

Meat selenium concentration
and oxidative stability in broiler
chickens fed diets with selenium
nanoparticles-loaded chitosan
microspheres

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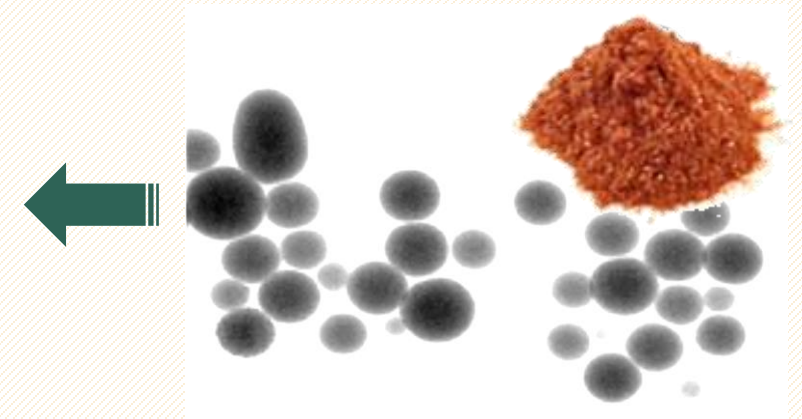
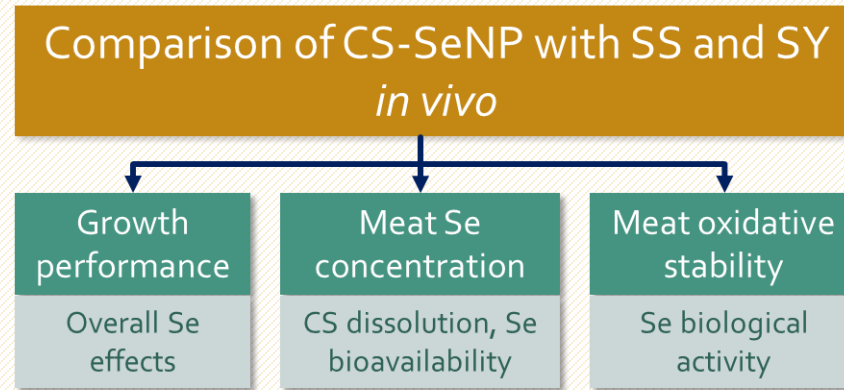


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BACKGROUND

Selenium (Se) nanoparticles (SeNPs) have attracted attention as alternative dietary Se source in animals. Compared to the commonly-used inorganic and organic Se forms (**sodium selenite; SS** and **Se-yeast; SY**), with a narrow margin between beneficial and toxic effects, SeNPs have very low toxicity and high antioxidant activity. A form of elemental Se nanoparticles stabilized in chitosan microspheres (**CS-SeNPs**) is under investigation in biomedicine with very promising results, but their potential as dietary Se source in livestock has not been extensively investigated.

