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Technical Report

Nano-scaled Selenium



Product highlights

Key components

NanoSel™ E (Liquid supplement)

Each ml contains:

Vitamin E (Tocopherol acetate) emulsion)..... 100 mg
Selenium nanoparticles (< 100 nm)..... 1 mg
Vitamin C coated (Ascorbic acid)..... 1 mg
Aqueous base..... Q.S.

NanoSel™ FS (Feed supplement)

Zerovalent nanoparticles of selenium at
3000 mg per kg (0.3%)



Product highlights

How NanoSel™ E is unique ?

Parameters	Competition	NanoSel™ E
Physical form	Mostly powder; few liquid products available	Stable liquid form
Chemistry	<ul style="list-style-type: none"> ⊖ Vitamin E as tocopherol acetate is oily in nature and is prone to poor dispersion in water application. ⊖ Inorganic selenium salts are soluble in water and gets separated from the formulation when applied in water. ⊖ Few products have vitamin C blended in the formulation. 	<ul style="list-style-type: none"> ⊖ Few products have vitamin C blended in the formulation. ⊖ Selenium as zerovalent NPs¹ have large surface area, higher catalytic efficiency, and higher biological activity. ⊖ Vitamin C is coated on selenium NPs, making it a nano-scaled entity.
Bioavailability	Poor dispersion of vitamin E and inorganic selenium salts result in unwanted interactions in chicken gut culminating in poor bioavailability.	Selenium NPs with coated vitamin C have highest bioavailability than any other forms. The stable emulsion of vitamin E ensures uniform dispersion in water.



¹Nanoparticles



Product highlights



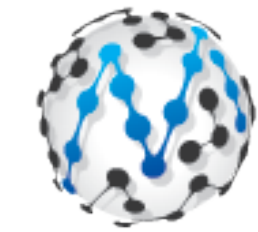
How NanoSel™ FS is unique ?

Parameters	Competition	NanoSel™ E
Type	Organic — Methionine chelate or yeast enriched	Stable liquid form
Consistency	Vitamin E as tocopherol acetate is oily in nature and is prone to poor dispersion in water application.	<ul style="list-style-type: none"> ⊖ Few products have vitamin C blended in the formulation. ⊖ Selenium as zerovalent NPs¹ have large surface area, higher catalytic efficiency, and higher biological activity. ⊖ Vitamin C is coated on selenium NPs, making it a nano-scaled entity.
Input cost	Poor dispersion of vitamin E and inorganic selenium salts result in unwanted interactions in chicken gut culminating in poor bioavailability.	Selenium NPs with coated vitamin C have highest bioavailability than any other forms. The stable emulsion of vitamin E ensures uniform dispersion in water.

