

# ORVIDetect – qPCR

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## General targets

Detection of	Goal	Link
Universal bacteria	Broader quantification of bacteria	
Universal Archaea	Broader quantification of Archaea	

## Biological degradation of soil contamination targets

Detection of	Goal	Link
<i>Acidimicrobium</i> A6	Involved in PFAS degradation	<a href="#">Project</a>
<i>Dehalococcoides</i> spp.	Anaerobic degradation of PCE, TCE, cisDCE and VC	
<i>Dehalobacter</i> spp.	Anaerobic degradation of 1,1,1-TCA, 1,1-DCA, chloroform and DCM	
<i>Dehalobacterium</i>	Anaerobic degradation of DCM	
<i>Dehalogenimonas</i>	Anaerobic degradation of 1,2,3-TCP, 1,2-DCP, 1,2-DCA, 1,1,2-TCA, 1,1,2,2-TeCA, PER, TRI, CIS and VC	<a href="#">Article DHG</a>
<i>Geobacter lovleyi</i>	Anaerobic degradation of TCE, includes <i>Pelobacter propionicus</i>	<a href="#">Article DHG</a>
Trichloroethene reductive dehalogenase ( <i>tceA</i> )	Specific conversion of TCE to DCE	
vinyl chloride reductive dehalogenase ( <i>vcrA</i> & <i>bvcA</i> )	Specific conversion of VC to ethylene	
<i>cfrA</i> & <i>dcrA</i> (respectively)	Specific conversion of TCA, chloroform and DCA	
<i>cerA</i> (from <i>Dehalogenimonas</i> )	Anaerobic degradation of VC	
alkene monooxygenase <i>etnC</i>	Micro-aerophilic degradation of CIS and VC to CO <sub>2</sub> and Cl	
epoxyalkane coenzyme M transferase ( <i>etnE</i> )	Micro-aerophilic degradation of CIS and VC to CO <sub>2</sub> and Cl	
Benzene carboxylase ( <i>abcA</i> )	Anaerobic degradation of benzene	
Benzylsuccinate synthase - ( <i>bssA</i> )	Toluene and xylene	
Ethylbenzene dehydrogenase ( <i>ebdA</i> )	Ethylbenzene	
Benzoyl-CoA reductase ( <i>bcrC</i> & <i>bzdN</i> )	General anaerobic degradation of aromatic compounds; intermediate Benzoyl-COA	
2-naphthoyl-CoA reductase ( <i>ncrC</i> )	Naphthalene intermediate naphthoyl-CoA	
<i>bssA</i> (benzylsuccinate synthase; <i>Thauera</i> )	Anaerobic degradation of toluene and xylene	

<i>bamA, (oah), badI, bzdY</i>	Anaerobic degradation of BTEX	
<i>Oxoacyl-CoA hydrolase (bamB)</i>	Anaerobic degradation of BTEX	
<i>Dechloromonas aromatica RCB</i>	Anaerobic degradation of BTEX	
<i>mdpJ</i> (tert-butyl alcoholhydroxylase)	Aerobic degradation of TBA	
<i>icmA</i> (tert-butyl alcoholhydroxylase)	Aerobic degradation of MTBE and ETBE	
<i>Variovorax paradoxus (asfA)</i>	Degradation MTBE and ETBE	
cytochrome P450 monooxygenase ( <i>ethB</i> )	Degradation MTBE and ETBE	
<i>Pseudomonas (oprL)</i>	Degradation of MCPP	
(R)-enantiomer-specific 2,4-dichlorophenoxypropionate dioxygenase ( <i>rDPA</i> )	First step in degradation of MCPP	
(S)-enantiomer-specific 2,4-dichlorophenoxypropionate dioxygenase ( <i>sDPA</i> )	First step in degradation of MCPP	
<i>Alcanivorax borkumensis</i>	Degradation of mineral oil (C20-C40)	
<i>Rhodococcus erythropolis</i>	Degradation of mineral oil (C20-C40)	
Particulate methane monooxygenase ( <i>pmoA</i> )	Methane oxidation	
<i>Methylomonas</i>	Methane oxidation	
Sulfite reductase beta subunit ( <i>dsrB</i> )	Sulphate reduction	
<i>Smithella spp.</i>		

