

## ANIMAL SCIENCE

**Title:** Impact of Mitochondrially Targeted Novel Antioxidant on Pig Feed Efficiency - NPB #11-126

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**Scientific Abstract:** Free radical production by the mitochondria and subsequent oxidative cellular damage may decrease mitochondrial function resulting in decreased growth rates and decreased feed efficiency. Therefore, mitigation of oxidative stress in growing animals is a potential target to improve feed efficiency in livestock. Targeting antioxidant compounds to the mitochondria may increase the efficiency with which antioxidants decrease oxidative stress. Thirty weaned barrows ( $68.9 \pm 7.4$  kg) were used in a completely randomized design to test the effect of dietary tertiary butylhydroquinone (TBHQ) and the triphenylphosphonium derivatized mitochondrially targeted TBHQ (mitoTBHQ) on measures of growth and feed efficiency. Each barrow was assigned randomly to one of 3 treatment diets, Control, TBHQ (Control plus 8.546 mg/kg TBHQ per day), and mitoTBHQ (Control plus 30 mg/kg mitoTBHQ per day). Barrows were penned individually and fed for 6 wks. They had ad libitum access to water and a corn/soy commercial diet. Feed intake was recorded and barrows were weighed weekly. All barrows were evaluated for loin eye area and backfat thickness via ultrasound at the initiation of treatments and at the conclusion of the experiment. Ultrasound evaluation of the barrows was performed to estimate lean tissue accretion during the feeding phase. We hypothesized that an improved ADG and feed conversion ratio will be observed in barrows in the TBHQ group compared with the control barrows and that ADG and feed conversion ratio will be further improved in barrows in the mitoTBHQ group compared with the TBHQ group. Treatment did not alter final BW ( $P = 0.8989$ ), ADG ( $P = 0.3374$ ), feed conversion ratio ( $P = 0.5330$ ), or lean tissue accretion ( $P = 0.1495$ ). However, the ranking of all response variables measured were predicted by our hypothesis. Barrows in the mitoTBHQ group had greater final BW, greater lean tissue accretion, increased ADG, and improved feed conversion ratio compared with barrows in the TBHQ group. Likewise, Barrows in the TBHQ group showed improvement in every variable measured when compared with barrows in the Control group. Feeding mitoTBHQ resulted in an 8.8% improvement in ADG and a 6.8% improvement in feed conversion ratio compared with barrows in the Control group. Additional trials may be required to determine if mitochondrially targeted antioxidants can improve growth rate and feed efficiency adequately enough to make them profitable in the swine industry. Additional studies should incorporate greater numbers of experimental units and the determination of the optimal dosage of mitoTBHQ.

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