

# Comparative efficacy of NanoSel and Selenium Yeast in commercial broiler chickens

## Introduction

Selenium deficiency in poultry leads to reduced appetite, declined growth, inefficient feed utilization, reduced egg production, hatchability, offspring performance and poor immunity. Selenium can prevent various conditions like nutritional muscular dystrophy, myopathy, immunodeficiency, and exudative diathesis in poultry.

Commonly available Selenium forms have poor absorption, low bioavailability, and high excretion rates. On the other hand, Se-nanoparticles (< 100 nm) have shown promise in enhancing poultry health. They improve feed conversion ratio, boost antioxidant capacity, support testicular function, spermatogenesis, and spermatozoa functions.

Se-nanoparticles protect cellular membranes and organelles from peroxidative damage and stimulate white blood cell production while activating the thymus, thereby strengthening the immune system. Se-nanoparticles also play a crucial role in maintaining meat quality by minimizing drip loss. Their higher bioavailability and reduced excretion make them ideal for poultry health improvement.

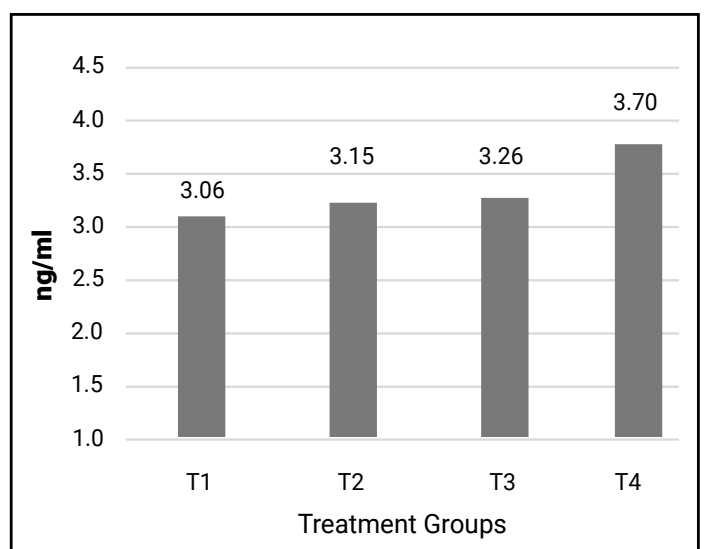
The objective of the study was to evaluate the comparative efficiency of NanoSel (Se-nanoparticles) and Selenium Yeast on antioxidant activity, deposition of Selenium in liver, meat quality and performance of commercial broiler chickens. The trial was conducted for a duration of 42 days on Vencobb 430 Y (male) chickens at Agrivet Research & Advisory, Kolkata, West Bengal, India.

## Experimental Design

Group	Treatment Details	Replicates/ Treatment	Birds/ Replicate	Birds/ Treatment
T1	Basal diet + Selenium Yeast @ 0.2 mg/Kg of feed	6	10	60
T2	Basal diet + Selenium Yeast @ 0.4 mg/Kg of feed	6	10	60
T3	Basal diet + NanoSel @ 0.2 mg/Kg of feed	6	10	60
T4	Basal diet + NanoSel @ 0.4 mg/Kg of feed	6	10	60
Total Number of Birds				240
Trial Duration (Days)				42

