelf life.



Inhibition of Bacillus subtilis

Culture conditions
37 C, constant-temperature incubation for 24 h

Addition level
0.3% whey fermentate powder



Control | 0.3% whey fermentate powder

Inhibition of Escherichia coli

Culture conditions
37 C, constant-temperature incubation for 24 h

Addition level: 0.3%

A clear inhibitory effect was observed under the stated test conditions.

Control | 0.3% whey fermentate powder

Application example: microbial control in braised meat

Addition level: 0.3%. In the braised-meat study, samples containing whey fermentate powder remained more than 3 log units lower in aerobic plate count than untreated samples. Under the stated conditions, the usable shelf-life window was extended by approximately 7 days.

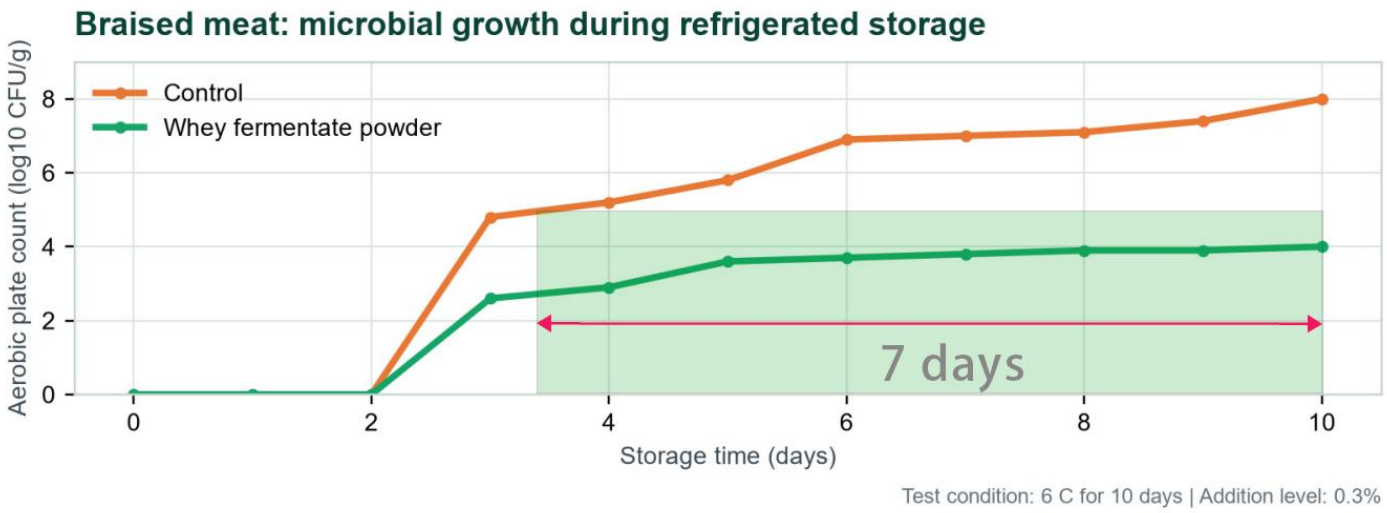


Figure 1. Aerobic plate count during storage at 6 C for 10 days. Values were redrawn from the source graph; raw replicate data were not supplied.

Freshly prepared control | Treated, day 10 at 6 C

Sensory observations after 10 days

Color: No obvious difference from freshly prepared braised meat.

Aroma: No obvious difference from freshly prepared braised meat.

Eating quality: No obvious difference from freshly prepared braised meat.

Panel: n=5 (2 chefs, 2 R&D staff, and 1 quality-control staff member).

Bakery application preview

At 0.3% in sliced toast bread, the treated sample remained more than 2 log units lower in aerobic plate count than the untreated control. Under the stated study conditions, shelf life was extended by approximately 5 days.

