



## Water Management in the Pulp & Paper Industry

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Water is the connection

**kemira**

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### Process water treatment

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- Kidney technology
- Odour control

# Water Footprint



## **Green water footprint**

- Volume of rainwater evaporated

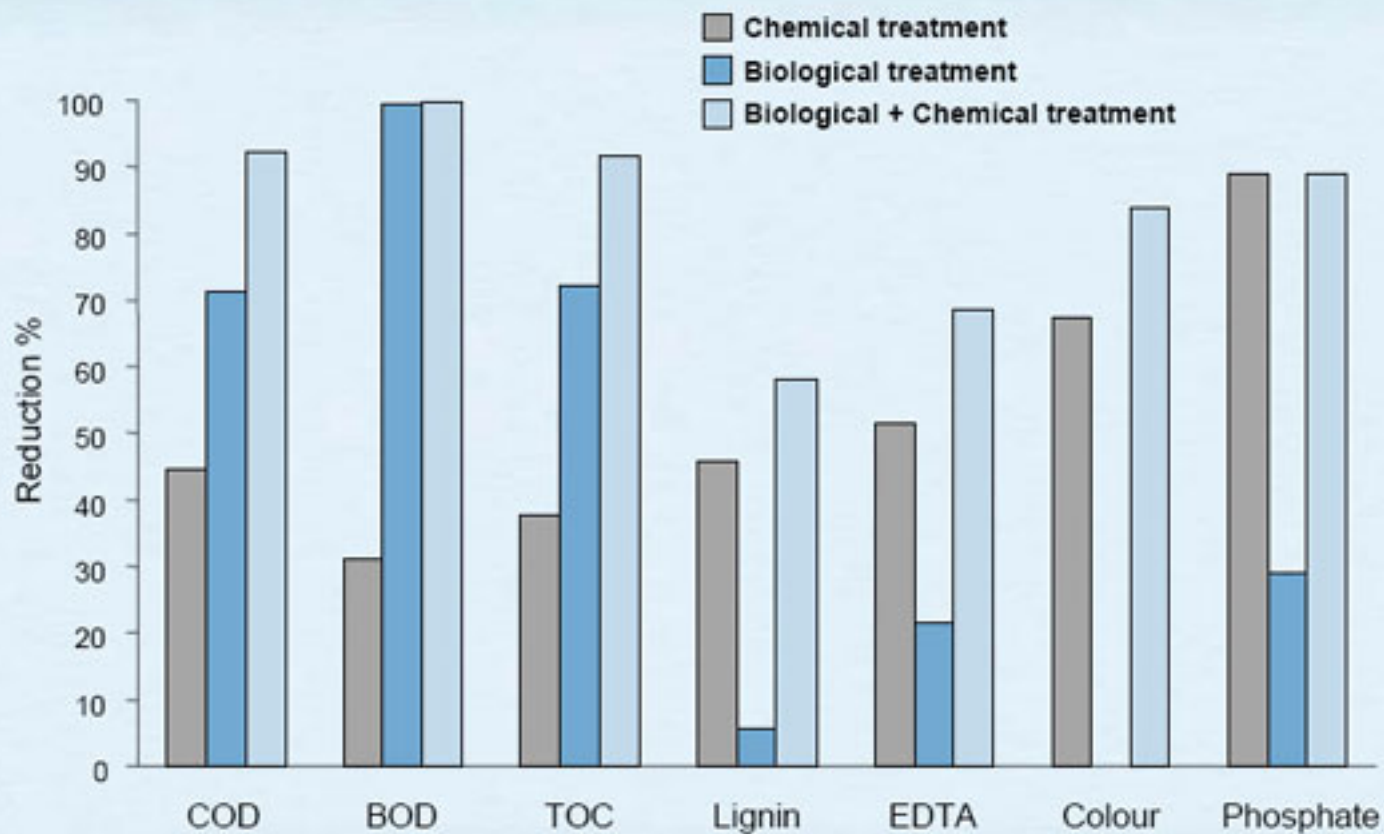
## **Blue water footprint**

- Volume of surface or groundwater evaporated

## **Grey water footprint**

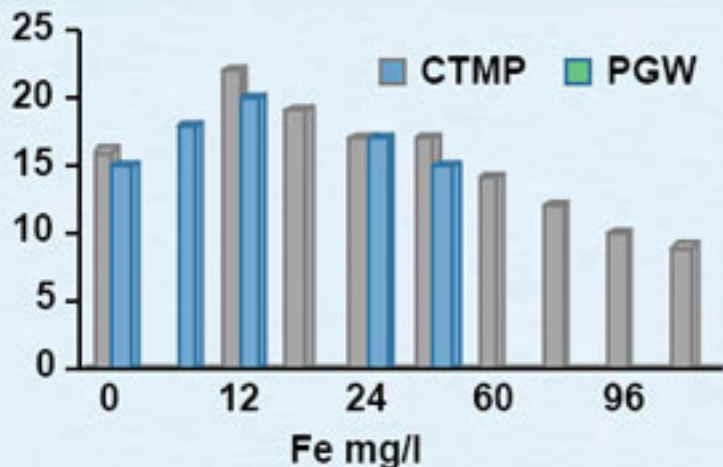
- Volume of polluted water

## Removal of different pollutants

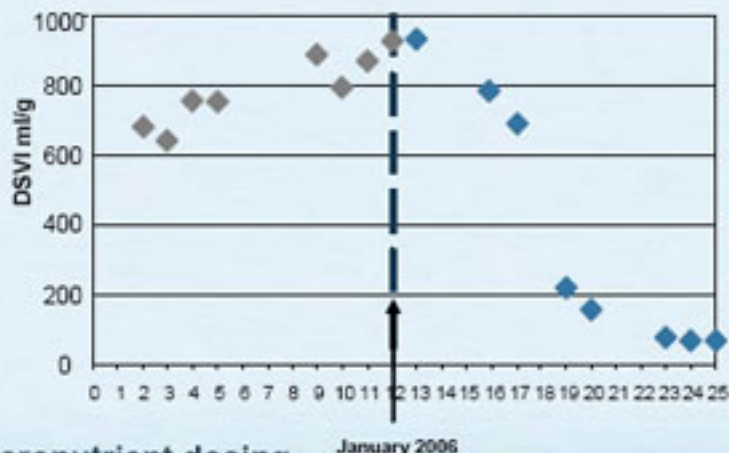


## Micronutrients - FennoNutri

Effect of iron on OUR mg/h : g/l



Effect of micronutrients on DSVI



### Why micronutrients?

- to guarantee a wide variety of different microbe species
- to avoid filament problems

### Dosing point:

- to effluent from primary clarifier, return sludge or directly to the biological stage

