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Effects of ammonia on survival and osmoregulation of post larval stages of the shrimp *Penaeus monodon*(Crustacea: Decapoda)

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Effects of ammonia (0-200 mgNH_3-N/l) on the survival and osmoregulation of the post larval stages (PL_{25} and PL_{35}) of *Penaeus monodon* were studied at two different salinities; full strength sea water (811±15 mmol/kg, 25 mg/l) and diluted sea water (440±3 mmol/kg, 15 mg/l). Acute toxicity of ammonia was studied for 48h exposure period. There was a significant ($p<0.05$) effect of ammonia on the survival of the post larvae with time. For PL_{25} stage, percentage survival was decreased with time, when ammonia concentration increased in full strength sea water and about 95% survived at 100 mgNH_3-N/l. In dilute sea water, for PL_{25} stage, critical concentration of ammonia was 40 mgNH_3-N/l at 48h exposure time and survival rate was 95%. Chronic toxicity of ammonia was tested for PL_{25} stage for 28 day exposure period, at different ammonia concentrations (0-20 mgNH_3-N/l). Percentage survival was decreased with increasing ammonia concentration in the developing post larvae.

Observations made on the morphology and changes in the molting frequencies of post larvae (PL_{25}) in different ammonia concentrations in full strength and diluted sea water for 48h. After exposure to different ammonia concentrations, shrimp exhibited red colorations and swollen hepatopancrese. Molting frequencies of the post larvae were increased with increased ambient ammonia concentrations in full strength sea water. However, in diluted sea water, molting frequency was lower at high ammonia concentrations.

Osmoregulatory capacity (OC) was calculated as the osmotic gradient between the hemolymph and the external medium at different ammonia concentrations. Osmolality measurements were made after 48h (short term) and at seven day intervals during the 28 day exposure period (long term) to different ammonia concentrations (0-200 mgNH_3-N/l). For PL_{25}, there was a significant increase ($p<0.05$) in the hypo-osmoregulatory capacity in full strength sea water. For PL_{35}, in dilute sea water, post larvae showed a significant change in the osmoregulatory capacity to hypo- from hyper-osmoregulation with increased ammonia concentration. Therefore, the present study confirmed the possibility of using OC as an indicator of physiological condition in post larvae of *Penaeus monodon* in different ammonia and salinity conditions.