

Research Now

Efficacy of Availa®Zn and Availa®Se for White Shrimp (*Litopenaeus vannamei*)

Introduction:

This study was designed to evaluate the effects of Availa®Zn and Availa®Se on growth performance, meat quality, and immune response of white shrimp (*Litopenaeus vannamei*).

Experimental Design:

This 8-wk trial operated as a complete randomized design, with a 2×2 factorial arrangement of treatments, along with 6 replications per treatment and 25 shrimp per replication. 600 shrimp initially weighed ~4 g and were fed pelleted diets 4 times daily, at 2.5 to 3% body weight. The arrangement of two zinc sources [Availa-Zn zinc amino acid complex or zinc sulfate (ZnSO₄)] and two selenium sources [Availa-Se zinc-L-selenomethionine or sodium selenite (Na₂SeO₃)] comprised the four treatments.

Treatments:

Item	ZnSO ₄ + Na ₂ SeO ₃	Availa®Zn ^a + Na ₂ SeO ₃	ZnSO ₄ + Availa®Se ^b	Availa-Zn + Availa-Se
	Supplemental Trace Mineral, ppm			
Zn as ZnSO ₄	120	70	120	70
Zn as Availa-Zn		50		50
Se as Na ₂ SeO ₃	0.30	0.30	0.15	0.15
Se as Availa-Se			0.15	0.15

^a Availa-Zn zinc amino acid complex

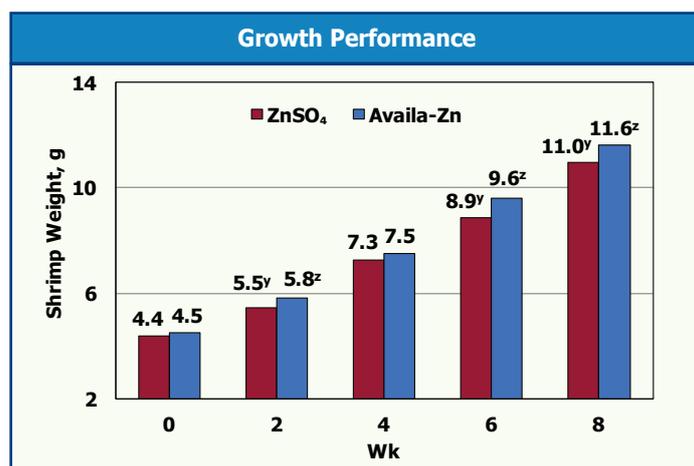
^b Availa-Se zinc-L-selenomethionine

Results:

- Partially replacing inorganic Zn with Availa-Zn improved shrimp weight, $P < 0.05$
- Feeding either Availa-Zn or Availa-Se generally improved measures of immunity, $P \leq 0.05$
- Whole shrimp drip-loss was decreased by feeding Availa-Se alone ($P < 0.05$) or in combination with Availa-Zn, $P < 0.10$
- Rancidity of shrimp meat was improved by feeding either Availa-Zn or Availa-Se, $P < 0.10$
- Redness of shrimp meat boiled post-72-h chill was improved for shrimp consuming Availa-Se, $P < 0.05$

Conclusion:

Including Availa-Zn and Availa-Se in the diets of white shrimp (*Litopenaeus vannamei*) is beneficial for shrimp growth, immunity, and meat production.



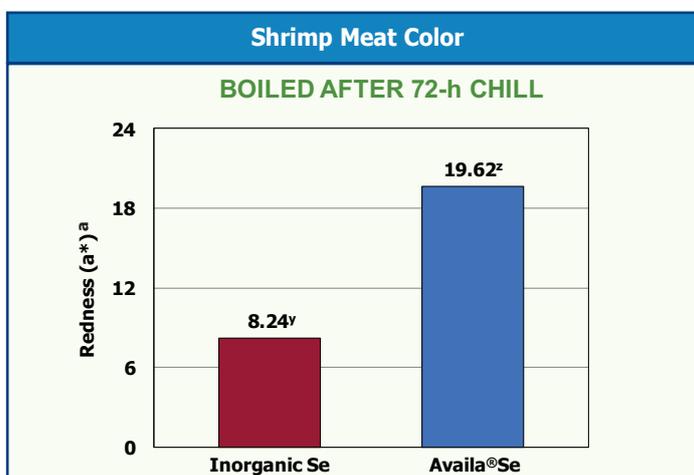
^{YZ} Within a week, zinc source effect, $P < 0.05$

	Treatment			
	ZnSO ₄ + Na ₂ SeO ₃	Availa®Zn + Na ₂ SeO ₃	ZnSO ₄ + Availa®Se	Availa-Zn + Availa-Se
Total hemocyte count ^{yz} , × 10 ⁶ cell/mL	1.52	1.90	2.18	2.15
Phenoloxidase activity ^{yz} , unit/min/mg protein	78.17	101.70	101.70	109.23
Hemolymph total protein ^{yz} , mg/dL	4.55	5.48	6.12	5.52
Superoxide anion activity, OD	0.55	0.56	0.60	0.58
Oxyhemocyanin, %	88.25	90.80	94.66	89.34

^x Zinc source, $P \leq 0.01$

^y Selenium source, $P \leq 0.05$

^z Selenium source × zinc source interaction, $P \leq 0.05$



^a Higher redness value (a*) indicates redder color (+60 for red to -60 for green)

^{YZ} Means lacking a common superscript letter differ; Selenium source effect, $P < 0.05$

Abstract

Efficacy of Availa[®]Zn and Availa[®]Se for White Shrimp (*Litopenaeus vannamei*) Mihai Sun^{1*}, Terry L. Ward¹, Orapint Jintasataporn², Cláudia Figueiredo-Silva¹; ¹Zinpro Corporation, Eden Prairie, MN, USA, ²Department of Aquaculture, Faculty of Fisheries, Kasetsart University, Bangkok, Thailand

A study of *Litopenaeus vannamei* (initial wt. = 4 g) was conducted as a complete randomized design (CRD) with 6 replications (tanks) of each treatment, and 25 shrimp per replication. Treatments were arranged as a 2 × 2 factorial, utilizing two zinc sources [zinc amino acid complex (ZnAA) or ZnSO₄] and two selenium sources [zinc-L-selenomethionine (SeAA) or sodium selenite (Na₂SeO₃)] (Availa[®]Zn, Availa[®]Se; Zinpro Corporation, Eden Prairie, MN, USA). Shrimp were fed pelleted diets 4 times daily, for eight weeks, at 2.5 to 3% body weight. Shrimp consuming diets containing ZnAA and Na₂SeO₃, along with shrimp fed ZnAA and SeAA, had greater ($P < 0.05$) body weight than shrimp fed inorganic sources of Zn and Se. Total hemocyte and phenol oxidase activity were increased ($P < 0.001$) when ZnAA or SeAA were present in the diet. Whole shrimp drip loss was decreased for shrimp consuming diets that included ZnAA or SeAA ($P < 0.05$). Rancidity of shrimp meat was decreased ($P \leq 0.10$) by feeding either ZnAA or SeAA. Redness of fresh shrimp meat after 72-h chill, boiled post-72-h chill or post-14-d freeze increased ($P = 0.03, 0.06, \text{ and } 0.07$, respectively) when shrimp were fed diets supplemented with SeAA. Overall, inclusion of Availa-Zn zinc amino acid complex and/or Availa-Se zinc-L-selenomethionine was beneficial for shrimp growth and some aspects of both immunity and shrimp meat production.

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