

Interreg



North Sea Region

European Regional Development Fund

NuReDrain

FILTER SYSTEMS FOR A SUSTAINABLE AGRICULTURE

Newsletter June 2020

The NUREDRAIN project is testing filter technologies and filter materials which can remove and/or trap nitrogen (N) and phosphorus (P) before they reach receiving waters and cause eutrophication.

This newsletter brings you an update about the latest developments and the test results of the project.

Nuredrain project continues until September 2021



Translating lab research to field demonstration is always challenging: it turns out colder than you had hoped for, it rains more than you can cope with, a pump fails and a filter clogs... Therefore, the Interreg North Sea Region program has approved a request for a 1 year project lifetime extension to facilitate for another season of field experiments.

[Read more](#)

Copenhagen University test zero valent iron filter pilot for nitrate filtration



University of Copenhagen is testing a so-called Zero Valent Iron (ZVI) filter for nitrate filtration at its Taastrup Campus. Through this filter, the nitrate in drainage water is being reduced to ammonium by metallic iron (ZVI), and the ammonium produced is being retained on a zeolite cation exchanger. The new idea is to recycle nitrogen.

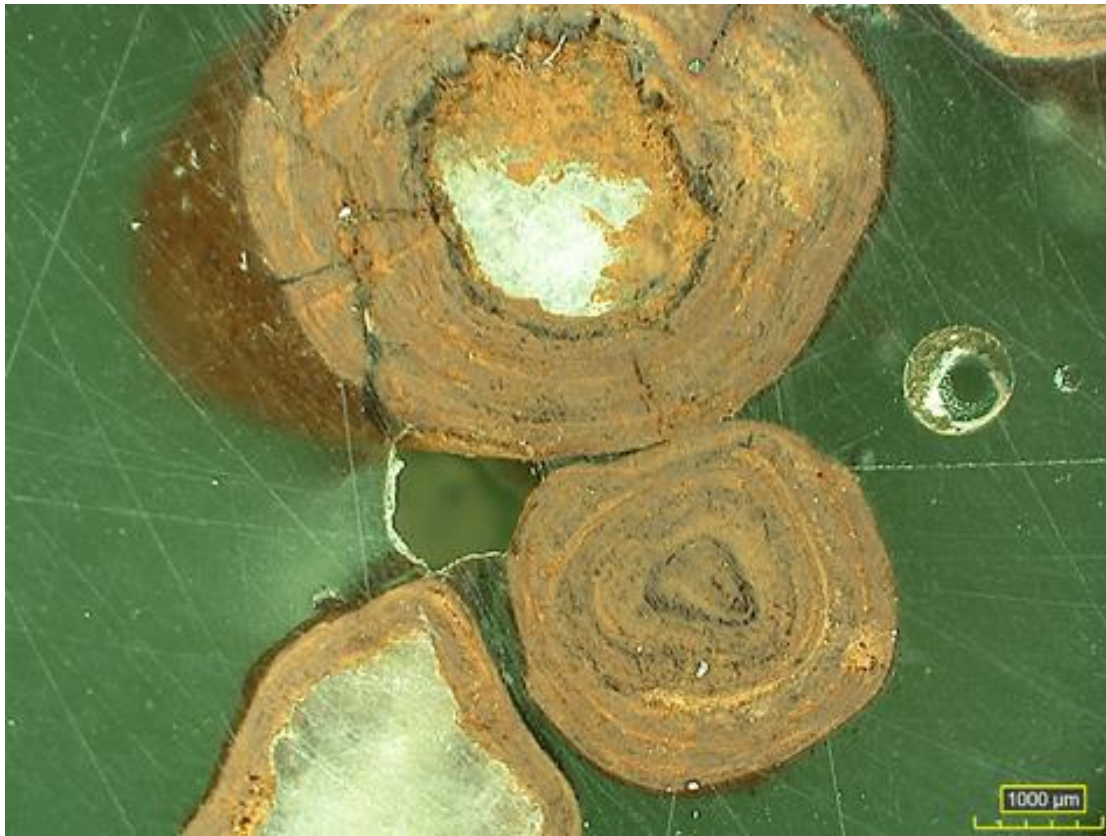
[Read more](#)

Reuse P in iron coated sand as fertilizer: results additional pot trials



What is the recovery potential from phosphorus captured in Iron Coated Sand (ICS) filter granules as fertilizer? PCS Ornamental Plant Research conducted a new series of pot trials on different plant species.

