Swine Update

Trial news | december 2014

Trouw AO-mix supports the anti-oxidant status in piglets

Anti-oxidants are important substances for reducing the negative effects of free radicals in the body. Polyphenols selected for anti-oxidant capacity and bio-availability can function as anti-oxidants in animal tissues. As such, they may be better suited for managing anti-oxidant status than vitamin E whose impact easily saturates. Trouw AO (anti-oxidant)-mix contains highly bio-available polyphenols and has been developed to partly replace vitamin E in swine diets. Trouw AO-mix supported anti-oxidant status in weaned piglets under heat-stress conditions. The result is visible in the level of malondialdehyde (MDA) within blood plasma. In swine fed with Trouw AO-mix, the level of MDA was significantly lower than in control animals fed the basic level of vitamin E recommended by the NRC. Additionally, the level of MDA in animals fed a higher dose of vitamin E was intermediate. The amount of MDA correlated with the levels of superoxide dismutase, which is an enzyme that neutralises reactive oxygen species (whose levels are increased by the presence of free radicals). The data shows that Trouw AO-mix supports the anti-oxidant status in piglets and is capable of partially replacing vitamin E in swine diets.

Anti-oxidants play an important role in managing anti-oxidant status in animals

Reactive oxygen species (ROS) are produced when cells use oxygen to generate metabolic energy from feed. During times of stress conditions ROS levels can increase dramatically. This compromises the anti-oxidant status of the animal, and negatively influences its health, growth and meat quality.
ROS levels can be determined by measuring the level of MDA in blood plasma, which is generated during lipid peroxidation. Anti-oxidants protect the body by neutralising ROS. On the other hand, ROS increase the level of anti-oxidant enzymes, such as superoxide dismutase (SOD), which deactivate ROS and diminish their negative effects.

Vitamin E has a limited role in managing anti-oxidant status

Vitamin E is needed to fulfill various important functions throughout the body, such as gene regulation, enzymatic activity regulation and signal transduction modulation. It is used in swine nutrition to

increase the anti-oxidant status in animals. However, the impact of vitamin E quickly saturates when dosed at higher levels. This brings into question the efficacy of high doses of vitamin E for managing the anti-oxidant status in swine.

Plant polyphenols can function as anti-oxidants in animal tissues

Plants contain an array of anti-oxidants besides vitamin E. Plant polyphenols have a similar phenolic structure as vitamin E, but their anti-oxidant capacity per gram can be substantially higher when they have a large amount of hydroxyl groups and a low molecular weight. Therefore, plant polyphenols selected for high anti-oxidant capacity and bioavailability can function as highly effective anti-oxidants in animal tissues. Trouw AO-mix contains a blend of highly bioavailable polyphenols specifically for this purpose.

Trouw AO-mix supports the anti-oxidant status in weaned piglets under heat-stress conditions

We have evaluated the anti-oxidant potential of Trouw AO-mix in a trial carried out in collaboration with Ghent University. During this trial, nursery piglets were fed on one of three diets. Either a diet containing 1) NRC-recommended levels of vitamin E (11 ppm); 2) or a positive control of 80 ppm of vitamin E; 3) or 11 ppm vitamin E and AO-mix equivalent to 69 ppm for a total anti-oxidant capacity equal to the positive control. After having been given time to adapt to these diets, the piglets were exposed to heat-stress conditions (40°C for 24 hours). Under unchallenged circumstances, there were no significant differences in plasma MDA levels – although the Trouw AO-mix fed group had numerically the lowest MDA values. The heat-stress conditions induced a clear increase in MDA levels in animals fed 11 ppm vitamin E. This increase was prevented by Trouw AO-mix, while 80 ppm Vitamin E resulted in an intermediate response (figure 1). Overall, the superoxide dismutase-levels were lower in Trouw AO-mix fed animals, compared to the 11 pm vitamin E control animals and correlated MDA levels (figure 2).

Conclusions

Anti-oxidants play an important role in managing anti-oxidant status in animals. Plant polyphenols selected for high bio-availability can function very effectively as anti-oxidants in animal tissues. Trouw AO-mix contains these polyphenols, and supports the anti-oxidant status in weaned piglet under heat- stress conditions. Our studies show the efficacy of Trouw AO-mix, as there was a significant difference in the levels of MDA in the animals' blood plasma. The animals fed on Trouw AO- mix had a far lower MDA level compared to control animals fed the level of vitamin E recommended by the NCR.
The correlation between SOD levels and MDA also confirmed the anti-oxidant function of the mix under heat-stress conditions. Trouw AO-mix can therefore significantly boost the anti-oxidant defenses of an animal, beyond the NRC recommended vitamin E levels.

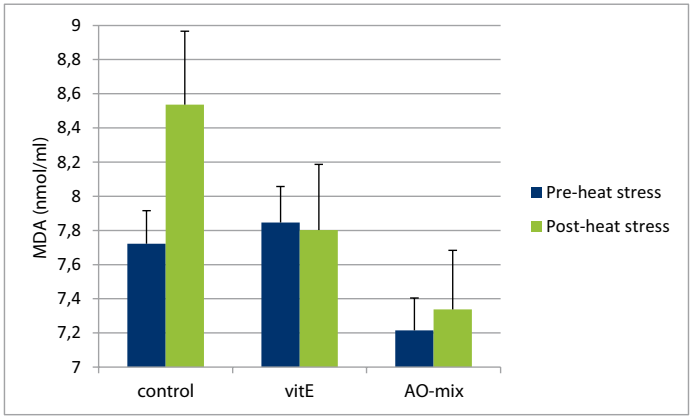

Figure 1. Effect of vitamin E and Trouw AO-mix on plasma MDA levels in weaned piglets pre- and post- heat-stress conditions.

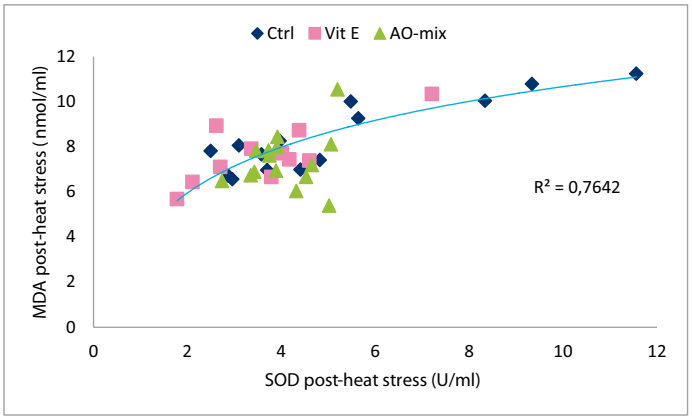

Figure 2. Correlation between plasma MDA and SOD levels under heat-stress conditions.

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