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饲料锌添加水平对凡纳滨对虾免疫抗菌机能和溶菌酶mRNA及Toll受体mRNA表达的影响

Effects of zinc supplementation in diet on the immunity, *Vibrio* resistant ability, lysozyme mRNA and Toll receptor mRNA expressions in the white shrimp (*Litopenaeus vannamei*)

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中文关键词: [凡纳滨对虾](#) [蛋氨酸锌](#) [Toll受体mRNA](#) [溶菌酶mRNA](#) [超氧化物歧化酶](#) [溶菌酶](#)

英文关键词: [Litopenaeus vannamei](#) [zinc methionine](#) [Toll receptor mRNA](#) [lysozyme mRNA](#) [SOD](#) [lysozyme](#)

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中文摘要:

在基础饲料中添加不同水平蛋氨酸锌(添加水平分别为0、50、150 mg Zn/kg)并饲喂凡纳滨对虾,养殖14 d后,取样测定对虾鳃组织中Toll受体mRNA和溶菌酶mRNA的表达水平以及肝胰腺、肌肉和血淋巴中超氧化物歧化酶(SOD)和溶菌酶(LSZ)活性,并进行溶藻弧菌人工急性感染试验。结果表明,凡纳滨对虾肝胰腺及肌肉中锌蓄积水平随饲料锌添加量的增加而显著增加($P<0.05$),肝胰腺中锌蓄积更明显。添加50 mg Zn/kg组(锌含量为73.25 mg Zn/kg饲料)对虾鳃组织中的Toll受体mRNA和溶菌酶mRNA表达量均显著高于未添加锌组和添加150 mg Zn/kg组($P<0.05$)。添加50 mg Zn/kg组对虾肌肉、肝胰腺和血淋巴中溶菌酶活性显著高于未添加锌组($P<0.05$)。添加50 mg Zn/kg组对虾肝胰腺和血淋巴中的SOD活性也显著高于未添加锌组,但与添加150 mg Zn/kg组无显著差异。而肌肉中SOD活性在添加150 mg Zn/kg组中最高。经溶藻弧菌人工急性感染后,添加50 mg Zn/kg组对虾半致死时间和全致死时间大于未添加锌组和添加150 mg Zn/kg组。本研究表明,相比摄食未添加锌组饲料和添加150 mg Zn/kg组饲料,凡纳滨对虾的免疫抗菌机能在摄取添加50 mg Zn/kg(锌含量为73.25 mg Zn/kg饲料)饲料时得到改善。

英文摘要:

Experiments were conducted to study the effects of dietary zinc supplementation on the immune gene expression and immunity and disease-resistant ability of white shrimp (*Litopenaeus vannamei*). The shrimp were fed with 3 zinc methionine diets (supplemented at 0, 50, 150 mg Zn/kg diet respectively) respectively for 14 days. Then the expressions of Toll Receptor mRNA and lysozyme mRNA in gill and superoxide dismutase (SOD) activity and lysozyme (LSZ) activity in hepatopancreas, muscle and haemolymph were assayed respectively. The shrimp treated with different zinc diets were also challenged with *Vibrio alginolyticus*. The results showed that the zinc levels in hepatopancreas and muscle of shrimp significantly increased ($P<0.05$) as the dietary zinc increased. While the hepatopancreas accumulated more zinc than muscle. Compared to those of the shrimp in 0 mg Zn/kg and 150 mg Zn/kg treatments, the expressions of Toll receptor mRNA and lysozyme mRNA in gill of the shrimp in 50 mg Zn/kg treatment were significantly up-regulated. The lysozyme activities in muscle, hepatopancreas and haemolymph of the shrimp in 50 mg Zn/kg treatment were

significantly higher than those in 0 mg Zn/kg treatment ($P < 0.05$). The SOD activities in hepatopancreas and haemolymph of the shrimp in 50 mg Zn/kg and 150 mg Zn/kg treatments were also higher than those in 0 mg Zn/kg treatments ($P < 0.05$). While the SOD activity in muscle of the shrimp treated with 150 mg Zn/kg was significantly higher than those treated with 0 mg Zn/kg and 50 mg Zn/kg respectively. The half lethal time and complete lethal time for the shrimp in 50 mg Zn/kg treatment were longer than those in 0 mg Zn/kg and 150 mg Zn/kg treatments after being challenged with *V. alginolyticus*. It is therefore suggested that compared to those in 0 mg Zn/kg and 150 mg Zn/kg treatments, the shrimp fed the diets added 50 mg Zn/kg (the content of zinc in diet was 73.25 mg Zn/kg) had improved immunity and *Vibrio* resistant ability.

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