Improper dosing of N & P cannot be replaced by micronutrient dosing

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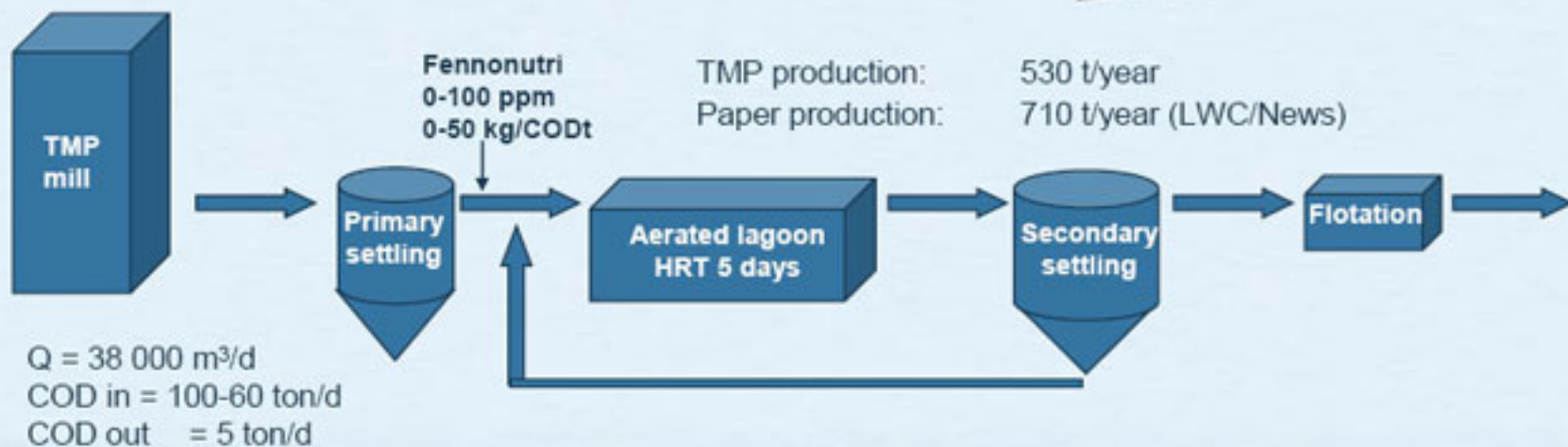
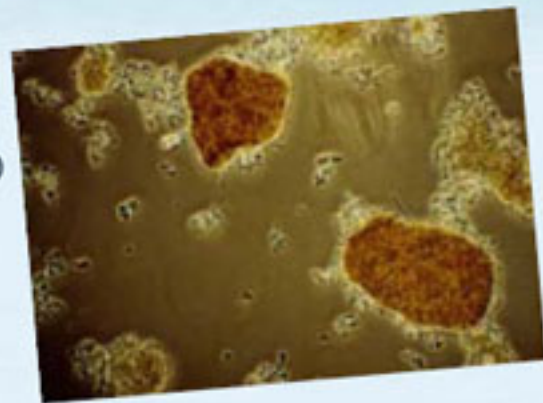
## FennoNutri - Case #1

### Problems during winter time

- High SVI during October-April
- Filaments, SS, COD & phosphorus emissions

### Fennonutri F115 dosage starts during October at 20 kg / t COD

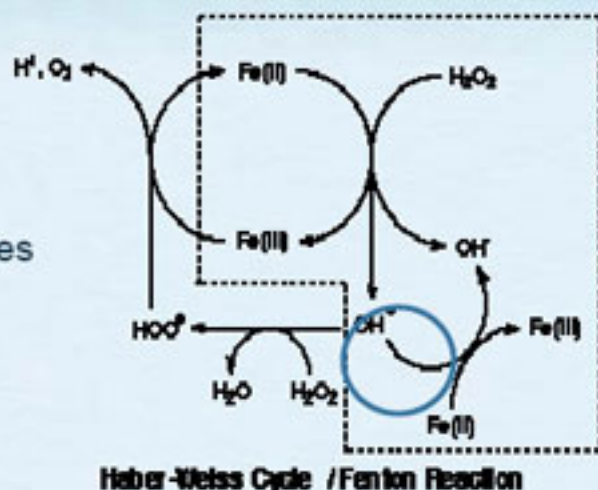
- dosage is increased gradually to 50 kg/COD t in mid winter
- dosage is decreased during the spring, and finished in April



