An optimized and simplified method for analysing urea and ammonia in freshwater aquaculture systems

This study presents a simple urease method for analysis of ammonia and urea in freshwater aquaculture systems. Urea is hydrolysed into ammonia using urease followed by analysis of released ammonia using the salicylate-hypochlorite method. The hydrolysis of urea is performed at room temperature and without addition of a buffer. A number of tests were performed on water samples obtained from a commercial rainbow trout farm to determine the optimal urease concentration and time for complete hydrolysis. One mL of water sample was spiked with 1.3 mL urea at three different concentrations: 50 lg L⁻¹, 100 lg L⁻¹ and 200 lg L⁻¹ urea-N. In addition, five concentrations of urease were tested, ranging from 0.1 U mL⁻¹ to 4 U mL⁻¹. Samples were hydrolysed for various time periods ranging from 5 to 120 min. A urease concentration of 0.4 U mL⁻¹ and a hydrolysis period of 120 min gave the best results, with 99.6–101% recovery of urea-N in samples spiked with 100 or 200 lg L⁻¹ urea-N.

The level of accurate quantification of ammonia using the method is 50 lg L⁻¹ NH₄⁺-N, and the detection level is 5–10 lg L⁻¹ NH₄⁺-N.