### Nitrogen conversion / wastewater treatment

Detection of	Goal	Link
<i>Nitrosomonas</i>	Nitrification; ammonium oxidation; ammonium (NH <sub>4</sub> ) to nitrite (NO <sub>2</sub> )	
<i>Nitrosomonas</i> (Is79A4 strain)	Nitrification; ammonium oxidation; ammonium (NH <sub>4</sub> ) to nitrite (NO <sub>2</sub> )	
<i>Nitrospira spp.</i>	Nitrification; nitrite oxidation; nitrite (NO <sub>2</sub> ) to nitrate (NO <sub>3</sub> )	
<i>Nitrospira (defluvii &amp; moscoviensis)</i>	Nitrification; nitrite oxidation; nitrite (NO <sub>2</sub> ) to nitrate (NO <sub>3</sub> )	
<i>Nitrotoga spp.</i>	Nitrification; nitrite oxidation; nitrite (NO <sub>2</sub> ) to	

	nitrate (NO <sub>3</sub> )	
<i>candidatus Kuenenia sp.</i>	Anammox (anaerobic ammonium oxidation); ammonium (NH <sub>4</sub> ) + nitrite (NO <sub>2</sub> ) to nitrogen gas (N <sub>2</sub> )	

### Water pathogens / faecal indicators / water quality

Detection of	Goal	Link
<i>Escherichia coli</i>	Indicator for faecal contamination ( <i>E. coli</i> ); increased chance of pathogenic species	<a href="#">Article</a> <a href="#">ViaWater</a>
<i>Bacteroides dorei</i>	Indicator for faecal contamination, more human specific (e.g. sewage)	
<i>Enterococcus spp.</i>	Indicator for faecal contamination; increased chance of pathogenic species	
<i>Campylobacter spp.</i>	Indicator for faecal contamination; increased chance of pathogenic species	
<i>Campylobacter jejuni</i>	Thermotolerant <i>Campylobacter</i> species; pathogenic	
<i>Campylobacter coli</i>	Thermotolerant <i>Campylobacter</i> species; pathogenic	
<i>Campylobacter lari</i>	Thermotolerant <i>Campylobacter</i> species; pathogenic	
<i>Campylobacter upsaliensis</i>	Thermotolerant <i>Campylobacter</i> species; pathogenic	
<i>Legionella spp.</i>	Genus-level analysis; increased chance of pathogenic species	
<i>Legionella pneumophila</i>	Most pathogenic <i>Legionella</i> species (legionnaire's disease)	
<i>Legionella pneumophila</i> serotype 1	Most pathogenic <i>Legionella</i> subgroup (legionellosis/legionnaire's disease)	
<i>Salmonella spp.</i>	Pathogenic (diarrhoea)	
<i>Leptospira spp.</i>	Pathogenic (leptospirosis/Weil's disease)	
<i>Helicobacter spp.</i>	Pathogenic (gastritis)	
Microcystin producing gene ( <i>mcyE/ndaF</i> )	Toxin producing cyanobacteria	<a href="#">STOWA report</a>
<i>Mycobacterium (MWF)</i>	Pathogenic (hypersensitivity pneumonitis)	
<i>Pseudonocardia dioxanivorans (dxmA)</i>	DXMO	
<i>Pseudonocardia dioxanivorans (dxmB)</i>	DXMO	
<i>Microthrix spp.</i>	Indicator for filamentous bacterial genus (e.g. in WWTPs)	

Detection of	Goal	Link
<i>Gallionella sp.</i>	Iron-oxidizing bacteria; from FeII (Fe <sup>2+</sup> ) to FeIII (Fe <sup>3+</sup> ) under microaerophilic conditions	
<b>eDNA Ecology (qualitative analyses)</b>		
Detection of	Goal	Link
<i>Cobitis taenia</i>	Spined loach	
<i>Misgurnus fossilis</i>	Weatherfish	<a href="#">Article AD</a>
<i>Procambarus clarkii</i>	Louisiana crawfish / red swamp crayfish	
<i>Ondatra zibethicus</i>	Muskrat	
Asian knotweed	Invasive weed	

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