# EXAMPLE ABSTRACT

**SYNERGISTIC EFFECTS OF DIETARY MICRONUTRIENTS AND LIPID ON PRODUCTION PERFORMANCE AND COMPOSITION OF SHRIMP AND FISH**

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**Dietary micronutrients and lipid interact to shape aquatic animal performance, yet factorial evidence in key species is scarce.** This study assessed the combined effects of a chelated trace mineral blend (zinc, selenium, manganese) and dietary lipid on growth, feed efficiency, and tissue composition in a shrimp–fish model. Two 8-week trials were conducted in recirculating systems with juvenile Penaeus monodon and Lates calcarifer. A 2 × 3 factorial design compared lipid at 80 or 140 g kg⁻¹ with the mineral blend at 0, 100, or 200 mg kg⁻¹. Basal diets contained 420 g kg⁻¹ crude protein and lipids supplied as a 1:1 mix of fish and vegetable oils. Shrimp (2.0 ± 0.1 g) were stocked at 30 per tank and fish (15.0 ± 0.4 g) at 20 per tank, with four replicates per treatment. Outcomes included weight gain, specific growth rate (SGR), feed conversion ratio (FCR), survival, whole-body mineral content, and hepatic/fillet lipid profiles. Data were analysed by two-way ANOVA (α = 0.05). A significant micronutrient × lipid interaction was detected for both species (P < 0.05). In shrimp, the combination of 140 g kg⁻¹ lipid and 100 mg kg⁻¹ blend gave the highest weight gain (7.1 ± 0.2 g) and best FCR (1.22 ± 0.03), compared with 6.0 ± 0.2 g and 1.38 ± 0.04 in the unsupplemented 80 g kg⁻¹ lipid diet. In barramundi, the same combination improved SGR by 11% and reduced FCR to 1.15 ± 0.03 versus 1.27 ± 0.04 in controls. Whole-body zinc and selenium increased dose-dependently, but excessive supplementation (200 mg kg⁻¹) provided no further growth gains and modestly elevated faecal mineral losses. Survival remained above 92% across treatments with no overt signs of deficiency or toxicity. Lipid profiles of shrimp hepatopancreas and fish fillets showed modest adjustments with diet, but no evidence of compromised tissue quality. **In summary, dietary lipid level modulated the efficacy of trace mineral supplementation in both shrimp and barramundi.** A moderate inclusion of the mineral blend (100 mg kg⁻¹) with higher lipid (140 g kg⁻¹) optimised growth and feed efficiency, whereas excessive supplementation yielded diminishing returns and increased mineral waste. These findings highlight a biologically meaningful synergy between balanced lipid supply and trace mineral nutrition, supporting more precise, species-appropriate formulations to improve aquaculture performance while reducing potential environmental loading.

Keywords: shrimp, fish, micronutrients, lipid, synergy, feed efficiency

Preferred Topic: feed additives and micronutrients

Secondary Alignment: sustainable raw materials