Application example: microbial control in sliced toast bread

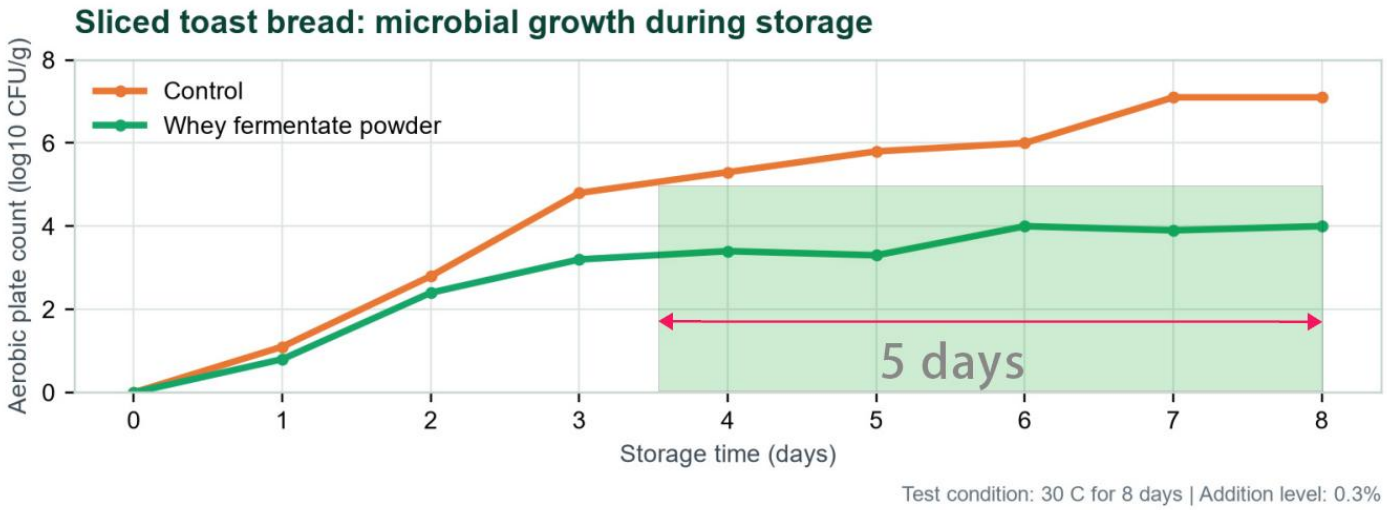
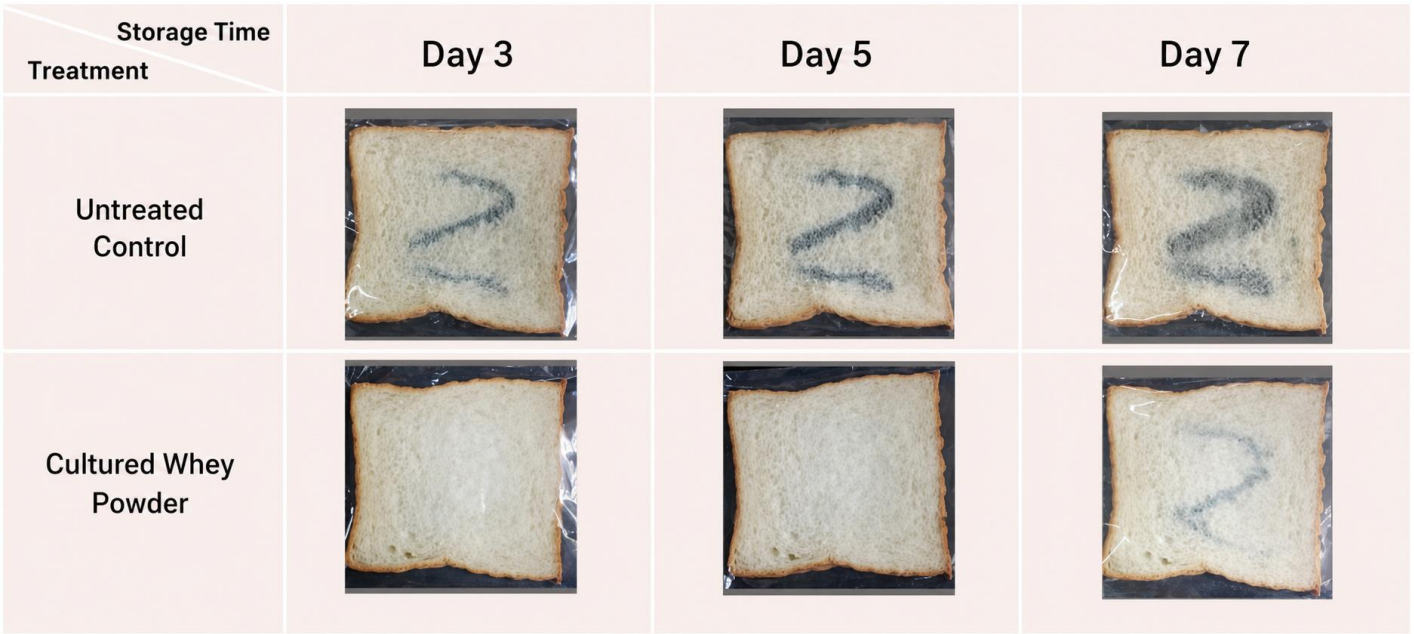


