

THE TOXICITY OF AMMONIA TO THE SUMMER FLOUNDER
(*PARALYCHTUS DENTATUS*), ATLANTIC SILVERSIDE (*MENIDIA
MENIDIA*), AND QUAHOG CLAM (*MERCENARIA MERCENARIA*)

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Abstract

The toxicity of ammonia has become an issue in recent years, especially in the Chesapeake Bay watershed. Currently, the EPA has set a chronic criterion of 0.035 mg/L (unionized ammonia). The chronic criterion is a four-day average concentration that cannot be exceeded more than once every three years. However, a lack of data exists on the toxicity of ammonia to saltwater organisms. Prior to this research, the chronic criterion was based on two saltwater and four freshwater organisms. This research was conducted to add additional data so more appropriate criteria may be set.

Two saltwater fish, the Summer Flounder (*Paralichthys dentatus*), and the Atlantic Silverside (*Menidia menidia*) and one invertebrate, the Quahog Clam (*Mercenaria mercenaria*) were tested for acute toxicity to ammonia. The acute tests performed on the Summer Flounder (2 months old) were 48 and 96-hour tests performed in both synthetic seawater and natural seawater. Seven-day chronic tests were also performed on the Summer Flounder using synthetic seawater. Both 48 and 96-hour acute tests were performed on the Atlantic Silverside (10-14 days old.) using natural seawater. Both 48 and 96-hour acute tests were performed on the Quahog Clam (5mm shell height) using synthetic seawater.

The 48-hour LC50s for the Summer Flounder in synthetic and natural seawater were 1.22 mg/L and 1.09 mg/L, respectively. The 96-hour LC50s for the Summer Flounder in synthetic and natural seawater were 1.07 mg/L and 0.889 mg/L, respectively. The 7-day chronic NOEC was 1.37 mg/L. The 48 and 96-hour LC50s for Atlantic Silverside in natural seawater were 1.52 mg/L and 1.18 mg/L, respectively. The 48 and 96-hour LC50s for Quahog Clam in synthetic seawater were 216 mg/L and 36.6 mg/L, respectively.

The acute-chronic ratio for the Summer Flounder was 2.27. The refined chronic criterion was 0.081 mg/L based on this research and the research of others. Summer Flounder were more sensitive to ammonia in natural seawater than synthetic seawater. However, Atlantic Silverside showed no difference in sensitivity.

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