

## Removal of Phosphorus from Drainage Water Using an Enveloped Pipe Drain

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### Abstract

In Dutch surface waters, phosphorus (P) concentrations are often too high and eutrophication is a major problem. Mitigation measures are needed which can contribute to improving the chemical surface water quality. The effectiveness of enveloping a pipe drain with iron-coated sand for reducing P losses was tested in a field experiment in the flower bulb growing region in the western part of The Netherlands. In this region, problems with P losses and surface water quality are large, and high P concentrations in pipe drain water are rather common. Iron-coated sand is a side product of drinking water production from anaerobic groundwater, and it exhibits a high P binding capacity and a high saturated hydraulic conductivity. In September 2010, a new pipe drain was installed at a depth of 0.8 m below the soil surface between two reference pipe drains, and enveloped with a layer of 10 cm iron-coated sand. Water samples were regularly collected from the effluents of the enveloped and the two reference pipe drains, the ditch which received all water from the field, and porous suction cups placed along the enveloped pipe drain. In addition, in situ measurements of pH and redox were done. Concentrations of amongst others dissolved reactive P, total dissolved P, and particulate P were measured. We will present results on the effectiveness of the enveloped pipe drain for reducing P losses by comparing the results of this measure with those of the two reference pipe drains.