Figure 2. Aerobic plate count during storage at 30 C for 8 days. Addition level: 0.3%.

Challenge study: Penicillium spp.

Artificial inoculation study. Visible mold appeared in the untreated bread on day 3. Bread containing whey fermentate powder showed visible mold on day 7, supporting a delayed mold-out response under the stated challenge conditions.



Challenge conditions: 30 C, 60% relative humidity, mold-spore suspension 10^2-10^3 CFU/mL.

Dairy application preview
At 0.15% in yogurt, the whey fermentate powder markedly suppressed mold growth during refrigerated storage and supported a longer shelf-life window in the source study.

Application example: mold control in yogurt

Addition level: 0.15%. Compared with the untreated control, the treated yogurt showed substantially lower mold counts during refrigerated storage.

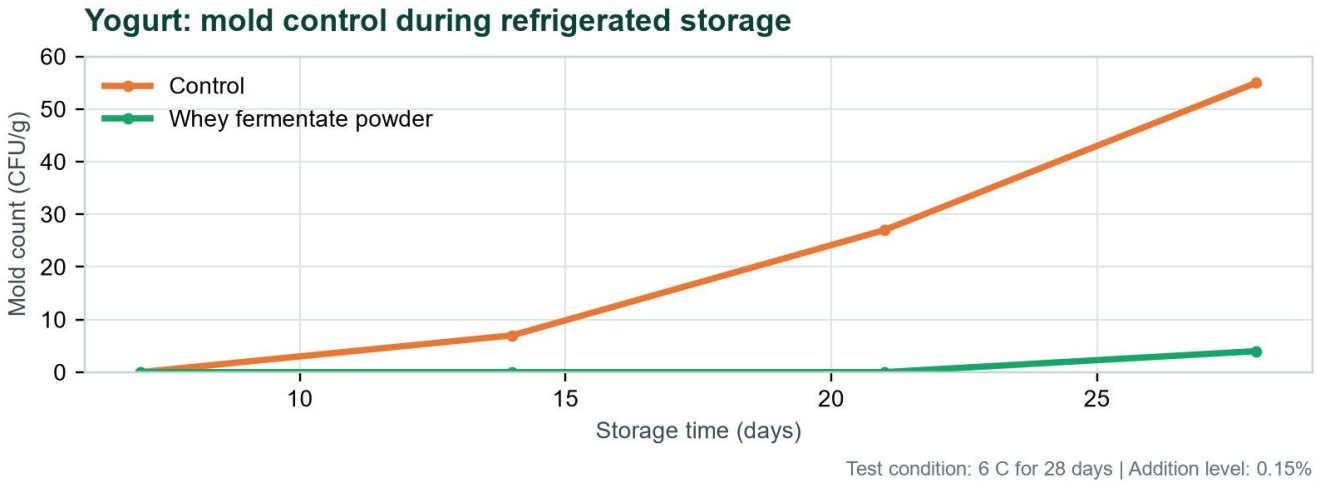


Figure 3. Mold count during storage at 6 C for 28 days. Values were redrawn from the source graph; raw replicate data were not supplied.

