Selenium Sense

Why is selenium essential for breeding hens?

- The gametes (eggs) that form embryos are particularly sensitive to attack by pro-oxidants, which can damage cell membranes and DNA.
- Se-dependent anti-oxidant enzymes and compounds in tissues are essential for successful fertilisation and the development of embryos.
- Natural 'organic' forms of selenium, i.e. Sel-Plex, are better absorbed and used more efficiently in the body compared to inorganic forms such as sodium selenite.
- Organic Se is stored in the body tissues, such as the liver and muscles, in readiness for periods when demand for additional antioxidant compounds is necessary – for example peak laying production in breeder hens.
- Breeding stock have high production demands and are often kept under intensive management conditions, and these birds therefore require higher levels of antioxidants within their diet to ensure their performance is optimised.
- Supplying a good source of readily available Se is essential for maintaining body reserves, which, in high value breeder hens, is important for ensuring a long and productive life.
- Trials have shown that enhanced protection from Se can be passed from hen to egg, thereby enhancing the antioxidant protection of the embryo and resulting chick.

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Selenium Sense

Why is selenium essential for developing embryos and hatching chicks?

- Developing embryos within eggs need antioxidant protection to ensure correct development.
- Embryos from parent stock fed organic forms of Se have more settable/fertile eggs and fewer embryonic mortalities.
- Se antioxidant enzymes are essential for membrane and tissue protection in fast growing chicks.
- In ovo chicks have higher Se and antioxidant status when their parents have been fed organic forms of Se.
- Organic Se is stored in the chick's liver and brain, which acts as a reserve for increased antioxidant protection during peak growth rates and during stressful times, such as post-hatch.
- Chicks from parents fed organic Se have been shown to have better hatchability and survival.
- Newly hatched chicks with good Se tissue reserves typically perform better, and have increased vaccination responses and disease protection.

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Selenium Sense

Why is selenium essential for growing broilers?

- Rapid growth results in the production of free radicals and hence growing broilers need higher levels of antioxidant protection, including organic Se, to ensure correct development.
- Young broilers kept under intensive conditions require a robust and efficient immune system, which is dependent upon Se status.
- Se antioxidant enzymes are essential for the maintenance of cell membranes and tissues.
- Correct, organic Se supplementation results in higher levels of stored Se in liver, brain and muscle, which acts as a reserve for increased antioxidant protection during peak growth rates and in periods of physiological stress.
- Feeding organic Se to growing broilers results in higher levels of Se and better antioxidant status in breast and leg muscle, improving meat quality and the Se levels in final meat products.
- The meat from broilers fed organic Se has less drip loss within packaging and a higher Se content which has benefits in terms of antioxidant defence for the consumer.

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Selenium Sense

Why is selenium essential for broiler meat quality?

- Meat from fast growing animals is subject to heavy levels of oxidative stress due to high metabolic rates and fast tissue development.
- Broiler chickens, especially as they grow heavier, require good levels of antioxidant minerals, especially Se, to maintain good physiological and biochemical status of cells within muscle tissues.
- Se is involved in maintaining membrane robustness, ensuring healthy tissue growth of key meat components, including leg and breast cuts.
- Organic forms of Se are stored in muscle tissue as well as liver and brain, increasing the nutritional value of the meat for human consumers.
- Good anti-oxidation protection is essential for ensuring cell integrity, which is associated with maintaining cell hydration, leading to less drip loss in packaging.
- Feeding organic selenium has been shown to promote shelf life of meat products.

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Why is selenium essential for table egg quality?

- Domesticated chickens have been shown to deposit lower levels of Se in their eggs compared to wild birds.
- Se is important to the health of the laying hen, maintaining egg production and the quality of nutrients within the egg.
- Feeding organic forms of Se to laying hens is more efficient in terms of how the hen uses the Se as an antioxidant, as well as maintaining good body reserves of this crucial mineral.
- Research has shown that eggs from hens fed organic Se deposit larger amounts in their eggs, which increases in a linear manner as more Se is added to the diet.
- Eggs can be produced by correct supplementation with organic Se in layer diets, which allow the consumption of two eggs per day to meet the recommended daily intake of Se for an adult human.
- Se, in its organic form, is important in human nutrition as a powerful antioxidant mineral, maintaining cell integrity, tissue health and guarding against degenerative disease.

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Selenium Sense

What are the financial benefits of using organic selenium?

Feeding organic selenium is known to be more efficiently utilised in avian species compared to inorganic forms, such as selenite and selenate, and may be used to replace other forms of selenium at a lower level without compromising performance.

Feeding organic selenium increases productive performance in broilers, laying hens, turkeys and breeding flocks, allowing higher profits from flocks and more efficient utilisation of fixed assets.

A five point (0.05) improvement in FCR, as observed in broilers fed organic selenium, reduces feed costs whilst maintaining or increasing weight gain, maximising efficiency and minimising some of the major costs of production.

Organic selenium can pass into the body reserves and tissues of the eggs and bird, resulting in higher levels of antioxidant protection, manifested as longer shelf life or better nutrition and quality characteristics of the final food products.

Birds fed organic selenium have significantly better feathering, which allows more energy to be available for growth as less metabolic energy is diverted for keeping warm.

Improved feathering also protects the bird's body from damage, reducing the number of downgrades at slaughter or for welfare reasons due to burns, blisters and lesions on the breast, hocks and feet.

Increasing the quality and nutritional value of egg and meat products from birds fed organic selenium where it is expressed in higher levels in tissues allows sale into niche and value added market sectors, with higher margins.

Selenium Sense

Medication and vaccination: the cost effective use of these key programmes in modern poultry production.

- Selenium (Se) deficiency in animals has been linked to a higher susceptibility to disease by researchers.
- Feeding organic Se is known to be more efficiently utilised in avian species compared to inorganic forms, such as selenite and selenate and is considered to be superior in building tissue reserves during time of stress, such as disease challenge or vaccination.
- Se-based enzymes form a crucial part of the antioxidant systems which support and interact with both the innate and acquired immune systems in animals.
- Antibody production is affected by Se status; for example, IgG, IgA and IgM titres are reduced in Se-deficient animals.
- The fast and efficient antibody response seen in birds fed organic Se is especially important for vaccines administered via nose or eye.
- Significant increases in immune cell expression and activity (including recognition and phagocytotic mechanisms) have been reported in chickens fed organic Se.
- Young animals undergoing vaccination (for example. Newcastle disease attenuated vaccine) have an increased antibody titre and hence better protection against disease when receiving organic Se in their diet.
- Chicks from hens fed organic Se have fewer vaccination failures compared to those from breeders reared using inorganic forms
- Ensuring good Se status via feeding organic Se reduces costs associated with poor immune responses, including vaccine failure, subclinical disease and disease outbreaks.