New ponds take the waste out of wastewater

August 1 2011

Research by Flinders University's School of the Environment has shown that a shallow, high-rate pond system to treat wastewater will slash the loss to evaporation as well as boosting the rates of removal of bacterial and viral pathogens.

The research results will be presented at the International Water Association's conference on Wastewater Stabilisation Ponds, which will be hosted by Flinders from August 1 to 3, 2011 at the Stamford Grand Hotel at Glenelg.

PhD researcher Mr Neil Buchanan (pictured) said that at present evaporation from treatment ponds wipes out a large proportion – up to 90 per cent – of reclaimed water in South Australia's small rural communities, where there is strong unmet demand for clean and relatively cheap water.

The research project compared a high-rate algal pond at Kingston-on-Murray with a conventional treatment pond system at Lyndoch. Funding for the performance research comes from the SA Local Government Association, which is assessing the viability of advanced pond systems for use in rural areas.

Mr Buchanan said that the depth and relatively static nature of conventional waste stabilisation ponds means that the combined decontaminating effect of sunlight and algal activity is limited to an upper layer of about eight to 20 centimetres.

The high rate algal pond, by contrast, uses a slowly revolving paddle wheel to aerate and move the water through a shallow, winding course. Moving the water exposes viral and bacterial pathogens to the direct effect of ultra-violet light while also inducing stronger algal growth.

“The chemical effect of the algae is to increase levels of alkalinity in the water, which acts as a strong disinfectant,” Mr Buchanan said.

The result, compared to a conventional pond system, is reduced evaporation and a higher rate of pathogen removal.

“The high rate pond has a surface area of about one fifth of the pond system, and our work to date suggests that in a fifth of the area we are getting the equivalent of double the rate of the removal of pathogens,” Mr Buchanan said.

“So overall, you could say that we could reduce the surface area and the evaporative losses by a factor of ten.”

While Australian reuse applications require an emphasis on pathogen removal, in Europe the foremost consideration is reducing nutrient load, since wastewater is often discharged into waterways.

“So concurrent with the pathogen work, we are also studying the rate of removal of nutrients from the water,” Mr Buchanan said.

Provided by Flinders University