

### What is the cost impact of using antimicrobials in ethanol production?

*By industry consultant Bob Miller*

The all-in cost to use BetaTec® products, like any other product, depends on the cost per unit and the usage rate. The usage, or dose rate, in turn depends on elements unique to each individual plant. The plant design, quality of build out, maintenance program and plant operations are all important components that together determine the plant performance and in turn influence the plant specific dose rate. Design and as-built problems can be difficult to identify and are frequently costly and time consuming to correct. But they essentially define the baseline for plant performance. Maintenance programs and operations on the other hand are completely within the immediate purview of plant personnel. So the question becomes how do plant management teams begin to understand the true costs of running their plant and begin to get costs under control?

The first step is to determine the cost of production per unit of production. For an ethanol plant the cost of production is the cost of a production element divided by gallons of either anhydrous or denatured alcohol produced. This needs to be done for each individual line item of interest. Combining items in a line called chemicals or supplies is useful only for those items that are not going to be tracked. Once this is done, comparisons and evaluations can begin to be made. For example the spread sheet below illustrates what an ethanol plant might find if the cost of their feedstock is \$1.30 per gallon; enzymes cost \$0.03 per gallon; yeast costs \$0.002 per gallon and their antimicrobial is costing \$0.001 per gallon. All other direct costs might be in the range of \$0.20 per gallon.

**A typical 100 million gallon per year plant will look something like this:**

Production Element		\$ / Gallon	% of Direct Costs
Cost of Feedstock		\$1.300	79.85%
Enzyme		\$0.030	1.84%
Yeast		\$0.002	0.12%
Standard Antimicrobial		\$0.001	0.06%
Energy		\$0.070	4.30%
Direct Labor		\$0.025	1.54%
All other Direct Costs		\$0.200	12.29%
Total Direct Cost		\$1.628	100.00%
Assumptions	Corn	\$3.65/bu	
	Yield	2.78 gal/bu	

What the numbers above indicate is that while energy cost is very important and labor and enzyme costs are certainly significant, **anything that impacts yield is huge**. In the grand scheme the remaining line items, while they should not be ignored, are not drivers and changes in them will not cause much impact in terms of total cost per finished gallon.

Let's further explore that financial impact of yield improvement. The 100 million gallon plant shown above would have direct cost for those gallons of \$162.8 million. Utilizing a BetaTec program of IsoStab® antimicrobial and VitaHop® yeast nutrient, costs for the antimicrobial and yeast nutrient could possibly increase input investment, but it would also increase yield. Let's assume a 1% yield increase (this and more has been demonstrated numerous times in the field). This would result in 101 million gallons at a cost of \$164,344,964. Per the cost-per-gallon shown in chart above, those same 101 million gallons would have cost \$164,428,000. With the BetaTec program, those **101 million gallons were produced at \$83,036 less cost**. That represents a 0.05% cost decrease per gallon produced. That's additional profit in the producer's pocket. Like I said, **anything that impacts yield is HUGE**. And this profit impact is not factoring-in the potential added value of DDG's that will be antibiotic-free.

Once a baseline has been established it is important to continue to track performance. This is best done using historical plant data as well as data, if available, from other plants. In addition other considerations may need to be included. Things such as safety, ease of use, impact on regulatory compliance, environmental effects and vendor support might need to be included in the overall decision making.

Your BetaTec representative is ready to discuss all the above and stands ready to assist in evaluating your individual situation.

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*A recognized industry expert, Bob Miller brings over 25 years of experience in the production of alcohol and alcohol related products, including beverage alcohol, wine, cooking wine and vinegar as well as fuel and industrial ethanol. His experience includes four years as plant manager of an ICM designed, Fagen built ethanol plant. His consulting business, Bob Miller Limited, is utilized by many companies serving the fuel ethanol business, including BetaTec Hop Products, Inc..*

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