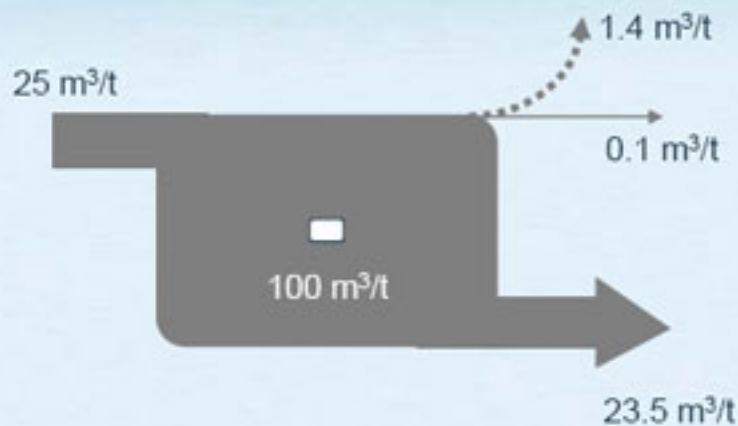
## Colour removal

### Treatment methods

- Inorganic coagulants
  - Alum, PAC
- Organic coagulants
  - Medium molecular mass polyelectrolytes
- Advanced oxidation processes
  - **FennoTriox**
- Ion Exchange
- Filtration UF/nano
- Electro-flocculation



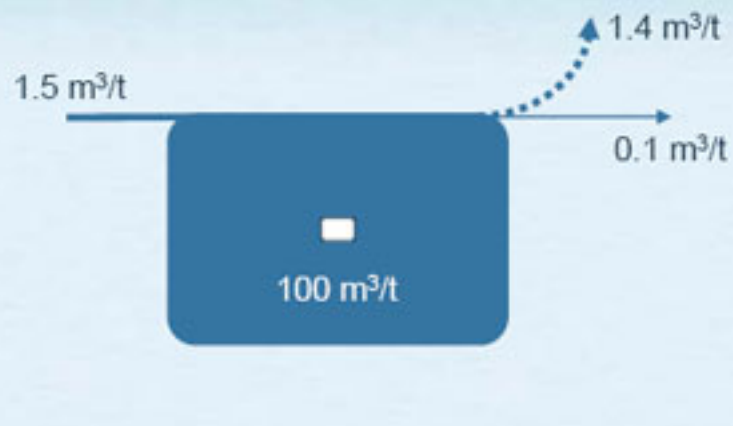
## Closing up the loops



200 mg/l COD in effluent

Chemistry used:

- Raw water treatment
- Effluent treatment
- Sludge treatment

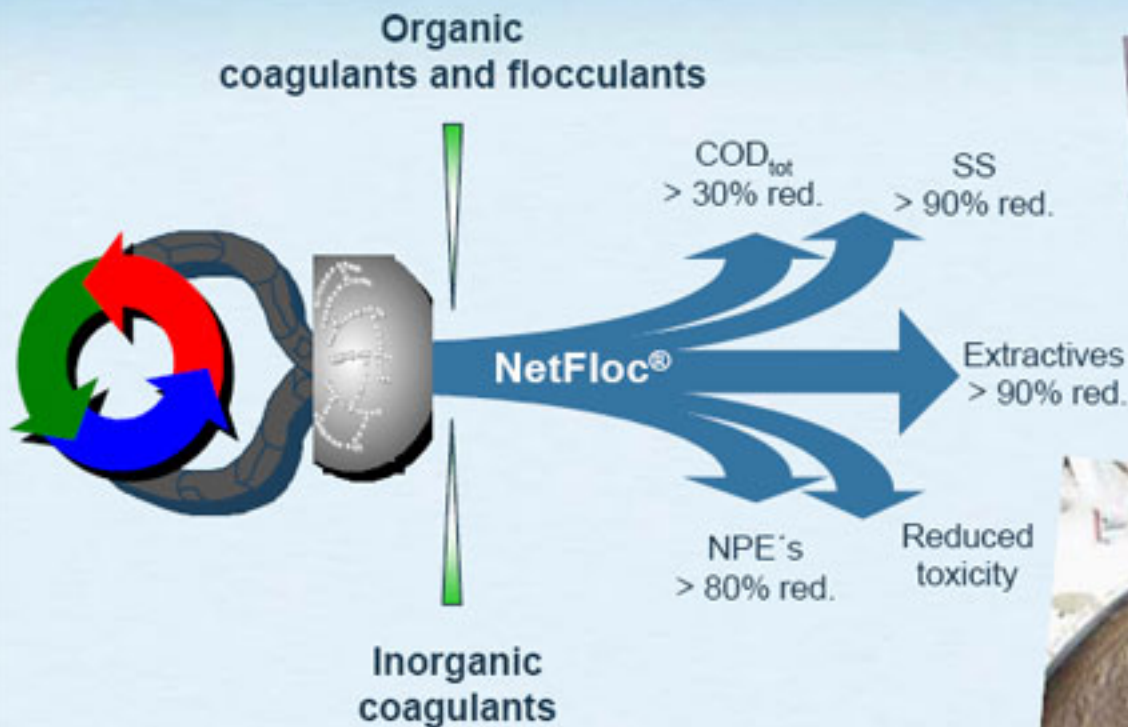