OBJECTIVES



METHODS

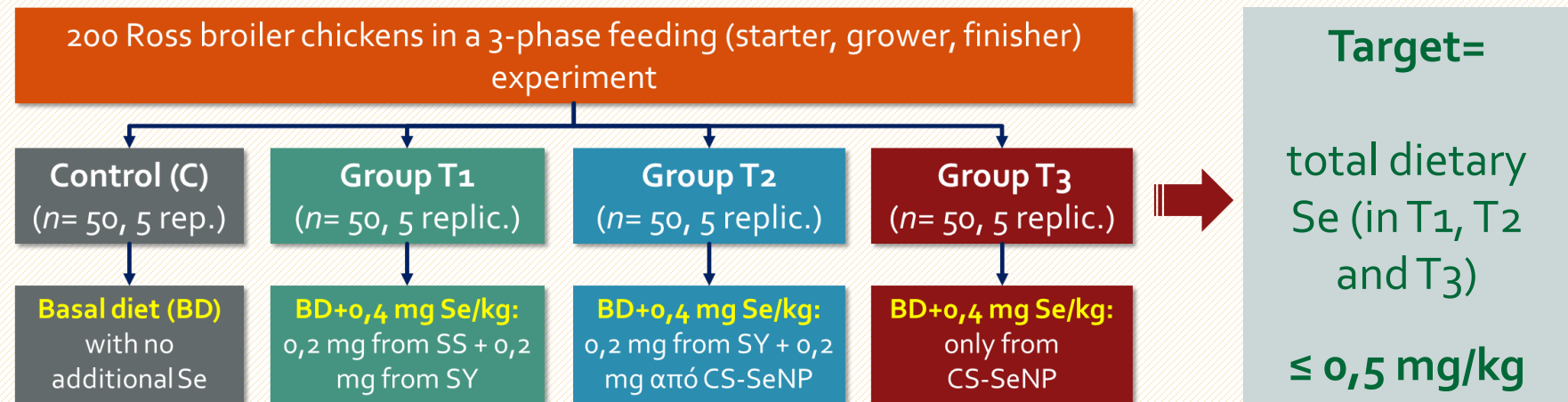
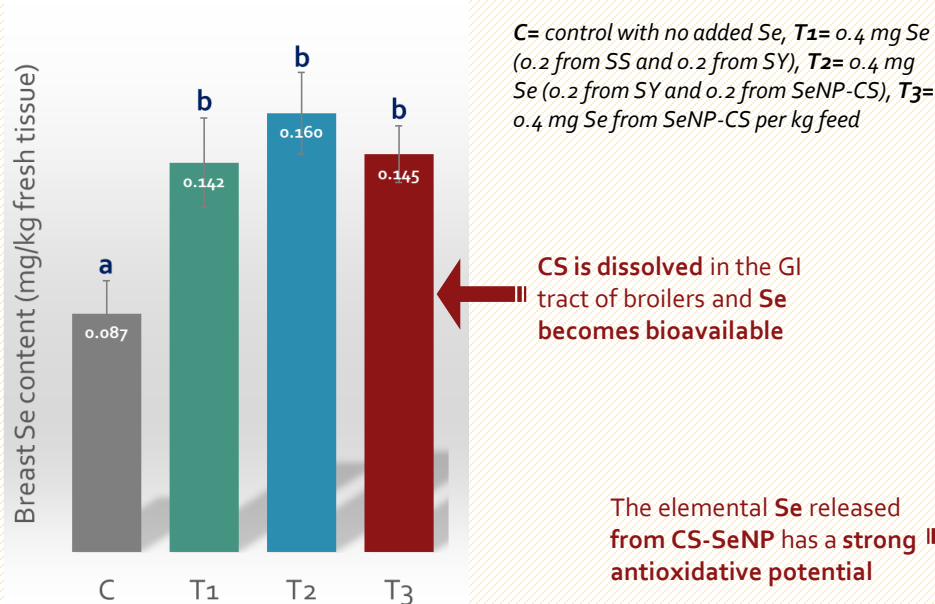
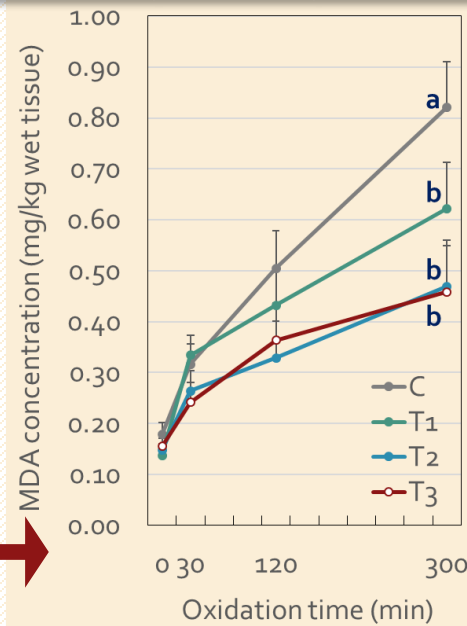


Table 1: Dietary Se content and growth performance of broilers from d1 to d42

	C	T ₁	T ₂	T ₃	SEM	P-value
Dietary Se, mg/kg	0.117	0.492	0.504	0.488	-	-
Initial BW, g (d 1)	46.9	46.8	46.9	46.8	0.46	0.989
Final BW, g (d 42)	3355.6	3299.4	3246.0	3144.7	134.70	0.555
Feed intake, g/d/broiler	125.8	123.2	123.6	119.5	3.82	0.542
BW gain, g/d/broiler	78.8	77.4	76.2	73.8	3.21	0.554
FCR, g feed/g BW gain	1.60	1.59	1.63	1.62	0.032	0.672
Cold carcass, g	2558.0	2674.0	2471.5	2537.5	79.37	0.121
Dressing, %	76.3	77.0	76.5	75.7	0.66	0.308

**Figure 1:** Meat Se concentration**Figure 2:** Meat malondialdehyde (MDA) values

RESULTS

- Feed intake, weight gain, feed conversion ratio and carcass traits were not affected by SS, SY or SeNP-M supplemented diets in comparison with the unsupplemented C diet, for the whole experimental period (Table 1).
- The dietary supplementation with SS+SY (T₁), SY+CS-SeNP (T₂) and CS-SeNP (T₃) increased significantly ($P < 0.05$) breast meat Se content by 164, 184 and 169%, respectively, in comparison with the control diet. No differences in the muscle Se content were found between T₁, T₂ and T₃ diets (Fig. 1).
- The MDA concentrations in T₁, T₂ and T₃ fed broilers showed significantly ($P < 0.05$) lower MDA concentrations compared to the C ones after 300 min of oxidation (Fig. 2)

CONCLUSIONS

- Breast Se content readily increased by the dietary supplementation with 0.4 mg Se from CS-SeNP, resulting in Se enriched meat similarly to the commonly used (SS and SY) Se sources.
- The dietary CS-SeNP also improved breast oxidative stability in manner comparable to the commonly used Se sources.
- The present results indicate that CS-SeNP can be a potential source of bioavailable Se with an important protective role against meat oxidation and merits further investigation in broiler feeding.