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EFFECTS OF DIETARY SELENIUM SUPPLEMENTS ON THE SELENIUM CONTENT
OF EGGS AND TISSUES

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Over the past several years we have conducted experiments to determine the effects of adding selenium to chicken diets. The purpose of this paper is to report effects of selenium supplements on tissue and egg deposition. Selenium is not adequate in the feeds grown in certain areas so currently the Food and Drug Administration is being asked to approve the addition of selenium to prepared feeds. As with any new additive there must be sufficient proof that there are no harmful effects before the Food and Drug Administration can grant permission to add selenium to feeds.

Selenium is a naturally occurring mineral found in soil, plants and animals. Although it is a natural substance, it is important to know if high amounts of selenium are deposited in eggs and tissues when it is added to the hen's diet. If excessively high levels accumulated in certain tissues, it would be undesirable to add selenium to feeds. However, if an amount of selenium could be added that would overcome deficiency problems and yet not accumulate, it would be extremely desirable.

Values listed in Table 1 are from selenium analyses of six different tissues and from eggs sampled at various times throughout two years. Day-old chicks were placed on feed and the same levels of selenium were fed to the hens for 64

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weeks with the purified type diets used and for 104 weeks to the hens fed a typical corn-soybean diet. The 0.2 ppm level was used only with the Torula Yeast diet.

The data in Tables 1 and 2 show that increasing dietary selenium results in higher levels of selenium in eggs and tissues. Thigh and breast muscle contained the lowest levels of selenium. Kidney and liver had higher amounts indicating that selenium tends to concentrate in these organs. The feathers contained the highest amounts which indicates this may be a way for hens to excrete excess selenium.

In most cases adding selenium (as an inorganic salt) at 2 ppm to the Isolated-Soy or Torula Yeast diet resulted in no higher selenium in eggs and tissues than found in the unsupplemented corn-soy diet. Selenium additions at nutritional levels (0.2 ppm or less) would have very little effect on tissue and egg selenium because even when added at the high levels in this study excessive levels did not accumulate.

TABLE 1. EFFECT OF DIETARY SELENIUM ADDITIONS ON TISSUE SELENIUM

Diet Type	Tissue	Amount Selenium Added (ppm)				
		0	0.2	2.0	8.0	8.0 + As ¹
Corn-Soy	Thigh	0.44 ²	--	0.44	0.52	0.65
Isolated-Soy		0.11	--	0.17	0.31	0.32
Torula Yeast		0.10	0.15	0.18	0.30	0.35
Corn-Soy	Breast	0.40	--	0.42	0.48	0.58
Isolated-Soy		0.09	--	0.18	0.26	0.30
Torula Yeast		0.06	0.10	0.16	0.23	0.29
Corn-Soy	Liver	0.80	--	1.03	3.92	3.32
Isolated-Soy		0.33	--	0.93	2.53	2.12
Torula Yeast		0.28	0.55	1.00	2.45	2.88
Corn-Soy	Kidney	0.96	--	1.16	3.18	2.85
Isolated-Soy		0.37	--	0.94	2.31	1.98
Torula Yeast		0.40	0.71	1.15	2.46	2.37
Corn-Soy	Heart	0.54	--	0.68	1.70	1.55
Isolated-Soy		0.16	--	0.32	0.95	0.83
Torula Yeast		0.18	0.27	0.43	1.23	1.05
Corn-Soy	Feathers	0.90	--	1.55	5.38	4.56
Isolated-Soy		0.27	--	1.36	3.32	4.97
Torula Yeast		0.33	0.37	1.11	3.42	3.10

¹Arsenic as sodium arsenite at 15 parts per million (ppm) in the corn-soy diet and 8 ppm in the purified diets.

²Values for the tissues are listed as parts per million (ppm) on the wet weight basis for three replicate groups of 5 hens per group.

TABLE 2. EFFECT OF DIETARY SELENIUM ADDITIONS ON WHOLE EGG SELENIUM

Diet Type	Added Selenium (ppm)	Age of Hens (Weeks)					
		32	42	52	62	96	104
Corn-Soy	0	0.44 ²	0.53	0.47	0.48	0.40	0.46
	2	0.56	0.77	0.71	0.64	0.59	0.57
	8	1.46	1.83	1.82	1.86	1.70	1.50
	8(15) ¹	1.88	1.54	1.46	1.77	1.21	1.28
Isolated-Soy	0	0.23	0.13	0.17	0.14	--	--
	2	0.44	0.61	0.58	0.53	--	--
	8	1.22	1.74	1.76	1.64	--	--
	8(8) ¹	1.14	1.33	1.40	1.47	--	--
Torula Yeast	0	0.15	0.13	0.14	0.11	--	--
	0.2	0.31	0.38	0.40	0.28	--	--
	2	0.59	0.57	0.69	0.60	--	--
	8	1.52	1.89	1.96	1.99	--	--
	8(8) ¹	1.21	1.29	1.34	1.56	--	--

¹ In addition arsenic added at 15 ppm in the corn-soy diet and 8 ppm in the others.

² Average of three replicate samples given in parts per million wet basis.