KU Leuven investigates the possibility of integrating phosphorus adsorbing materials in a circular process



The regeneration of saturated P filter materials and the recovery of adsorbed phosphorus, is part of the research within the NuReDrain project. Researchers at KU Leuven have developed a method to remove a large part of the adsorbed phosphorus from the adsorption material by means of an alkaline desorption process.

[Read more](#)

Build your own MBBR filter for N removal



Nitrate removal can be achieved by biological denitrification to nitrogen gas. NuReDrain partner PCS has been intensively testing the Moving Bed Biofilm Reactor (MBBR) filter that uses this principle as working mechanism. A complete and easy to use construction manual of this filter can be downloaded on our project website.

[Read more](#)

Learn more about nutrient removal filters in the
NuReDrain Filter Fact Sheets

Woodchip Bioreactor

Nitrate removal by biological denitrification

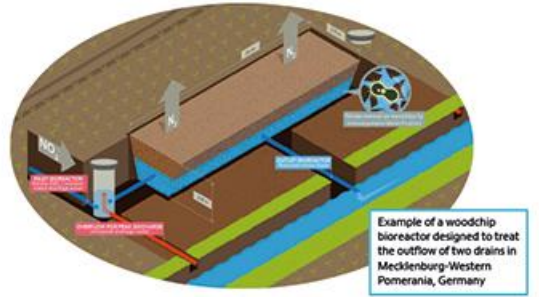
Price: € 20,000 – 30,000 + € 350/y
Flow: 3-20 m ³ /d
PO ₄ removal
NO ₃ removal
Plant Protection Product removal
OM removal

Benefits	Limitations
<ul style="list-style-type: none"> Edge-of-field and low-tech measure Low maintenance Effective nitrate remediation Moderate temperature fluctuations favor microbial activity even in winter 	<ul style="list-style-type: none"> Construction work for excavation and diversion of drainage pipes necessary Substance release (e.g. TOC) from the woodchips, in particular in the beginning of drainage season

Working principle and installation

Mechanism

Nitrate-enriched drainage water is diverted through a bioreactor filled with woodchips, which provides anoxic and carbon-enriched conditions. Microorganisms in the bioreactor break down nitrate to nitrogen gas, which is released in the atmosphere. As nitrate represents the major form of nitrogen in drainage water, nitrogen loads to the aquatic ecosystems are significantly reduced.



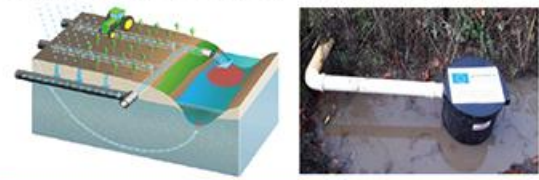
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Iron coated sand filter

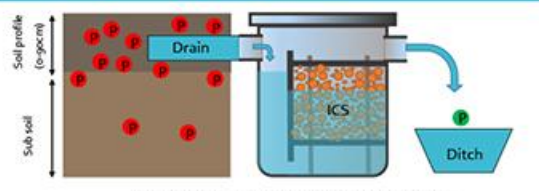
Phosphorus removal from drained agriculture fields

Price: € 1.000-6.000 + € 60/y
Flow: 6-8 m ³ /d
PO ₄ -P removal
Total P removal
NO ₃ -N removal
OM removal

Problem	Solution
Direct phosphorus (P) discharge towards the surrounding water due to high P content in soil	To install Iron coated sand (ICS) filter at the end of drainage pipes



Mechanism of the filter



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You want to know more about the operating conditions, removal efficiency, investment costs and operational expenditures of our filter systems? Download the NuReDrain Filter Fact Sheets on our project website. [Click here](#)



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Visit the NuReDrain Website

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