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Product highlights

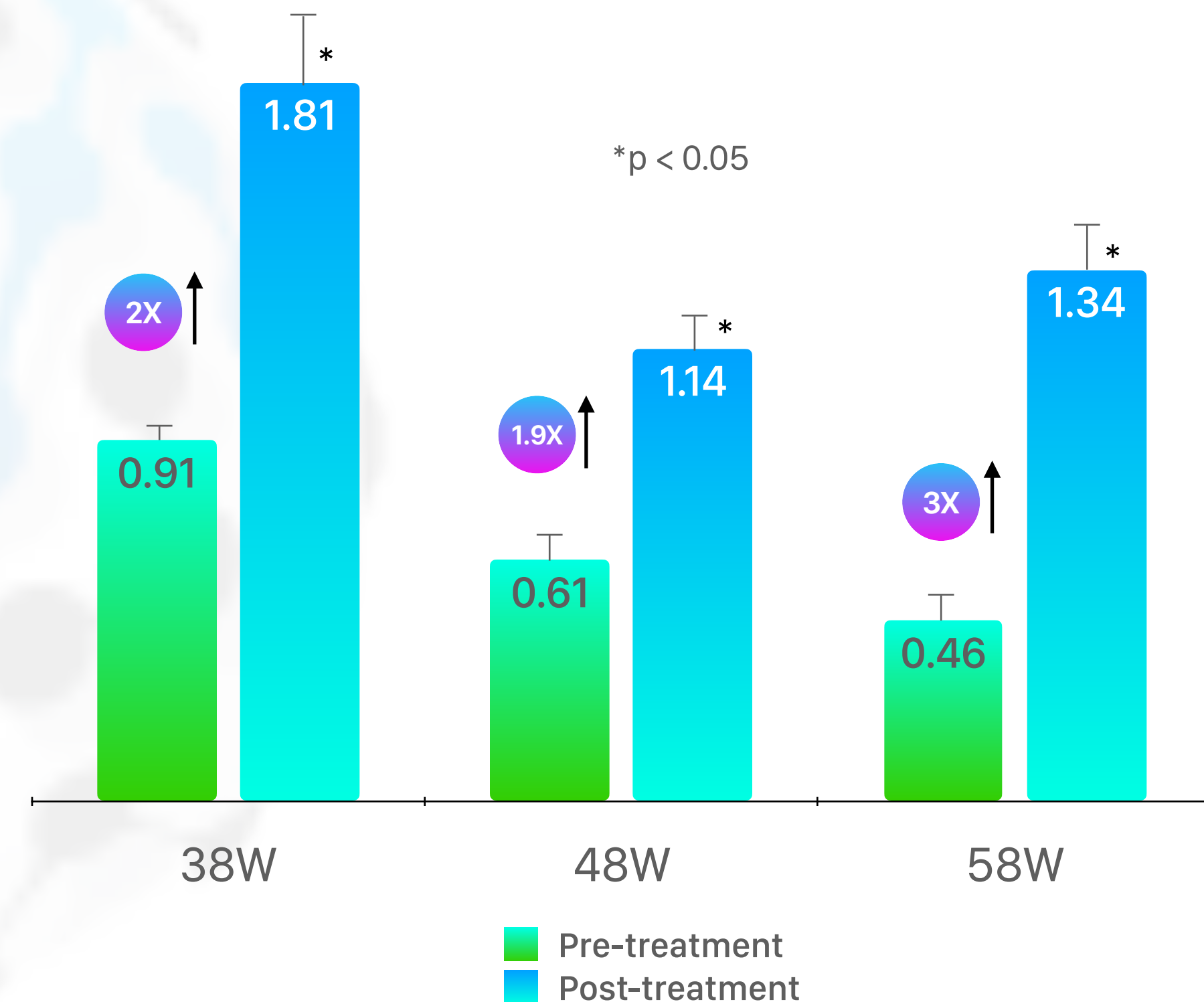


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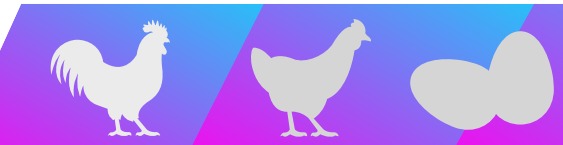
Field trial

- **Class:** Commercial layers
- **Breed:** Lohmann white
- **No of flocks:** 3
- **Flock size:** 38W≈ 13800, 48W≈ 5500, 58W≈ 8500
- **History:** All indicated flocks encountered varying degree of production drop speculated to be due to oil rancidity
 - 38W: Production dropped by 7% during a period of 18 days (94% to 87%)
 - 48W: Production dropped by 6% during a period of 15 days (94% to 88%)
 - 58W: Production dropped by 13% during a period of 21 days (89% to 76%)
- **Treatment:** All the flocks were treated with NanoSel™ E at 1 ml per 10 birds for 4 days followed by NanoSel™ FS at 200 g per tone for next 10 days
- **Parameters studied:** Serum glutathione peroxidase level (ng/ml) before and after treatment, Egg production %, and general well being

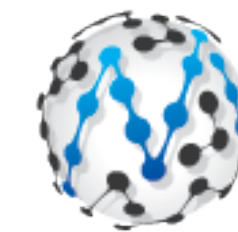
Effect of NanoSel™ E and NanoSel™ FS supplementation on serum glutathione peroxidase¹ level (ng/ml) in commercial layers — treatment duration 14d



¹Serum glutathione peroxidase (GPX) is a critical antioxidant enzyme that protects cellular oxidative damage during stress and selenium (Se) is the key component for maintenance of GPX activity. Higher bioavailability and biological activity of dietary Se supplementation directly correlates with higher serum GPX activity.