Open-container observation

Untreated control 0.15% whey fermentate powder

0.15% addition

Open at room temperature for 4 days

The untreated sample showed visible mold; the treated sample remained visually clean in the source image.

Application example: pH development and sensor y quality

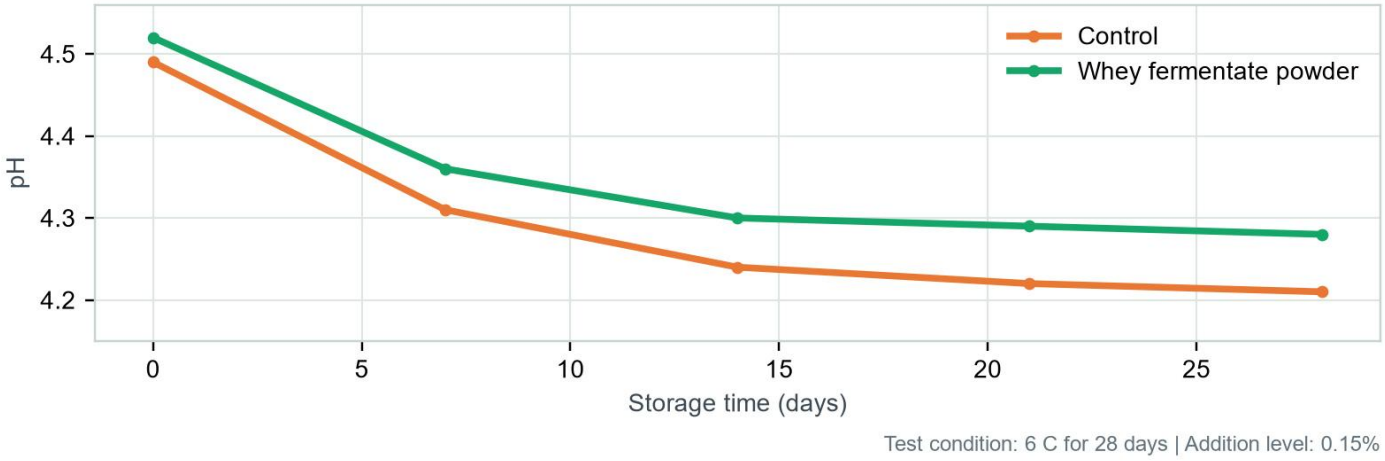
Addition level: 0.15%. During yogurt storage, the treated sample maintained a slightly higher pH. The source assessment also described a fine body, stronger yogurt aroma, and a milder sour taste.

Interpretation

The observed pH and sensory differences are product- and process-specific. Confirm performance through matrix-specific trials, appropriate controls, replicate testing, and market-specific regulatory review.

Yogurt pH development during refrigerated storage

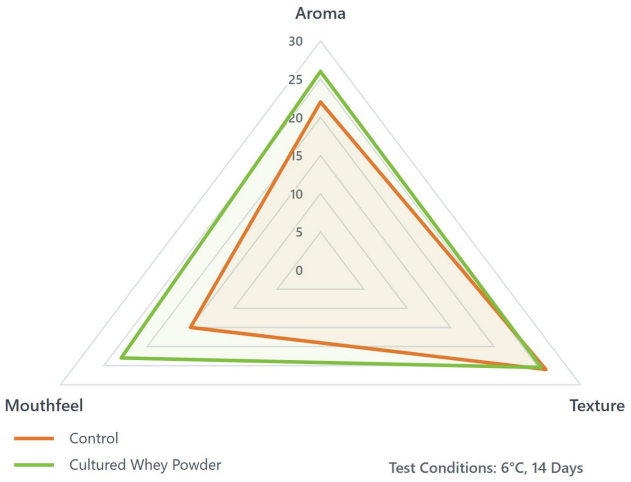
Yogurt: pH development during refrigerated storage



Test condition: 6 C for 28 days | Addition level: 0.15%

Figure 4. Yogurt pH during storage at 6 C for 28 days. Addition level: 0.15%.

