

Added Volatile Fatty Acid Value of **Excell™** Compared to Ionophores

Ionophores have been used in ruminant feeding programs for decades but are coming under review in light of all-natural feeding programs and alternative feed additives that improve rumen function and performance.

Excell™ an all-natural a lactobacillus fermentation product from Pacer Technology has shown improved growth and performance in cattle with equal feed efficiency compared to the ionophores Bovatec and Rumensin. In vitro studies on rumen volatile fatty acid (VFA) production indicates **Excell™** increases total VFA levels and energy mobilization more than the propionate increase from the ionophores.

Excell™ Generates More Total VFA Production:

In vitro studies conducted at the University of Georgia indicate **Excell™** fed at 5 grams per head per day produced more total VFA than Rumensin. The in vitro design consisted of two replicates of duplicate samples containing 60 mls of rumen fluid after 24 hours of digestion.

Figure 1. shows the **Excell™** treatment produced 59.55 mM of VFA compared to 55.02 mM from the Monensin treatment, a 4.53 mM increase or 8.2% additional VFA.

Monensin increases propionate by reducing the fiber digestors in the rumen, thereby increasing bacteria that favor starch fermentation.

Although propionate is the most efficient VFA, the increased energy from propionate comes at a cost of reduced fiber digestion and reduction of the volatile fatty acids produced by fiber fermentation especially on pasture and high fiber growing rations.

Research Documents the Value of **Excell™**

Research done at the University of Idaho supports the increased energy advantage of **Excell™** by producing .23 pounds more daily gain over Monensin with equal feed efficiency.

The bar graph in Figure 2. on the following page shows the six volatile fatty acids measured in the University of Georgia in vitro study and the increase of total VFA energy produced by the **Excell™** treatment.