Product highlights



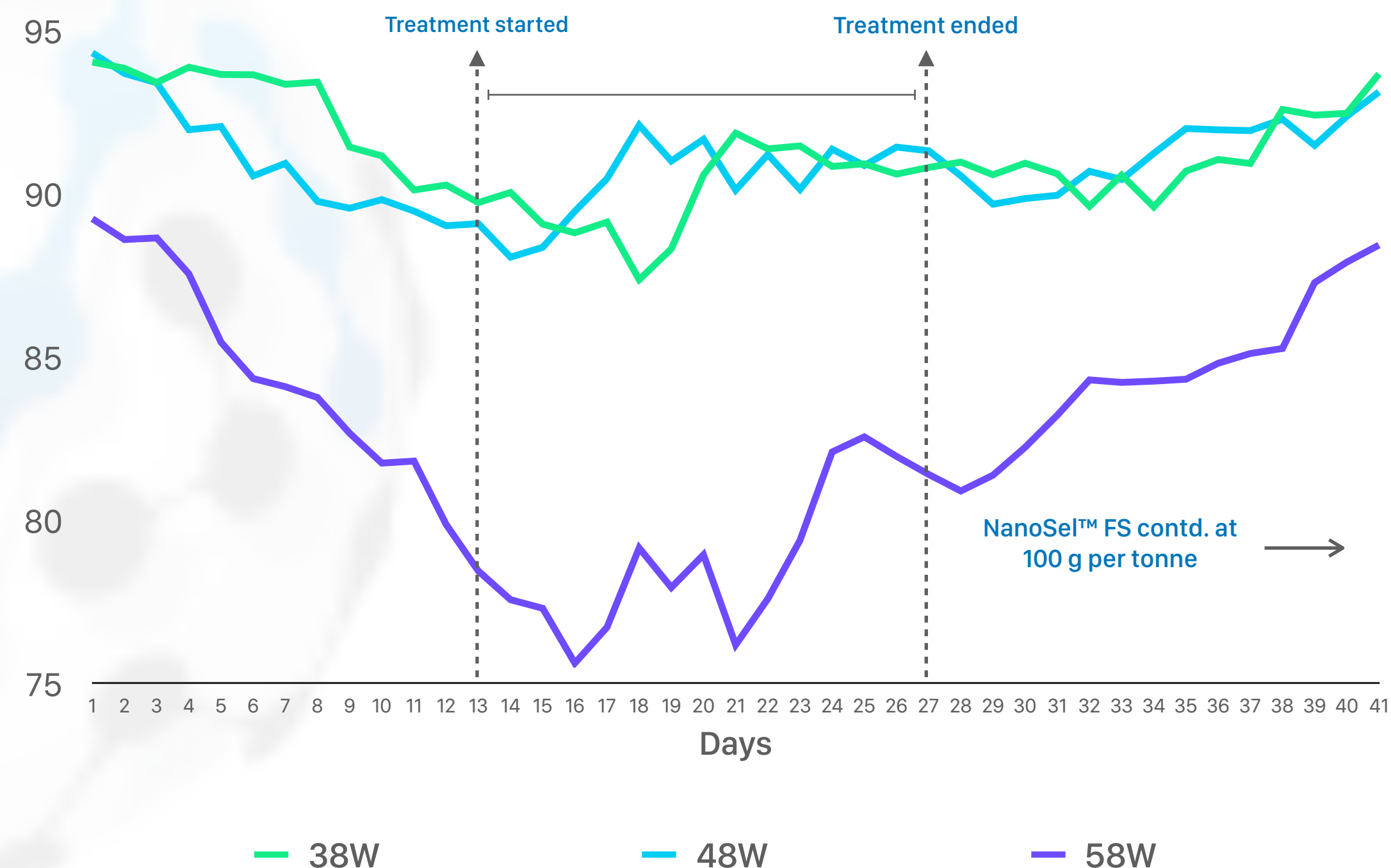
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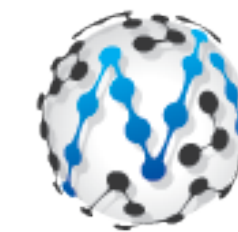
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Effect of NanoSel™ E and NanoSel™ FS supplementation on egg production % in commercial layers — treatment duration 14d



