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Title: Water quality in laboratory soil-water microcosms with soils from different areas of Thailand

Author(s): Claude Boyd
Prasert Munsiri
Department of Fisheries and Allied Aquacultures
Auburn University, Alabama 36849 USA

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Abstract: Forty-five soil samples were collected from aquaculture areas in 23 provinces of Thailand to include six soil orders and wide variation in physical and chemical properties. Soil-water microcosms were prepared containing 5 g of soil and 150 mL of distilled water. Microcosms were held in an oscillating table shaker (150 rpm) for 1 wk at 25 C in the dark. Water pH and concentrations of dissolved nutrients, total alkalinity, and total hardness were measured. Differences in properties within soil orders caused wide variation in composition of solutions and differences in concentrations of dissolved substances and pH were not related to order. Regression analyses revealed significant correlations between concentrations of soil nutrients extractable in dilute acid (0.05 N HCl plus 0.025 N H_2SO_4) or in neutral, 1 N ammonium acetate and aqueous concentrations. Regression coefficients usually were higher for dilute-acid extractable nutrients than for ammonium acetate extractable ones. Regression coefficients based on dilute-acid nutrients follow: soluble reactive phosphorus (r = 0.816); calcium (r = 0.685); magnesium (r = 0.470); potassium (r =0.959); sodium (r = 0.977); manganese (r = 0.462); boron (r = 0.399). The correlation between soil and solution iron was not significant and aqueous concentrations of copper and zinc were below detection limit. Hardness was correlated with soil carbon (r = 0.710) and soil pH was a good predictor of alkalinity (r = 0.877). Soil pH and aqueous pH were highly correlated (r = 0.939). Findings suggest that soil characteristics can be used to predict pH and concentrations of several dissolved substances in soil-water systems under aerobic conditions.

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