

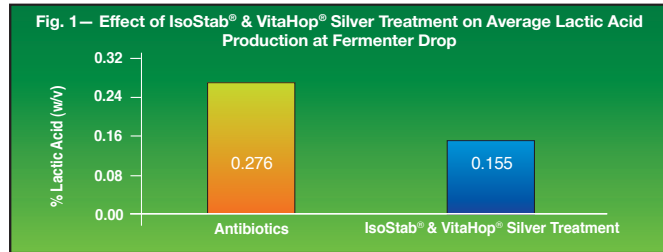


# BetaTec® – Case Study

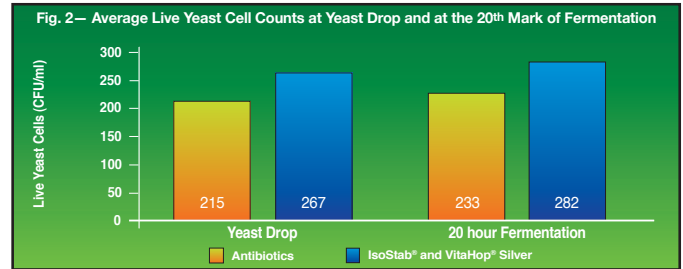
## IsoStab® & VitaHop® Silver in Full Scale Production Trial

### South Dakota dry mill batch ethanol plant

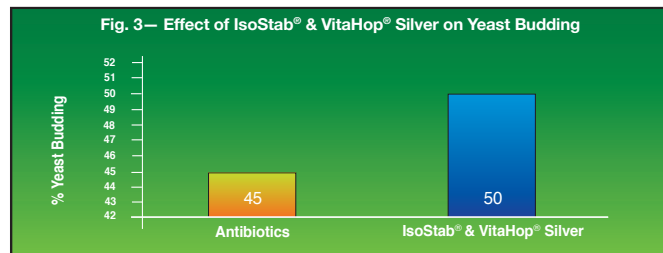
The following graphs show analytical data from a 110 MM gal/yr ICM fuel ethanol plant utilizing both BetaTec® IsoStab® antimicrobial and VitaHop® Silver yeast nutrient programs. Both products were added to the fermentation process at an economic rate.



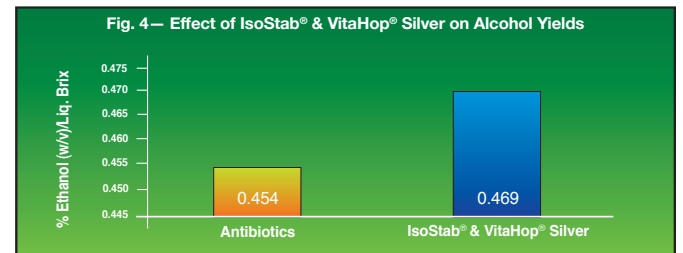
The BetaTec® program reduced the lactic acid concentration by 40% when compared to the antibiotic regime.



The BetaTec® program increased the live yeast counts at the end of propagation by 10% over the antibiotic regime. A similar increase was also observed at the 20th hour of fermentation.

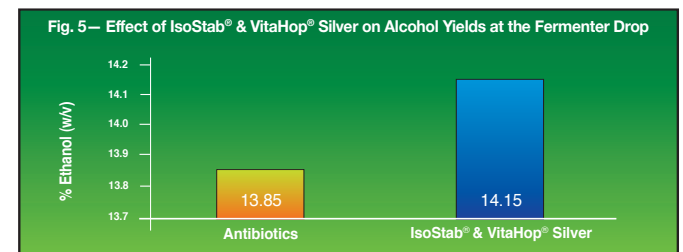


The BetaTec® program raised the yeast budding by 11% over the antibiotic regime.



The Ethanol/Brix ratio is used as an indicator to determine the ethanol yield for each batch. The comparison clearly shows that the BetaTec® program increased the average ethanol yield by 3.30% or 9,900 gal/day.

- IsoStab® and VitaHop® Silver reduced the lactic acid concentration; a metabolite of lactic acid bacteria by 40%.
- Healthier yeast will consume less sugar for growth, thus leading to more ethanol production, greater than 9,900 gallons/day.
- IsoStab® & VitaHop® Silver increased the total rate of fermentation by reducing the total sugar residue at the end of fermentation by 3.00%.
- At 300,000 gallons per day, the 3.3% ethanol yield increase represents an additional 9,900 gallons per day, or \$5.8 million in increased annual revenue @ \$1.60/gallon.



The average % ethanol under the IsoStab® & VitaHop® treatment increased by 2.20%, from 13.85% under the antibiotic treatment to 14.15% during the test.

For more information on IsoStab® and VitaHop® Silver yeast nutrient visit [www.bthp.info](http://www.bthp.info).