Sensory profile after refrigerated storage

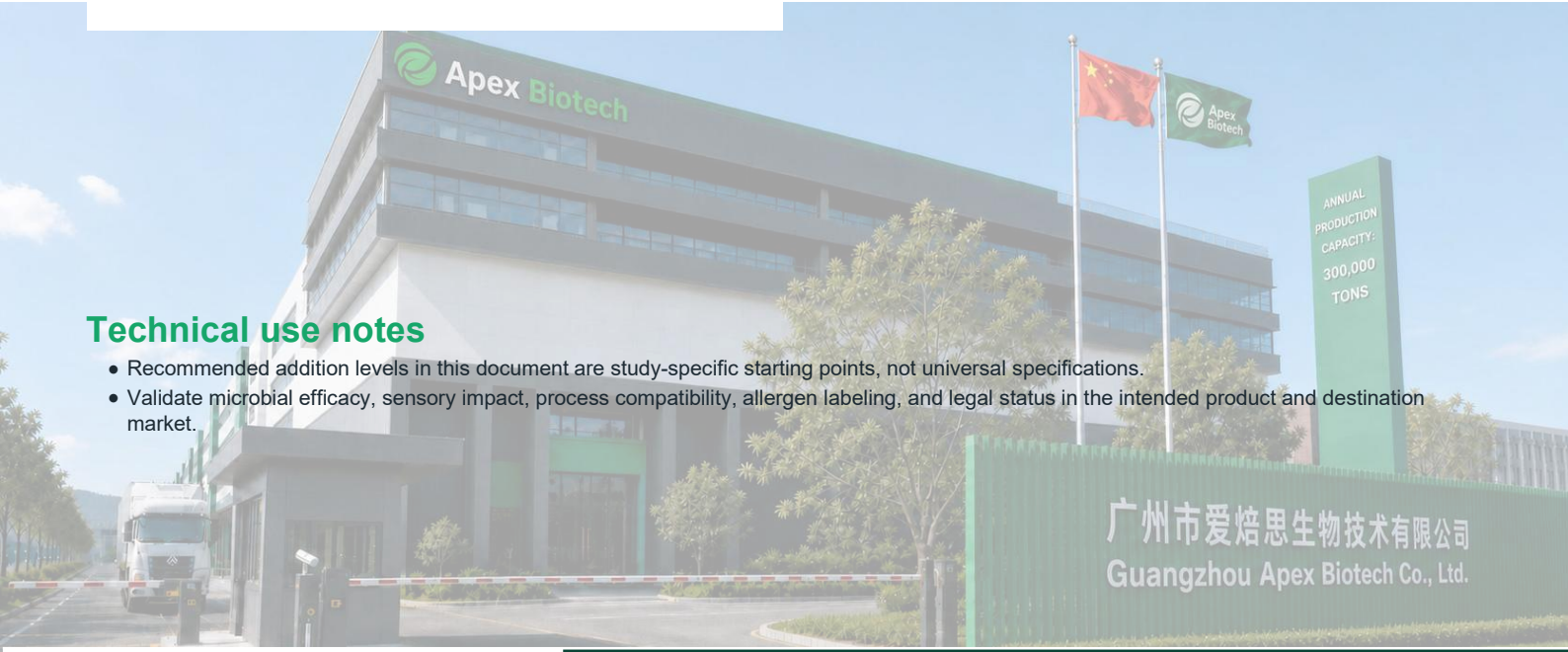


Test conditions

- 6 C storage
- 14-day sensory evaluation
- Attributes: aroma, texture, and taste

Source interpretation

The treated yogurt was described as having a finer body, a more pronounced yogurt aroma, and a milder sour taste.



Technical use notes

- Recommended addition levels in this document are study-specific starting points, not universal specifications.
- Validate microbial efficacy, sensory impact, process compatibility, allergen labeling, and legal status in the intended product and destination market.

Apex Biotech

Guangzhou Apex Biotech Co., Ltd.
Technical inquiries: info@foodapexbio.com
Website: www.foodapexbio.com
Contact Number: +86 186 6655 7231
Add.: Room 803A(8395),1268 Guangzhou Avenue Middle, Tianhe District, Guangzhou City, Guangdong Province，China

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