

## High Feed Prices Warrant Evaluating Copper Use in Growing-Finishing Diets<sup>a</sup>

Today's high feed prices have dramatically altered the value of improved feed conversion. Growth promotant copper levels are widely used in starter feeds for benefits in feed conversion and growth. However, high levels of copper are less often used in growing-finishing (g-f) diets. With the high feed prices now in place, using high levels of copper in g-f diets warrants a closer look.

Copper has been recognized to have positive effects on performance of pigs since the 1940's and hundreds of studies have been conducted to document the response. Research summarized in table 1 shows very consistent responses to copper when used in g-f diets at growth promotant levels (100-250 ppm Cu).

Table 1. Summary of historical review articles on growth response to copper sulfate.

Author	Pig wts, kg	Cu level	Performance increase to copper, %	
			ADG	F/G
R. Braude, 1967	20 - 100	250 ppm	8.10	5.40
R. Braude, 1975	25 - 105	250 ppm	9.10	7.40
Meyer et al., 1973	30 - 110	250 ppm	7.40	4.60

UKASTA (England) in 1979 performed a statistical analysis of results from 129 published research reports which studied various levels of Cu fed during the g-f period. They reported that the optimum level of Cu was 224 ppm and the average increase in ADG was 6.5% over the control diets. Hayes and Cromwell extensively studied the effects of copper in pigs from 1970-1980 and 18 experiments were summarized by Dr. Cromwell in 1981 (Table 2).

## High Copper in Finishing Diets Recommended



Dr. Chad Hagen

Dr. Chad Hagen recommends the use of growth promotant levels of copper in starter, grower and finishing diets. "High feed costs combined with the low cost of copper and the consistent improvement in F/G observed in hundreds of research trials make using high levels of copper from weaning to market a great value for swine producers," states Hagen. "I recommend the use of IntelliBond™ C (tribasic copper chloride, TBCC) at 0.60 lb/ton (174 ppm) in starter diets and 0.40 lb/ton (116 ppm) in g-f diets. With the current cost of IntelliBond C, its cost is about \$0.07 per pig in the

Table 2. Summary of performance response to 250 ppm Cu at the Univ. of Kentucky from 1970-1980<sup>a</sup>.

Growth Stage	Control	250 ppm Cu	Improvement, %
<b>Growing Phase (40-123 lb)</b>			
ADG, lb	1.47	1.56	6.10
F/G	2.80	2.70	3.60
<b>Finishing Phase (123-205 lb)</b>			
ADG, lb	1.66	1.71	3.00
F/G	3.56	3.50	1.60
<b>Growing-Finishing Phase (40-205 lb)</b>			
ADG, lb	1.56	1.63	3.10
F/G	3.18	3.10	2.50

<sup>a</sup>Summary of 18 research trials.

Table 3. Growth response to copper in grow-finish pigs<sup>a</sup>.

Item	Control	Copper level, ppm			Improvement, %
		50	100	200	
<b>Exp. 1</b>					
Phase 1, d 0-31					
ADG, lb	1.83			2.02	10.40
F/G	2.25			1.88	16.40
<b>Overall, d 0-115</b>					
ADG, lb	1.56			1.66	6.40
F/G	2.79			2.51	10.00
<b>Exp. 2</b>					
Phase 1, d 0-14					
ADG, lb	1.83	2.01	1.99	2.02	10.40
F/G	1.80	1.73	1.71	1.75	2.70
<b>Overall, d 0-56</b>					
ADG, lb	1.90	1.96	1.93	1.96	3.20
F/G	2.19	2.15	2.19	2.17	0.90

<sup>a</sup>Exp. 1 avg. initial wt. 74.4 lb., avg end wt. 185 lb, 26-28 pigs per pen, 8 pens per treatment; Exp. 2 avg. initial wt. 68.9 lb., avg. end wt. 117 lb, 28 pigs per pen, 6 pens per treatment. Hasted et. al., Kansas State Swine Day, 2001.

More recently, researchers from Kansas State University reported results in 2001 from two trials conducted in modern facilities and four-phased feeding programs (Table 3).

It is apparent that feeding growth promotant levels of copper in g-f results in increased ADG of 3% to 6% and improvements in feed efficiency of 2% to 4%. Data also suggest the response is greater in the

starter phase and \$0.43 during finishing. My experience shows an ROI of over 4:1 in the starter phase and at least 2:1 in the finishing phase,” concludes Hagen.

**Thank You  
NUTRIQUEST  
Customers**



Despite the unpredictable weather conditions throughout the three-day 2011 World Pork Expo nearly 20,000 people from over 30 countries gathered to participate in the world's largest pork specific trade show June 8-10.

The 2011 World Pork Expo was a huge success for the NUTRIQUEST team. A very sincere thank you to all of our customers, friends and new acquaintances for stopping by the NUTRIQUEST hospitality tent and learning more about NUTRIQUEST Real Solutions.

We look forward to serving you in 2011 and seeing you all again next year at the 2012 World Pork Expo!

grower period and lessens in the finisher period. Even though copper usage in finishing may not provide as great of return as in earlier phases, its use in finishing diets should be evaluated based on the economics specific to the situation. A small improvement in feed efficiency with high feed costs can provide a solid return.

The research summarized above deals exclusively with copper from copper sulfate. IntelliBond™ C (tribasic copper chloride) has been proven in numerous studies and 15 years of commercial swine industry success to provide an increased level of bioactivity per unit of copper when compared with copper sulfate. Multiple dose titration studies have demonstrated the ability of IntelliBond C to allow nutritionists the option to either significantly reduce the level of copper in the diet while maintaining animal performance or to keep the copper level consistent and gain improved performance.

<sup>a</sup>Adapted from a summary prepared by Terry Prince, Ph.D.; Prince Nutrition Service, LLC.

## Estimated Return from Use of IntelliBond C is Substantial, By Dr. Ken Purser

The estimated return from using IntelliBond C in g-f diets to improve feed efficiency is substantial (Table 1). As expected, the estimated return increases as feed costs increase. However, a positive return is provided with a feed cost as low as \$100/ton and 2% improvement in F/G. At a feed cost of \$240, an improvement in F/G of only 0.6% will cover the cost of IntelliBond C. If you would like to learn more about using IntelliBond C in g-f diets, contact your NUTRIQUEST representative.

Table 4. Estimated return over feed cost per 1,000 pigs with IntelliBond C<sup>a</sup>.

Feed Cost, \$/ton	Feed Efficiency Improvement vs. No Pharmacological Copper		
	2%	3%	4%
\$100	\$183	\$487	\$791
\$220	\$902	\$1,565	2,228
\$240	\$1,022	\$1,745	\$2,468
\$260	\$1,142	\$1,924	\$2,707
\$280	\$1,261	\$2,104	\$2,947

<sup>a</sup>Assumes IntelliBond C inclusion of 0.40 lb/ton and cost of \$3.54/lb (\$0.43/pig), 50 lb initial wt, 270 lb market wt, 2.80 F/G and 3% mortality. No economic advantage for increased gain is considered.

## ILLUMINATE® Services Earns High Interest from Broiler and Egg Producers

Broiler and egg producers have shown high interest in NUTRIQUEST'S ILLUMINATE Services since its launch in late June. ILLUMINATE Services, a tool used by many pork producers for over three years, helps producers buy and better-use high value DDGS to produce high quality diets at lower cost. In several meetings with poultry producers, NUTRIQUEST personnel have shown poultry producers what ILLUMINATE swine customers have already seen. Significant feed cost savings are available by using ILLUMINATE Services.