20 g/l COD in white water

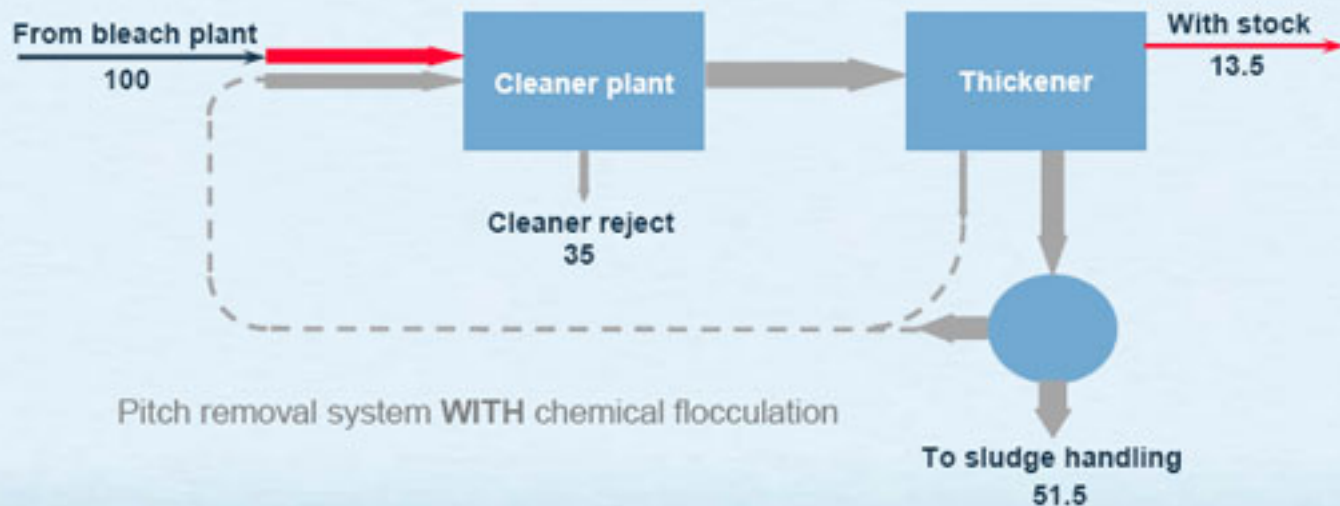
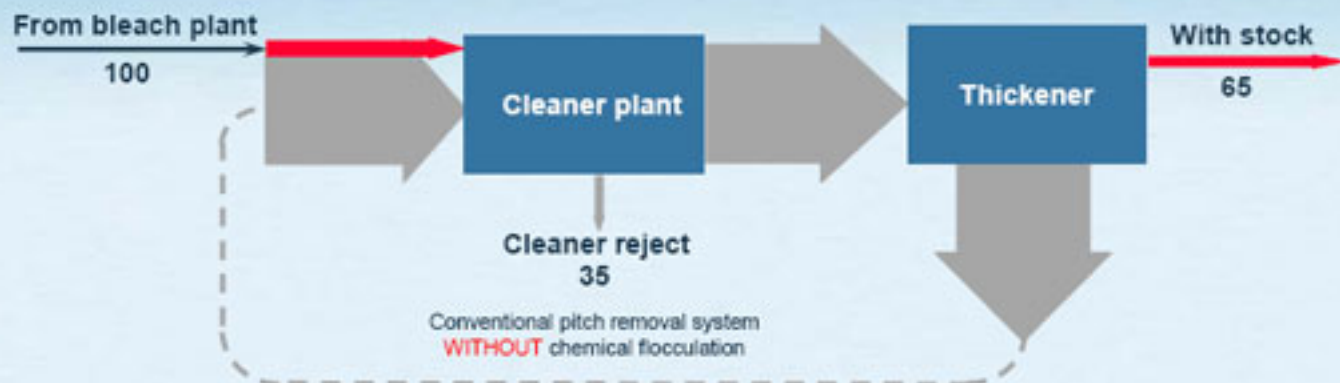
Chemistry used:

- Kidney technology
- Deposit control
- Odour control

# NetFloc® Kidney Technology

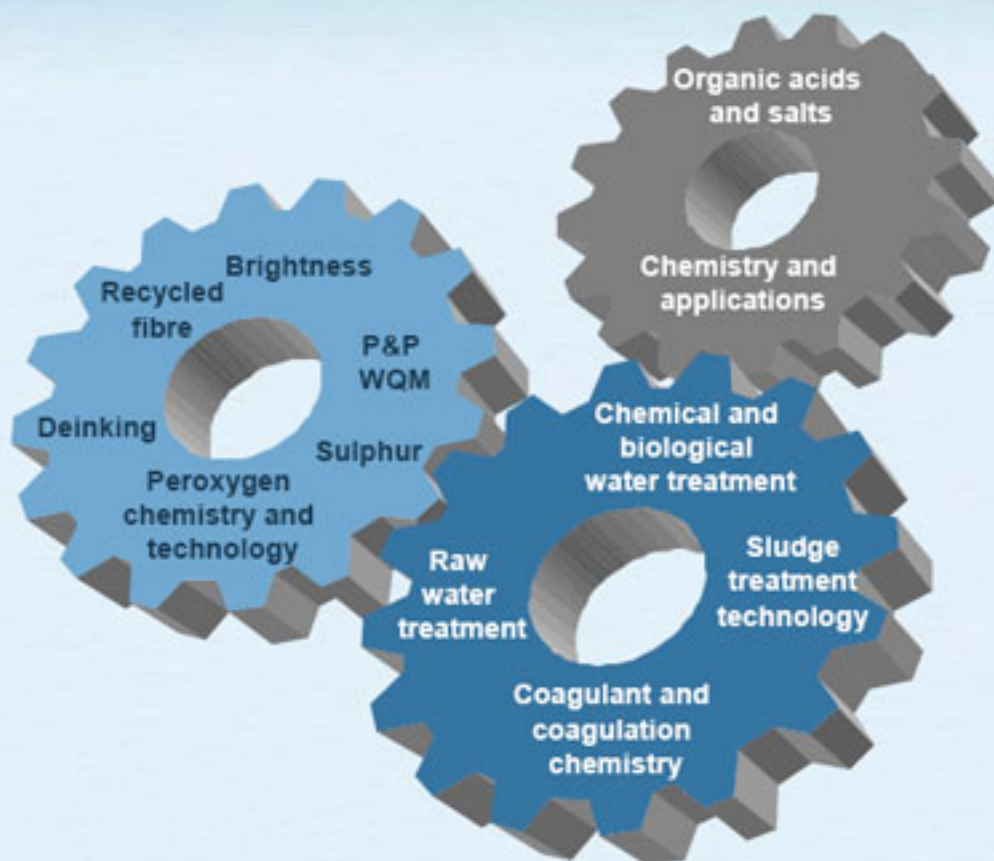


# Pitch removal



Research competences

## Kemira has all the tools



Biology  
Chemistry  
Chemical Technology  
Chemical Dosing Concepts  
Coagulation  
Flocculation  
Oxidation  
Reduction technology  
Process Design and Development  
Simulation, Modelling and Experimenting  
Advanced Analytical Chemistry  
Material Science  
Corrosion  
Information Services



Thank you!

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