B-TRAXIM® Se

pancosma

Dose-response of three selenium sources on broiler breeders.

Technical Bulletin

KEY FINDINGS

B-TRAXIM®Se showed:
- ***Increased Se status (liver).***
- ***Reduced GPX activity indicating reduced oxidative stress.***
- ***Increased Se deposition in egg yolk, whereas Se yeast increased deposition in egg albumen.***

INTRODUCTION AND OBJECTIVE

Inorganic sodium selenite is generally added to the diet of broiler chickens at the level of 0.3 ppm. Selenium is an integral part of the glutathione peroxidase enzyme, which is an antioxidant enzyme that destroys hydrogen peroxide and lipid peroxides produced during normal metabolic activity.

The aim of this study was to investigate, in broiler breeders, the effect of selenium sources on performance, hatchability, glutathione peroxidase activities, Se incorporation into tissues (blood, liver and breast muscle) and eggs.

MATERIALS AND METHOD

The study was conducted by Prof. Leeson at the University of Guelph, Canada.

Experimental design:
Forty eight individually caged broiler breeder hens (aged of 50 weeks) were allocated, at random, to 6 dietary treatments (table 1).

Table 1: Treatments

Se-Source	Added Se
Sodium selenite	0.1 ppm ; 0.3 ppm
Selenium yeast	0.1 ppm ; 0.3 ppm
B-TRAXIM®Se	0.1 ppm ; 0.3 ppm

The treatments diets, based on a basal diet unsupplemented in Se (table 2) were fed restrictively (150 g/bird/d) for 45 days.

Data:
Following samples were taken within each treatment:
- Eggs: Between day 30 and 35 for egg weight, eggshell deformation, shell strength and selenium content.
- Eggs: Between day 36 and 45 for hatchability.
- Hens: on day 45 all hens were sacrificed for blood, liver and breast muscle sampling.

Statistical Analysis:
The 48 birds were arranged in a randomized design and individual bird was the experimental unit. Data were subjected to an analysis of variance procedure. Those response variables resulting in a significant F test were further analysed using Tukey's test.

Table 2: Basal diet

Ingredient	Content
Corn	58.0%
Wheat shorts	8.4%
Soybean meal	21.0%
Limestone	8.0%
Fat	2.0%
Premix	2.6%
Analyzed	
CP	17.0%
CF	3.8%

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RESULTS AND CONCLUSION

Animal performance

Egg production was affected positively by level of selenium in the diet (P<0.01) but not by source of selenium and there was no interaction between level and source of selenium in the diet.

Egg weight and eggshell deformation were unaffected by either level or source of selenium in the diet.

Hatchability was affected by interaction between dietary selenium level and source (P<0.05); hatchability of eggs from hens fed 0.1 ppm Se yeast was lowest.

Selenium status

Plasma Se concentration was not affected by treatments (table 3). Liver Se content was increased (p<0.01) by 9.1% with increasing Se supply. Liver Se was increased by 11.6% (p<0.01) using Se yeast and 9.6% (p>0.01) using B-TRAXIM®Se, when compared to sodium selenite. Breast meat Se concentration was increased (p<0.01) with increasing Se supply. The use of Se yeast increased (p<0.01) the Se content in breast meat.

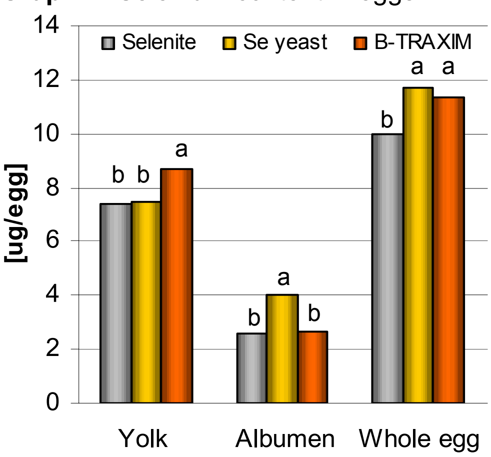
Table 3: Effect of Se level or source on plasma, liver and breast meat Se.

[ug/g]	Plasma	Liver	Breast
Selenite	0.17	0.43^{b}	0.16^{b}
Se yeast	0.17	0.48^{a}	0.19^{a}
B-TRAXIM	0.15	0.47^{ab}	0.16^{b}
0.1 ppm	0.16	0.44^{x}	0.16^{x}
0.3 ppm	0.17	0.48^{y}	0.17^{y}

a,b; x,y: p<0.01

Se content in eggs, yolk and albumen was increased (p<0.01) with increasing Se supply.

Graph 1: Selenium content in eggs.

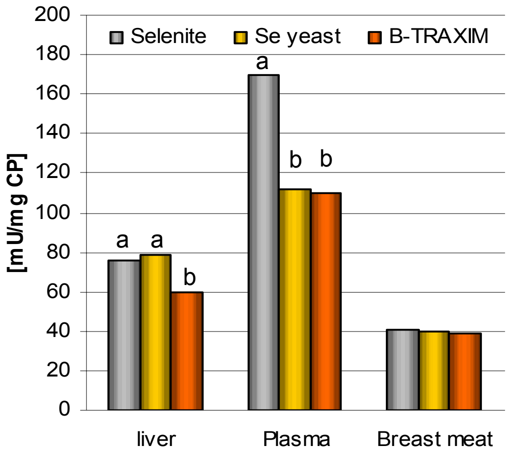


Compared to sodium selenite, Se content in yolk was increased by 17.6% (p<0.01) feeding B-TRAXIM®Se, whereas selenium content in albumen was highest (p<0.01) feeding Se yeast (graph 1). Total Se egg contents were improved (p<0.01) by either feeding Se yeast (+17.2%) or B-TRAXIM®Se (+13.0%).

Se yeast appears to deposit in proteins as evidenced by higher levels in both albumen and breast meat. However where there is more fat association, as in yolk, then B-TRAXIM®Se is preferentially deposited.

Glutathione peroxidase activity (GPX) in liver and plasma was affected by source but not by level. GPX activity in liver was lower (p<0.01) when B-TRAXIM®Se was fed and was lower with both organic Se sources in plasma (graph 2). GPX in breast was not different among treatments.

Graph 2: GPX concentrations.



There is anecdotal evidence suggesting higher GPX levels with higher levels of Se. However enzymes are produced in response to levels of substrate. Higher levels of GPX are therefore expected with high levels of oxidation stress. Conversely there is no need for birds to sustain high levels GPX when oxidation stress is minimal. Low levels of GPX as found in plasma with both organic Se products and in liver with B-TRAXIM®Se can be construed as indication of less oxidative stress in birds fed these products.

This study shows that a dietary supplementation of 0.3 ppm Se is required to support egg performance of broiler breeders.

Pancosma's B-TRAXIM®Se was better incorporated into liver and eggs compared to sodium selenite and indicated lower oxidative stress (GPX activity in plasma and liver).

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