

## Natural Antimicrobial for Higher pH Ethanol Production

**LactoStab® is a naturally-derived antimicrobial that eliminates chemical antibiotics in higher pH ethanol fermentation systems.** The newest member of our hops-derived antimicrobials product line, LactoStab® is ideal for ethanol fermentation environments with a pH range of 5.0 – 6.0. LactoStab® is derived from the natural weak organic acids found in the hops cone and has a proprietary blend of hop acids. It's the natural way to effectively control gram-positive bacteria and eliminate chemical antibiotics in your process, and in your distillers grains.

### LactoStab® Properties

- Safe, naturally-derived, food grade product.
- Eliminates the need for chemical antibiotics and harsh chemicals.
- Effectively inhibits lactic acid bacteria.
- Ideal for use in higher pH plants.
- No effect on yeast activity or vitality.
- Increases profits with higher value antibiotic-free co-products.
- Cost effective to use.
- Thermally stable.



*LactoStab® results in higher value, antibiotic-free DDGs.*

### How to use LactoStab®

- You can pump or pour LactoStab® directly into the propagation tank.
- You can also add LactoStab® in through the propagation/mix tank.
- No additional preparation is required before use.

### Packaging

- 20 kg (5 gallon) pails
- 200 kg (55 gallon) drums
- 1,000 kg (245 gallon) totes

**Pump more profit per bushel...  
with LactoStab®**

### LactoStab® is proven effective

Ethanol production facilities, as well as numerous scientific studies, have proven that LactoStab® works as promised. These higher pH plants have inhibited infection and eliminated the use of antibiotics and produced more valuable co-products.



*LactoStab® has been proven effective in higher pH ethanol operations.*



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### The natural secret behind LactoStab®

The hops cone has been used for centuries to provide flavor, aroma and preservation for beer. But hidden within that cone are compounds that have natural antimicrobial functionalities. BetaTec discovered a way to extract and isolate these compounds, and provide a product with bacteriostatic and bactericidal activity against gram-positive bacteria. The result is naturally derived LactoStab®.

### LactoStab®

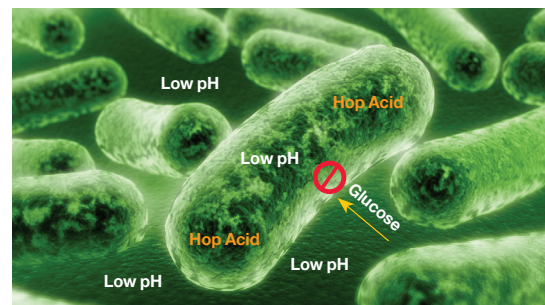
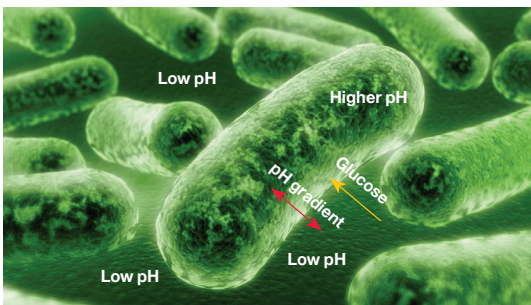
- Naturally derived.
- Safe.
- Effective.
- Proven.



LactoStab® is a natural alternative to chemical antibiotics in your ethanol production system.

### How LactoStab® works in ethanol production

Bacteria cells take nourishment by absorbing glucose through their cell membrane. Without the presence of LactoStab®, the pH gradient across the cytoplasmic membrane allows the uptake of glucose by lactic acid bacteria resulting in infection and lower ethanol yields.



By adding LactoStab®, the hop-based product dissipates the pH gradient across the cytoplasmic membrane of lactic acid bacteria. Consequently, the lower pH inside the cell interferes with the enzyme reactions and nutrient uptake, resulting in decreased growth rate and death of cells. The inhibition of lactic acid producing bacteria will lead to healthier yeast and higher ethanol yield.

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