Product highlights



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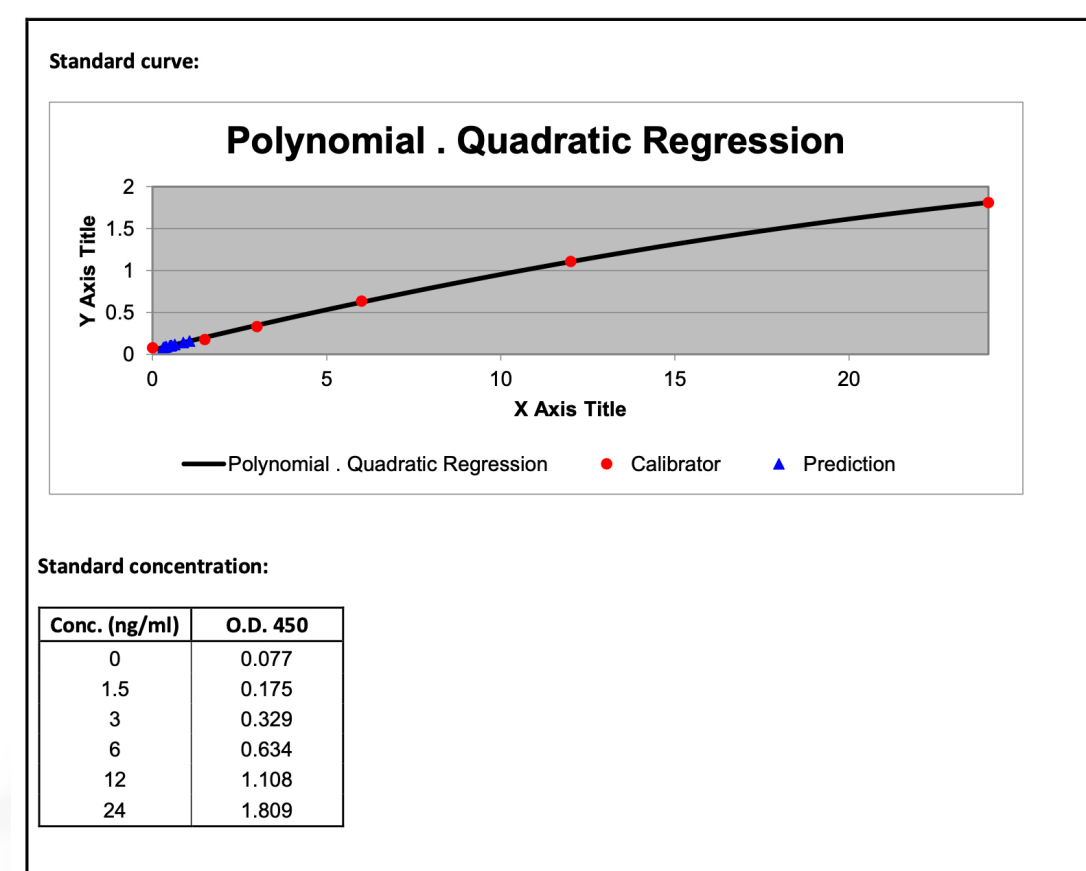
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Testimonials

Analysis Report – Microbiology
Test Name: Glutathione Peroxidase

Results:

Sl. No.	JANA POULTRY					
	Shed 4, 58 weeks		Shed 5, 48 weeks		Shed 6, 38 weeks	
	O.D. 450	Conc. (ng/ml)	O.D. 450	Conc. (ng/ml)	O.D. 450	Conc. (ng/ml)
1	0.075	0.248	0.105	0.543	0.178	1.271
2	0.087	0.365	0.157	1.061	0.130	0.791
3	0.085	0.346	0.139	0.881	0.160	1.091
4	0.125	0.741	0.102	0.514	0.143	0.921
5	0.149	0.981	0.081	0.306	0.183	1.322
6	0.072	0.218	0.126	0.751	0.136	0.851
7	0.104	0.533	0.109	0.583	0.130	0.791
8	0.083	0.326	0.104	0.533	0.120	0.692
9	0.077	0.267	0.125	0.642	0.152	1.011
10	0.113	0.622	0.089	0.385	0.125	0.741
11	0.115	0.642	0.100	0.494	0.102	0.514
12	0.080	0.297				
13	0.096	0.454				
14	0.078	0.277				
15	0.090	0.395				
16	0.109	0.583				

