

**Ammonia Volatilisation Rates from Primary Facultative and
Maturation Wastewater Ponds in the United Kingdom.**

by

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ABSTRACT

Many investigations have studied the methods of nitrogen removal from wastewater stabilisation ponds. This debate has remained undecided as to which mechanism is the most important and effective in the ponds. This investigation primarily studied the amount of ammonia volatilising from the surface of a facultative pond and a maturation pond in the UK. This was conducted through trapping the gas off the surface of the water in an on-pond chamber designed for the ponds. It also analysed the possibility of the other mechanisms of nitrogen removal, namely; nitrification and denitrification, and algal uptake and sedimentation. Other nitrogen tests were conducted including: nitrate and nitrite analyses and Total Kjeldahl nitrogen tests.

The environmental conditions in the ponds, including pH, temperature and dissolved oxygen (DO) content, were recorded. The fluctuations in these parameters were monitored and their effects on the mechanisms of nitrogen removal were considered.

In both the facultative and maturation ponds very low rates of ammonia volatilisation were recorded. In all of the weeks investigated, less than 1% of the ammonia removal in the ponds could be accounted for by volatilisation. However, there were slightly higher rates of removal in the maturation pond.

The nitrate and nitrite results could not provide evidence that nitrification and denitrification were occurring; however, this does not necessarily rule out the mechanism. The dissolved oxygen content of the ponds followed a cyclical pattern in which low DO occurred during the night and higher DO during the day; this could provide ideal conditions for denitrification and nitrification to occur, particularly in the facultative pond.

The pH and temperature parameters followed the same cyclical patterns as the DO, being directly affected by the algal photosynthetic rates in the pond. In turn the ammonia removal rates were widely affected by the pH levels.

Key-words: waste stabilisation ponds, ammonia, volatilisation, nitrification, denitrification, facultative, maturation, algae, Daphnia, pH, temperature, DO.

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