

Introduction

In work package 5.2, the potential for the development of bank filtration as a managed aquifer recharge strategy has been analysed, with a main focus on newly industrializing countries. Different aspects were investigated in detail and exemplary field studies were carried out in Delhi, India for system analysis and identification of relevant processes. The studies have shown, that this low tech method has a high potential not only in Northern India but also in other developing and newly industrialising countries. In this context, one important aspect of bank filtration is the efficiency to attenuate pollutants from surface water. The fate and behaviour of many contaminants has been tested within work package 5.2 (i.e. organic and inorganic pollutants, pathogens, salinity). Other parameters, namely endocrine disruptor chemicals (EDC) and algal toxins (investigated in work package 3.2) were identified as important parameters for bankfiltration (BF) systems. The development of sophisticated methods for the analyses of these substances has also been fostered within the TECHNEAU project.

Approach

For work package 7.9, the occurrence and behaviour of EDC and algal toxins during BF passage at field sites in Delhi and Mathura was selected as a TECHNEAU case study. The BF field sites in Delhi and Mathura offer the opportunity to study BF systems under a wide range of environmental conditions (e.g. perennial/ephemeral streams, heavy/low contamination load, monsoon climate). Moreover, the analysis of hormonal activity by bioassays and algal toxins during BF passage is, to the best of our knowledge, the first of its kind in India. Apart from three BF sites in Delhi and Mathura additionally a conventional water treatment plant in Mathura was sampled to compare the chemical/biological treatment efficiency with a natural treatment by BF.

Results

During sampling algal toxins were not detected in the Yamuna River. Estrogenic and glucocorticoid-like compounds were detected in surface waters around Delhi. No androgenic or progestagenic activity was detected in any of the samples. Estrogenic and glucocorticoid-like activity were reduced by bank filtration. River bank filtration removal efficiency was higher for the New Delhi samples, but too few samples have been analysed to show whether this is true in general. The decrease during Bf passage was found to be very different from site to site.

More information

Contact

Freie Universität Berlin, Hydrogeology Group, Malteserstr. 74-100, 12249 Berlin, Germany, tel.: +49 30 83870629; fax: +49 30 83870742

Dipl.–Geol. Christoph Sprenger, e-mail: chspreng@zedat.fu-berlin.de

TKI Categorisation

Classification									
Supply Chain		Process Chain		Process Chain (cont'd)		Water Quality		Water Quantity (cont'd)	
Source		Raw water storage		Sludge treatment		Legislation/regulation		- Leakage	
- Catchment		- Supply reservoir		- Settlement		- Raw water (source)		- Recycle	
- Groundwater	X	- Bankside storage		- Thickening		- Treated water			
- Surface water	X	Pretreatment		- Dewatering		Chemical			
- Spring water		- Screening		- Disposal		- Organic compounds	X		
- Storm water		- Microstraining		Chemical dosing		- Inorganic compounds			
- Brackish/seawater		Primary treatment		- pH adjustment		- Disinfection by-products			
- Wastewater	X	- Sedimentation		- Coagulant		- Corrosion			
Raw water storage		- Rapid filtration		- Polyelectrolyte		- Scaling			
- Supply reservoir		- Slow sand filtration		- Disinfectant		- Chlorine decay			
- Bankside storage		- Bank filtration	X	- Lead/plumbosolvency		Microbiological			
Water treatment		- Dune infiltration		Control/instrumentation		- Viruses		Consumers / Risk	
- Pretreatment	X	Secondary treatment		- Flow		- Parasites			
- Primary treatment		- Coagulation/flocculation		- Pressure		- Bacteria		Trust	
- Secondary treatment		- Sedimentation		- pH		- Fungi		- In water safety/quality	
- Sludge treatment		- Filtration		- Chlorine		Aesthetic		- In security of supply	
Treated water storage		- Dissolved air flotation(DAF)		- Dosing		- Hardness / alkalinity		- In suppliers	
- Service reservoir		- Ion exchange		- Telemetry		- pH		- In regulations and regulators	
Distribution		- Membrane treatment		Analysis		- Turbidity		Willingness-to-pay/acceptance	
- Pumps		- Adsorption		- Chemical		- Colour		- For safety	
- Supply pipe / main		- Disinfection		- Microbiological		- Taste		- For improved taste/odour	
Tap (Customer)		- Dechlorination		- Physical		- Odour		- For infrastructure	
- Supply (service) pipe		Treated water storage						- For security of supply	

- Internal plumbing		- Service reservoir			Water Quantity	Risk Communication	
- Internal storage		Distribution				- Communication strategies	
		- Disinfection			Source	- Potential pitfalls	
		- Lead/plumbosolvency			- Source management	- Proven techniques	
		- Manganese control			- Alternative source(s)		
		- Biofilm control			Management		
		Tap (Customer)			- Water balance		
		- Point-of-entry (POE)			- Demand/supply trend(s)		
		- Point-of-use (POU)			- Demand reduction		

TKI Categorisation (continued)

Contains		Constraints		Meta data				
Report	X	Low cost	X					
Database		Simple technology	X					
Spreadsheet		No/low skill requirement	X					
Model		No/low energy requirement	X					
Research		No/low chemical requirement	X					
Literature review		No/low sludge production	X					
Trend analysis		Rural location						
Case study / demonstration	X	Developing world location	X					
Financial / organisational								
Methodology	X							
Legislation / regulation								
Benchmarking								