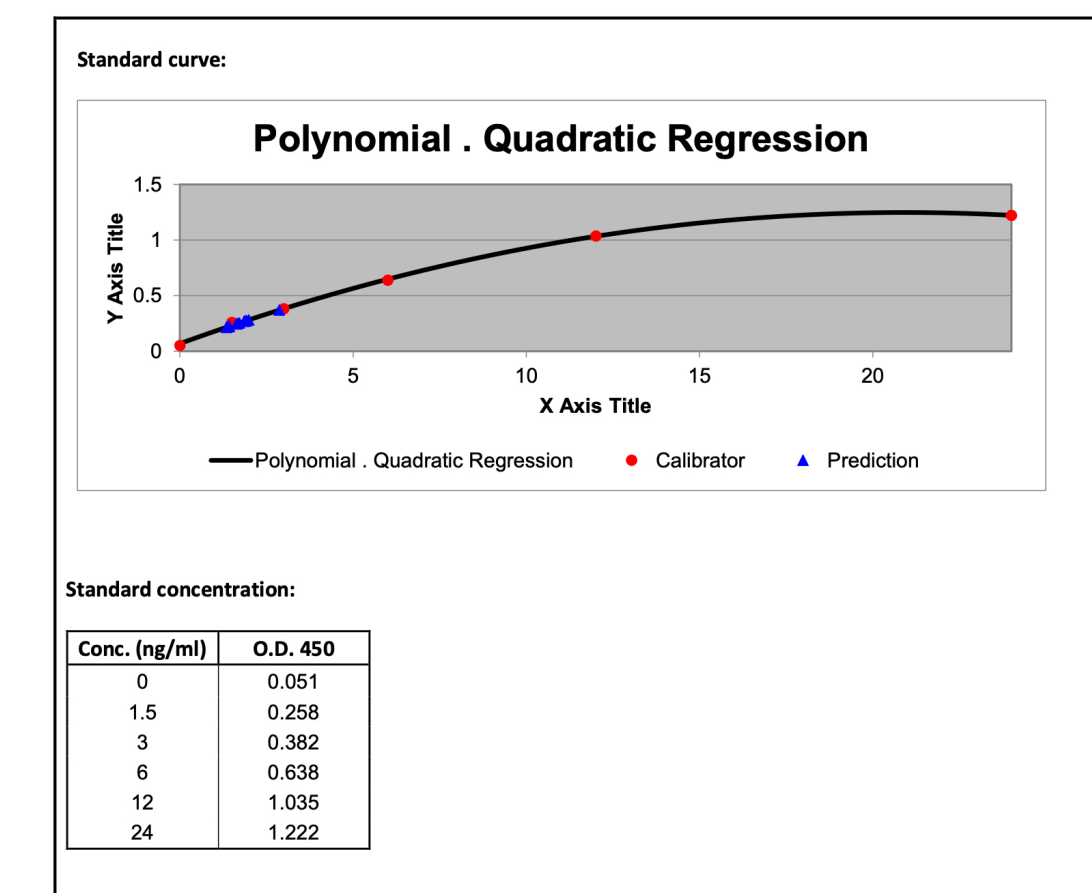


Serum GPX ELISA data — pre & post treatment

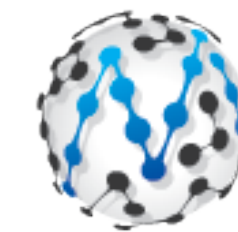
Analysis Report – Microbiology
Test Name: Glutathione Peroxidase

Results:

S.No.	Jana Poultry Farm					
	Shed 4, Age 60wk		Shed 5, Age 50 wk		Shed 6, Age 40 wk	
	O.D.	Conc. (ng/ml)	O.D.	Conc. (ng/ml)	O.D.	Conc. (ng/ml)
1	0.202	1.2191960	0.161	0.836793	0.252	1.695837
2	0.122	0.4796844	0.220	1.389446	0.248	1.657271
3	0.472	3.9514470	0.278	1.94842	0.339	2.554669
4	0.215	1.3420060	0.18	1.041070	0.298	2.145035
5	0.132	0.5706531	0.172	0.938670	0.225	1.437002
6	0.152	0.7538218	0.23	1.465591	0.34	2.514303
7	0.240	1.5803710	0.179	1.003773	0.244	1.618783
8	0.164	0.8645263	0.193	1.134620	0.262	1.792591
9	0.310	2.2639960	0.149	0.726241	0.232	1.503776
10	0.189	1.0971470	0.192	1.125245	0.262	1.792591
11	0.248	1.6572710	0.18	1.013090	0.30	2.184605
12	0.209	1.285229	0.185	1.059745		
13	0.105	0.3259603				



Summary & Conclusion



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- Supplementation of NanoSel™ E and NanoSel™ FS restored the productivity of affected flock to normal.
- The antioxidant levels were significantly improved ensuring better stress management of the flock

