



Improving caloric efficiency

By: Bob Lantz, Monogastric Business Manager, North America

Energy is the most expensive component of a grow-finish swine diet. Regardless if the energy comes from corn, fat, or oil, the cost of energy has a tremendous impact on overall feed cost per pig, and cost per pound of gain. With this in mind, Chr Hansen established a protocol to evaluate the impact of feeding BioPlus® YC on the pig's ability to convert Kcals of energy into pounds of gain, also referred to as Caloric Efficiency.

In mid-July of 2012, in a commercial research facility in the US

Midwest, a grow-finish trial was initiated with 1,080 commercial Fast X PIC pigs that averaged 83.5 lbs. These pigs were divided into 4 treatment groups with 9 replications per treatment. There were 30 pigs per pen at 6.8' sq per pig. The treatment groups consisted of:

Treatment	Description
2.5%	Standard Diet with 2.5% added fat
5.0%	Standard Diet with 5.0% added fat
2.5% + YC	Standard Diet with 2.5% added fat plus BioPlus® YC
5.0% + YC	Standard Diet with 5.0% added fat plus BioPlus® YC

The standard diet was comprised of corn, soybean meal and distillers grains. There were five feeding phases in the trial. Each diet was formulated to maintain a lysine:calorie ratio across all treatments within a phase, and the levels of salt, VTM and Phytase were locked in across all treatments within a phase. Phytase was included at the rate of 250 FTU per lb of complete feed. The trial lasted 110 days, with the average market weight ranging from 297 lbs. to 305 lbs. depending on the treatment group. The results can be seen in Table 1:

Table 1. Growth Performance for Swine Feeder to Finish Trial

	Treatments				SEM	P<
	2.5% Added Fat	5.0% Added Fat	2.5% Added Fat Plus YC	5.0% Added Fat Plus YC		
Weight, lb						
Day 0	83.5	83.5	83.5	83.5	0.631	1.00
Day 110	298.9 ^{ab}	297.2 ^a	297.3 ^a	304.7 ^b	2.417	0.05
Performance						
Day 0 to 110						
ADG, lb	1.95 ^{ac}	1.93 ^a	1.92 ^a	2.00 ^{bc}	0.019	0.01
ADFI, lb	5.55 ^a	5.16 ^b	5.29 ^{bc}	5.36 ^c	0.057	0.01
F/G	2.84 ^a	2.68 ^b	2.75 ^c	2.68 ^b	0.025	0.01
Caloric Efficiency¹						
ME	4320 ^a	4192 ^b	4170 ^b	4195 ^b	37.58	0.05
Economics, \$						
Feed cost/pig	91.37 ^b	89.27 ^{ab}	87.93 ^a	93.25 ^b	0.975	0.01
Cost/lb gain	0.424	0.417	0.411	0.422	0.004	0.09
Revenue ² /pig	139.51 ^{ab}	137.93 ^a	137.63 ^a	143.09 ^b	1.327	0.01
IOF ³	48.15	48.66	49.70	49.84	1.044	0.69

¹Caloric efficiency is expressed as kcal/lb gain
²Revenue based on \$62.00/cwt.

³IOF = Income over feed cost
^{ab}Within a row, means without common superscript differ (P<0.05)

When the treatment group of Standard Diet with Added Fat (2.5% and 5%) were compared to those of Standard Diet with Added Fat plus BioPlus® YC, the Caloric Efficiency associated with BioPlus® YC can be easily seen in Table 2:

Table 2. Contrast of Added Fat Only vs. Added Fat plus BioPlus® YC Treatments^{1,2}

Item	2.5% & 5.0% Added Fat Only	2.5% & 5.0% Added Fat Plus BioPlus® YC	SEM	P-value
Weight, lb				
Day 0	83.51	83.49	0.446	0.98
Day 110	298.03	300.96	1.709	0.23
Day 0 to 110				
ADG, lb	1.94	1.96	0.013	0.23
ADFI, lb	5.36	5.32	0.040	0.56
F/G	2.76	2.71	0.017	0.06
Caloric Efficiency ²				
ME	4255	4182	26.572	0.06
Economics, \$ ³				
Feed cost/pig	90.32	90.59	0.689	0.78
Cost/lb gain	0.421	0.417	0.003	0.32
Revenue/pig	138.72	140.36	0.939	0.23
IOF	48.41	49.77	0.738	0.20

¹Results are reported as estimated means
²Values are an averaged mean across the combined treatments
³Caloric efficiency is expressed as kcal/lb gain
³Revenue based on \$62.00/cwt.

Though not statistically significant (P = .06), there is a strong tendency toward greater Caloric Efficiency from diets containing BioPlus® YC. In addition, the Income Over Feed Cost was to the advantage of BioPlus® YC by \$1.36 per pig. The economic advantage included the cost of the BioPlus® YC.

There are several known modes of action associated with the use of BioPlus® YC. We believe that the most likely explanation for these results is

“the most likely explanation for these results is the high enzymatic activity of the *Bacillus subtilis* strain of probiotic used in BioPlus® YC.”

the high enzymatic activity of the *Bacillus subtilis* strain of probiotic used in BioPlus® YC. This enzymatic activity may be responsible for an increased energy release from the diets of those pigs fed BioPlus® YC.