Times are tough. Everyone is feeling the pinch and the poultry industry is no exception. Production costs are soaring, the pressure to make efficiency savings is ever increasing and we continue to strive to ensure that British poultry are kept to some of the highest welfare standards in the world. We must look at every possible avenue to make cost savings and exploring the science behind our feeding regimes and understanding what works is crucial. Understanding the impact of oxidative stress on egg production is one such example, it has a hugely detrimental effect on the quantity and quality of eggs, but, with some simple science, it can be very easily remedied.

What is oxidative stress?
Nutrients in the diet are utilised by the birds for maintenance, growth or production. The metabolism of nutrients occurs at a cellular level throughout the body. Reactive oxygen species (ROS) are a natural product of cellular metabolism. However, ROS can damage the structure of cells and may even cause cell death. ROS effects are normally countered by the presence of endogenous antioxidants. However, if this natural balancing process fails a situation of ROS overload or ‘oxidative stress’ develops and the supply of antioxidants in the diet becomes more critical. Cellular metabolism, production of ROS and the potential for oxidative stress is clearly much greater for growth and production than for maintenance. Thus, to maximise productivity, the correct provision of dietary antioxidants to the laying bird is critical. This is particularly the case in older birds, the age-related decline in antioxidant status potentially having a considerable bearing on productivity.

For breeding birds this antioxidant requirement appears even more acute, with reduced antioxidant status having a negative impact on both the egg and the developing chick. The cells of the embryonic chick have a very high level of metabolic activity and, consequently, the threat of oxidative stress developing is marked. Moreover, embryonic tissues contain a sizeable component of polyunsaturated fatty acids that is highly susceptible to oxidation by ROS. Failure to combat oxidative challenge reduces the efficiency of cell structures involved in energy production and results in the increased production of ROS. A downward spiral ensues, the net effect of which is compromised development of the chick embryo.

An effective and simple solution
Nature provides a solution for wild birds in the form of carotenoids, pigments with antioxidant effects that are naturally present in the structures of some plants. Carotenoids are incorporated into the egg yolk and subsequently into the liver and other tissues of the chicken embryo. Canthaxanthin is among the most efficiently deposited carotenoids in egg yolk. This transfer protects the developing embryo against oxidative challenge helping to ensure healthy chick development. Deposition of carotenoids in the egg enriches the yolk pigment thus yolk colour may also be considered as an indicator of antioxidant status in the laying bird. Research indicates canthaxanthin significantly improves yolk, embryo and day-old chick antioxidant status and increases both hatchability and chick numbers per hen housed. In addition an improved yolk antioxidant status can be demonstrated in stored eggs from birds fed canthaxanthin. CAROPHYLL® Red 10% is used globally by the feed industry as a nature-identical source of canthaxanthin.

In times of rising costs and increasing regulation we all want to compete more effectively in the market place and the use of canthaxanthin in eggs promises increased profit and better quality production for breeders, producers and hatcheries all-round.

For further information, please contact: Sarah Davies
+44 (0) 1773 536500
Email: sarah.davies@dsm.com
DSM Nutritional Products (UK) Limited
Heanor Gate Ind. Est.
Heanor, Derbyshire
DE75 7SG, UK