



Technical Data Sheet
(EB - BL06)
Bacillus licheniformis

1. Taxonomy:

- Domain: Bacteria
- Phylum: Firmicutes
- Class: Bacilli
- Order: Bacillales
- Family: Bacillaceae
- Genus: Bacillus
- Species: Bacillus licheniformis

2. Microscopic Appearance:

- Gram stain: Positive
- Morphology: Rod-shaped bacterial cells
- Size: 0.8–1.2 μm $\times$ 2.0–4.0 μm
- Arrangement: Single or chains
- Motility: Motile
- Spore Formation: Endospore-forming

3. Culture Description:

- Growth Medium: Nutrient agar / Bacillus selective media
- Incubation Conditions: Aerobic at 30–37°C for 24–48 hours
- Colony Morphology: Cream to off-white, rough, irregular colonies

4. Physiological Characteristics:

- Oxygen Requirement: Aerobic/ Facultative anaerobe
- Temperature Range: 25–50°C (optimal 30–37°C)
- pH Range: 5.5–8.5
- Enzyme Production: Produces protease, amylase, lipase
- Spore Resistance: High resistance to heat and environmental stress

5. General Functional Attributes:

- Digestive Support: Enhances digestion via enzyme production

- Gut Health: Supports microbial balance (mainly feed/industrial use)
- Industrial Enzyme Production: Widely used for enzyme manufacturing
- Pathogen Inhibition: Produces antimicrobial peptides
- Stability: Excellent due to spore formation

6. Test Specifications:

- Appearance: Off-white to light beige powder
- Odor: Characteristic
- Moisture Content: $\leq 7\%$
- Mesh Size: NLT 90 % passes through 60 mesh #
- Viable Cell Count: 1–200 Billion CFU/g

7. Pathogen and Contaminant Testing:

- *Salmonella spp.*: Absent in 25g
- *Escherichia coli*: Absent in g
- *Staphylococcus aureus*: Absent in g
- *Pseudomonas aeruginosa*: Absent in g
- Yeasts and Molds: <100 CFU/g
- Coliforms: Absent in g

8. Heavy Metals Analysis:

- Lead (Pb): <1.0 ppm
- Arsenic (As): <0.5 ppm
- Cadmium (Cd): <0.5 ppm
- Mercury (Hg): <0.1 ppm

9. Packaging and Storage:

- Packaging: Aluminium foil laminated bags / HDPE drums
- Storage Conditions: Store at $\leq 25^\circ\text{C}$ in a dry, dark place
- Long Term Storage: 2–8°C recommended
- Shelf Life: 24 months under recommended conditions

10. General Applications:

- Animal Feed Additives
- Industrial Enzyme Production
- Agricultural probiotics
- Limited use in dietary supplements (strain dependent)

11. Temperature Sensitivity:

- Spores highly resistant to temperature
- Stable up to 80–90°C (short exposure)
- Suitable for feed pelleting applications

12. Shelf Life:

- At 2–8°C: ≥90% viability up to 24 months
- At room temperature: gradual decline

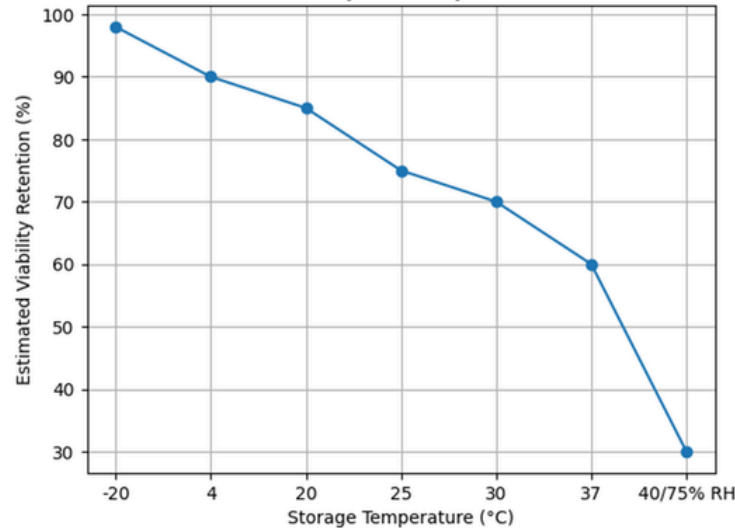
13. Packaging Considerations:

