



NUTRITION NOTES

Innovation + Research from Kent Nutrition Group

APRIL 2024

SELISSEO (HYDROXY-SELENOMETHIONINE) IN HOME FRESH POULTRY FEEDS

Michael Edmonds, Ph.D., Vice President, Swine and Poultry Nutrition, Kent Nutrition Group

In 2022 we introduced Selisseo as a more bioavailable source of selenium (Se) in nursery pig and sow diets compared to other Se sources such as selenium yeast. From a chemistry standpoint, a hydroxyl group (OH) replaces the amino group (NH₂) on the amino acid methionine. The other change in the chemistry is the sulfur (S) in the methionine molecule is replaced with selenium which is why it is named Hydroxy-Selenomethionine. This unique structure is readily deposited in tissues as Se-containing proteins that can be utilized when Se is needed to synthesize various enzymes and/or endogenous antioxidants. A Nutrition Note from May of 2022 showed significant improvements in the enzyme glutathione peroxidase when Selisseo was supplemented vs. sodium selenite (inorganic Se source) in gestating sows. Increased glutathione peroxidase is important as it helps detoxify reactive oxygen species that can damage cells and impair immune system function. Also, in that article was a study in nursery pigs in which added Selisseo to provide 0.3 ppm added dietary Se, resulted in a 37% increase in total antioxidant capacity when compared to 0.3 ppm added Se from sodium selenite. These improvements in the two biomarkers of Se status is due in part to there being more Se reserves in tissues when Selisseo is fed, thus having more Se available when needed during times of increased stress.

The company Adisseo is the supplier of Selisseo. The next five reports are research bulletins from studies that they have conducted at various global research centers. After we review these five studies, then we will go over a broiler study conducted at the Kent Research Farm. A study conducted in Thailand with 2,048 male meat birds (chronic heat stress in tropical conditions) showed that added Selisseo fed to provide 0.3 ppm Se slightly (0.5%) increased body weight and lowered mortality in broilers compared to using sodium selenite to provide 0.3 ppm added Se. A study with 720 male meat birds at Texas A & M University evaluated 0.3 ppm added Se from sodium selenite compared to 0.3 ppm added Se from Selisseo in a 7 week study. There was a tendency for improved gain (2.6%) and slight reductions in death loss. In addition, drip loss was reduced in breast and thigh muscle from birds fed Selisseo.

In a study with 960 male meat-type chicks in France, the researchers evaluated Selisseo (0.2 ppm) compared to sodium selenite (0.2 ppm) in two environments (thermo-neutral and heat stress). Performance was not different between the two Se sources in a thermo-neutral environment. With heat stress, the chicks fed Selisseo had a numerical improvement (2.6%) in gain. With either environment, there were significant increases in breast muscle Se content from Selisseo. In another study conducted in China, the researchers there found significantly ($P < 0.05$) greater Se levels with Selisseo compared to selenium yeast in breast muscle. As expected, both selenium yeast and Selisseo were markedly better than sodium selenite in the breast muscle. In a turkey trial conducted in Europe, turkey toms were raised in a commercial standard facility for 83 days. Then they were placed on test for 28 days prior to harvest. The control diet used sodium selenite to provide 0.3 ppm added Se whereas the Selisseo-supplemented treatment had only 0.2 ppm added Se. Turkey breasts were then obtained and stored for 10 days. At the end of 10 days, the researchers found that the turkeys on the Selisseo diet had 54% saleable breast meat (visual color score) compared to about 7% saleable breast meat with the sodium selenite. They attributed this benefit of Selisseo to increased Se levels in the muscle allowing for increased glutathione peroxidase activity.

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At the Kent Research Farm, we evaluated the effect of using Selisseo to provide 0.3 ppm added Se compared to selenium yeast providing 0.3 ppm Se in a 46-day broiler study. We fed Home Fresh Starter with Amprolium the first 14 days followed by 32 days on a grind and mix diet utilizing corn, soybean meal and GM 38 Poultry Base. The starter and grind and mix diets contained 20% crude protein with added methionine and lysine. At the end of the 46-day study, we harvested breast muscle from three random average-weight birds per pen. These samples were pooled for each pen and placed on ice. They were then frozen and shipped later shipped (on dry ice overnight) to a laboratory for selenium analysis.

Table 1. Effect of Selisseo in Broilers

Days 0-46	Selenium Source	
	Selenium Yeast	Selisseo
Average Daily Gain, lb	0.147	0.148
Average Daily Feed, lb	0.267	0.268
Feed/Gain	1.809	1.805
Cost/Lb of Gain, cents	35.08	35.01
Net Return, \$/Broiler @ \$0.75/Lb Live Weight	2.718	2.736
Breast Selenium, ppm ¹	1.53	1.77

¹Selenium source effect (P < 0.001)

In this trial, we observed very small numerical performance benefits by using Selisseo compared to selenium yeast. Keep in mind that selenium yeast is a far better Se source than the inorganic Se source sodium selenite. The very small gain response of 0.6% is similar to that observed in the study conducted in Thailand with meat-type broilers. Because the added cost to use Selisseo compared to selenium yeast is very small, we saw a slight decrease in cost of gain since feed efficiency was slightly improved. Because of these very small performance responses to Selisseo, we did see an improved net return of \$0.018 per broiler marketed. However, the key objective of this study was to determine the impact of Selisseo on breast muscle Se content compared to another source of organic Se, selenium yeast. We observed a highly significant 15.7% increase in muscle Se content from using Selisseo compared to selenium yeast. It is very positive to confirm these findings with our own research and see these increased tissue Se concentrations that can potentially benefit broilers whenever stressors occur such as heat stress.

Summary:

Based on our research, supplemental Selisseo is a superior source of Se when compared to selenium yeast and is the new standard in the Home Fresh lineup of products.