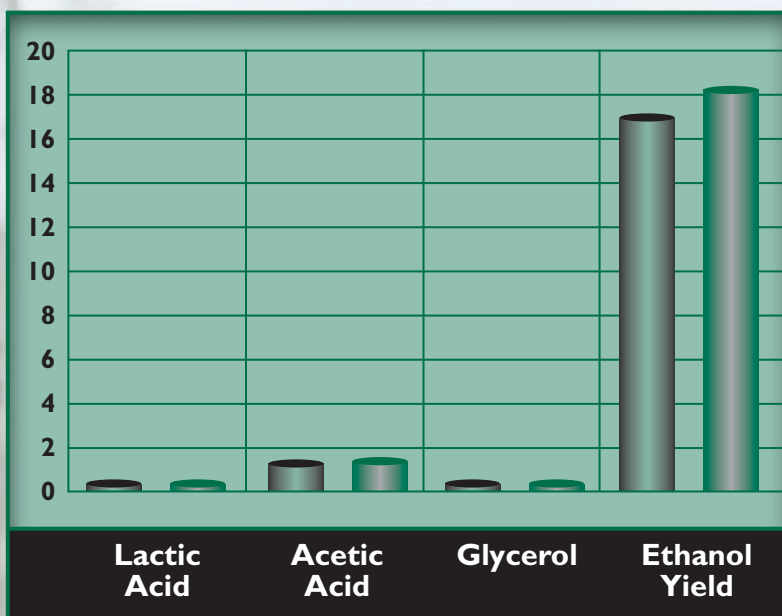


This midwest batch ethanol plant increased their ethanol yield 1.27% by using IsoStab™



The average ethanol yield before using IsoStab™ was 17.1%. The average ethanol yield after using IsoStab™ was 18.37%.

At 30 ppm of IsoStab™ we saw microbiological control in the corn mash of all *Lactobacillus* organisms. This midwest batch, 20 million gallon per year, ethanol plant fed 30 ppm of IsoStab™ to the propagator and gained a 1.27% increase in ethanol yield. The IsoStab™ has increased this plant's revenue more than \$2,000 per day.

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Controlling lactic acid bacteria increases ethanol yields

Bacterial infections in distilleries can occur anytime when water and sugar are present at temperatures below 50°C. The major contaminant's in ethanol production are *Lactobacilli*, such as *Lactobacillus plantarum*, *Lactobacillus fermentum* and *Lactobacillus casei*. The bacteria causes ethanol yield losses by consumption of sugar and formation of lactic acid as well as acetic acid.

IsoStab™ and LactoStab™ efficiently inhibit formation of lactic acid/acetic acid at bacteriostatic concentration (ppm levels).

Natural preventatives enhance yeast performance

Antibiotics are generally used to control bacterial infections in ethanol production. Unfortunately they also affect yeast vitality and performance.

- Hop ingredients are known to enhance yeast performance by slowing down flocculation. The result is faster more efficient fermentation
- Hop ingredients have a synergistic antimicrobial effect with low pH values during yeast washing

IsoStab™ and LactoStab™ are very selective. They inhibit or kill grampositive bacteria but do not affect yeast.

Areas of use

- Into a mash line feeding into a yeast propagator
- Into a mash line feeding into a fermenter
- Prior to a heat exchanger
- Prior to a pump

IsoStab™ and LactoStab™ are heat stable and active within a wide pH range. They come in liquid form and can easily be dosed in all areas of bacterial infection by a metering pump and a diptube.

Key advantages of IsoStab™ and LactoStab™

- Very active against bacterial contamination at low dosage levels
- Active at processing temperatures and at a wide range of pH values
- Faster fermentations and higher ethanol yields
- Food grade product: enables production of food grade ethanol and yeast
- DDG can be claimed as antibiotic free
- Non-volatile, safe, and easy to use

These losses could be saved by the use of biocides derived from the hop plant:

Reduction of lactic acid formation	Increase in ethanol yield
0.2% w/w	1.03%
0.4% w/w	2.04%
0.6% w/w	3.06%
0.8% w/w	4.08%
1.0% w/w	5.08%

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