- High-barrier aluminium foil
- Moisture and oxygen protection
- Bulk packaging available

14. Stability Summary Table:

Storage Temperature (°C)	Duration	Estimated Viability Retention (%)	Remarks
-20	24 months	>98%	Highly stable
4	24 months	90–95%	Preferred
20	12 months	85–90%	Good stability
25	12 months	75–85%	Moderate decline
30	6 months	70–80%	CFU reduction
37	4 months	<70%	Reduced stability
40/75% RH	1 month	<40%	Accelerated degradation

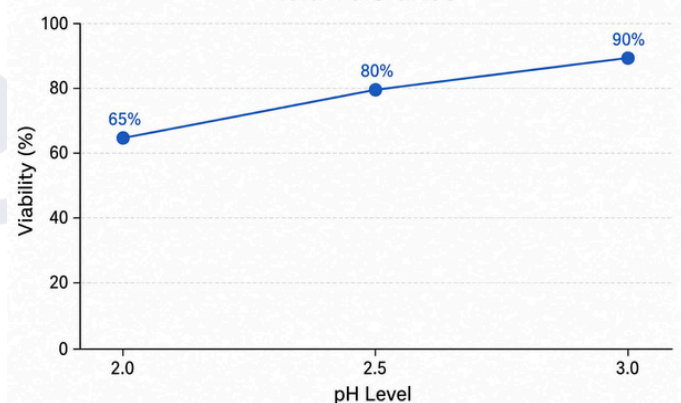
Stability Summary Chart



15. Acid Tolerance Table:

pH Level	Exposure Time	Viability (%)
2.0	1 hour	55–65%
3.0	1 hour	75–85%
4.0	2 hours	>90%

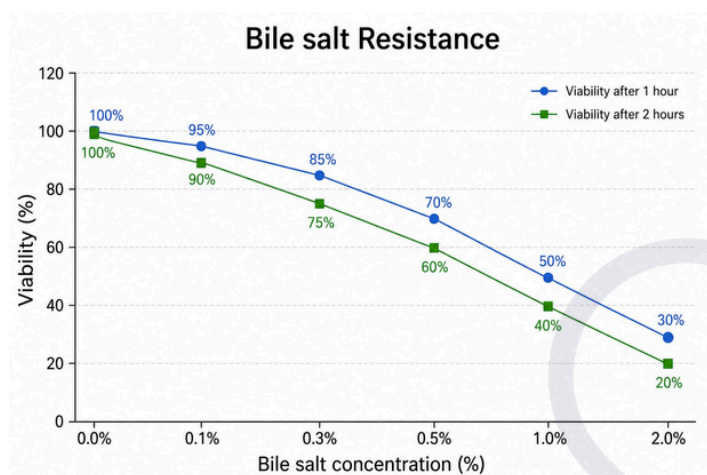
Acid Tolerance



16. Bile Salt Resistance:

Bile Salt %	1 hr	2 hrs	Remarks
0.0	100%	100%	Control
0.1%	95%	90%	Excellent
0.3%	85%	75%	Good

Bile Salt%	1 hr	2hrs	Remark
0.5%	70%	60%	Moderate
1.0%	50%	40%	Stress
2.0%	<30%	<20%	Severe



17. Quality Control and Monitoring:

- Batch testing for potency, purity, and safety
- Manufactured under GMP conditions
- Stability studies (real-time & accelerated)
- Certificate of Analysis (CoA) provided

END OF DOCUMENT

"This technical data sheet outlines general specifications. For batch-specific results, please refer to the Certificate of Analysis (CoA)."



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