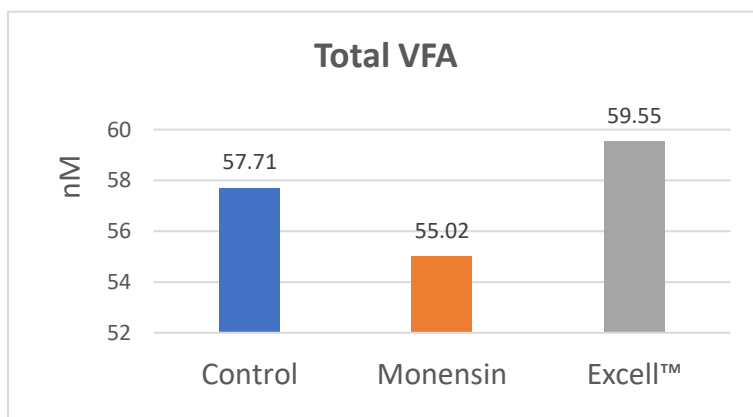


Figure 1. Total Volatile Fatty Acid Production

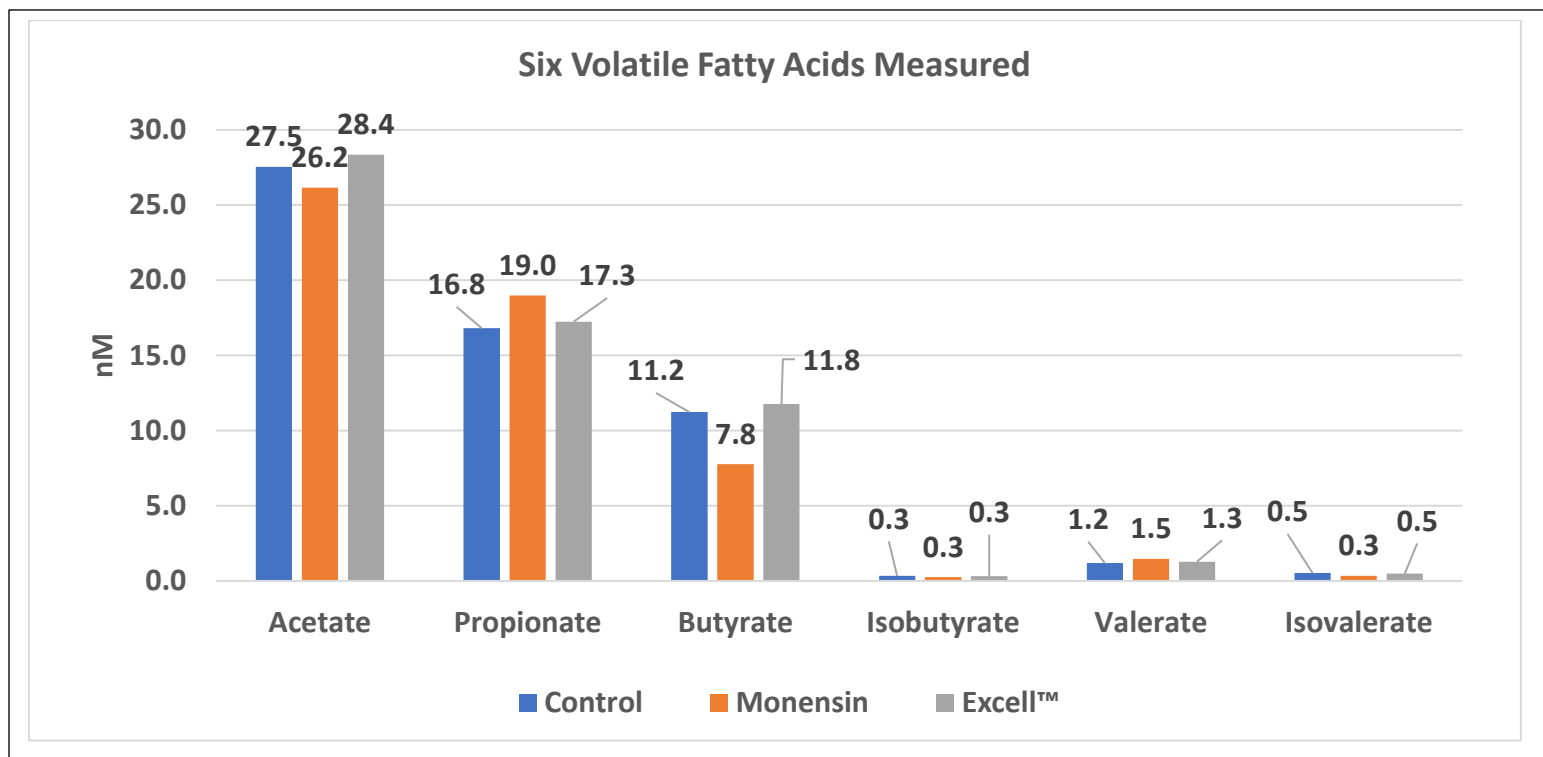


Figure 2. shows that the Monensin treatment produced 19 mM of propionate compared to 17.5mM for **Excell™** and 16.81 mM for the control. However, this increase in propionate comes at a loss of three other VFA components and the underlying question is; does the increased propionate level produce more usable energy than a higher total production of the six volatile fatty acids from **Excell™**.

Efficiency of Volatile Fatty Acid Production

Volatile Fatty Acid production from starch and cellulose can be inefficient due to the different carbon structures of the VFA and the loss of energy from heat and methane production. The relative energy efficiency values of the three main VFA's are approximately 109% for propionate, 78% butyrate, and 62% for acetate. A conservative efficiency value of 62% was also used for isovalerate, valerate and isovalerate.

Figure 3. on the following page shows that **Excell™** produced more total available energy from an increase of all VFA's compared to the propionate increase from Monensin. This effect on rumen function is a reasonable explanation for the improved animal performance of **Excell™** in feeding studies against the ionophores Bovatec and Monensin.

Figure 3. shows the effect of applying the relative energy efficiency of the VFA's tested.

The ionophores alter rumen function to increase propionate by lowering acetate and butyrate production. Even at the higher energy efficiency of 109%, the propionate increase of Monensin produced less total VFA energy than the **Excell™** treatment.

Figure 3. Total VFA Energy (mM of VFA Based on Energy Efficiency)

VFA	Energy Efficiency	mM of VFA Based on Energy Efficiency		
		Control	Monensin	Excell™
Acetate	62%	17.07	16.21	17.58
Propionate	109%	18.32	20.69	18.80
Butyrate	78%	8.76	6.05	9.17
Isobutyrate	62%	0.20	0.16	0.20
Valerate	62%	0.74	0.91	0.79
Isovalerate	62%	0.32	0.20	0.30
Total VFA's		45.42	44.23	46.85

Summary: **Excell™** Produces More Total Volatile Acids than Monensin

- **Excell™** produced 4.5 mM or 8.2% more total VFA than Monensin; (59.55 compared to 55.02)
- The additional VFA from **Excell™** produced 5.9% more equivalent energy; (46.85 mM compared to 44.2 mM for Monensin)
- **Excell™** reduced hydrogen levels similar to Monensin
- **Excell™** reduced methane levels similar to Monensin
- **Excell™** increases acetate and butyrate produced from fiber digesters...Monensin reduces acetate and butyrate due to its' inhibition of fiber digesters.

Excell™ creates an optimum rumen environment producing 5.9% more total volatile fatty acids than Monensin...more energy for production and growth without compromising feed efficiency.