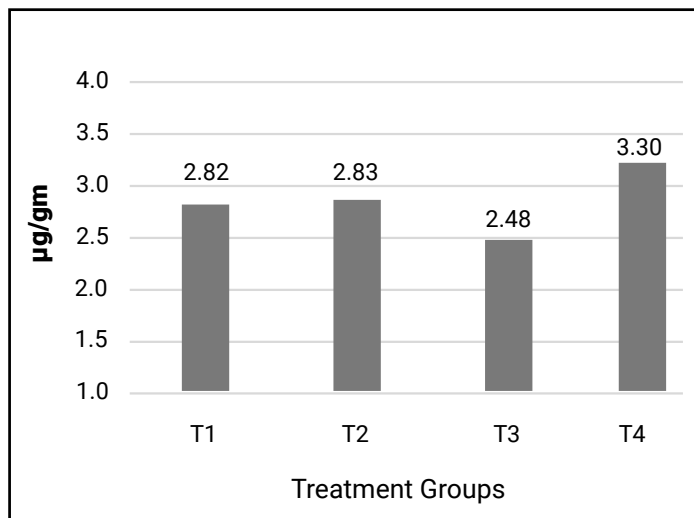
## Observations

### Effect on Serum Glutathione Peroxidase Activity



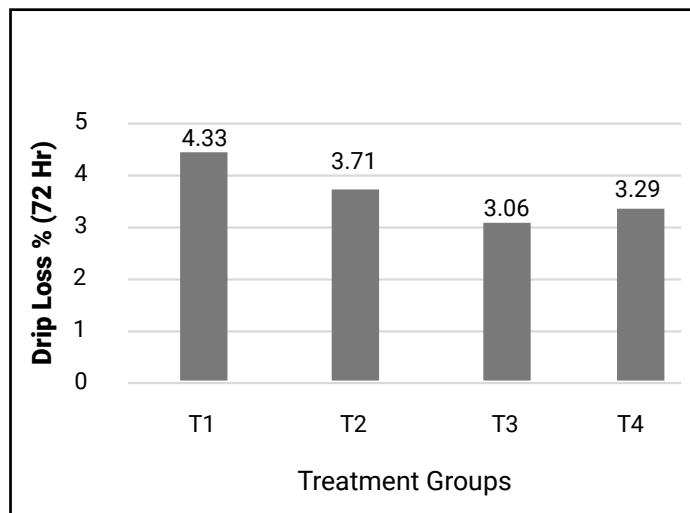
Higher serum glutathione peroxidase activity observed with NanoSel supplemented groups compared to Selenium Yeast. This indicates stronger antioxidant effect of NanoSel.

**Effect on Liver Selenium Concentration**



NanoSel at a dosage of 0.4 mg/kg in the diet has higher accumulation of Selenium in the liver. This suggests that NanoSel exhibits better tissue penetration compared to Selenium Yeast.

**Effect on Drip Loss %**



NanoSel improved selenoprotein activity in muscle, leading to lower drip loss in stored meat by 29.33% and 11.32% at dose of 0.2 mg/kg and 0.4 mg/kg diet respectively as compared to Selenium Yeast at 72 hours.

Group	Body weight (gm)							Average daily gain in body weight (gm)			
	0-d	7-d	14-d	21-d	28-d	35-d	42-d	1-14 d	15-28 d	29-42 d	1-42 d
T1	43.9	187.1	536	1074.3	1687.2	2376.3	2944.2	35.15	82.23	89.79	69.06
T2	44.1	189.2	541.1	1092.9	1745.6	2428.4	3001.8	35.49	86.04	89.73	70.42
T3	44.1	184.2	536.4	1088.3	1708.2	2380	2916.6	35.16	83.7	86.31	68.39
T4	44.2	191.3	547.7	1113	1768.3	2438.3	3025.3	35.97	87.18	89.79	70.98

Group	Feed conversion ratio				Livability%	EPEF
	1-14 d	15-28 d	29-42 d	1-42 d	1-42 d	1-42 d
T1	1.088	1.47	1.759	1.53	95	435.4
T2	1.099	1.394	1.825	1.526	95	444.6
T3	1.121	1.418	1.834	1.541	95	428.5
T4	1.06	1.4	1.803	1.512	95	452.5

NanoSel enhances overall production performance in terms of FCR and European Production Efficiency Index (EPEF).

## Conclusion

The Inclusion of NanoSel when compared to Selenium Yeast in poultry diets increases antioxidant defence activity, hepatic Selenium deposition and enhances overall production performance. NanoSel also reduces drip loss in meat during storage. It can be concluded that when introduced as a Selenium source in diets of poultry, NanoSel demonstrates superior efficacy over Selenium Yeast enhancing the antioxidant status and improving the meat quality in broilers.