

Biological Water Testing

Reliable safety and quality control



Ensure Safety and Quality with Reliable and Fast Biological Water Testing

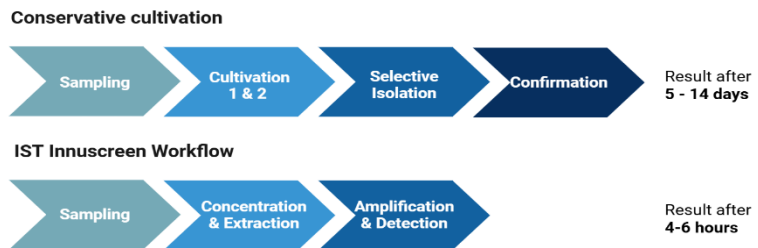
Water is the basis of life. Drinking water, processing and industrial water are relevant resources that need to be controlled and protected carefully.

Your benefits

- Efficient – from sample to result in a few hours instead of weeks
- Save reaction time – results are available earlier
- Reliable – specific detection kits secure results
- Optimized – perfect combination of device and kit
- Comprehensive – assays for numerous relevant microbiological targets
- Simple – Fast - Reliable



A conventional cultivating method takes up to 14 days, but only a few hours with IST Innuscreen's Extraction & PCR-based detection method for the highly specific and reliable microbiological parameters.



Unlock Precision with TCT Technology

Efficient detection starts with reliable concentration. With Target Concentration Technology (TCT), IST Innuscreen introduces a patent-pending, bead-based method to enrich DNA, RNA, viruses, bacteria, and other biomolecules directly from liquid samples—without the need for filtration, ultracentrifugation or chemical precipitation.

Our ready-to-use TCT Kits streamline your workflow, delivering high recovery rates from water, wastewater and culture samples in record time. Whether for research, diagnostics, or quality control, TCT ensures your downstream analyses—from PCR to immunoassays and microscopy—are more sensitive, accurate, and consistent.

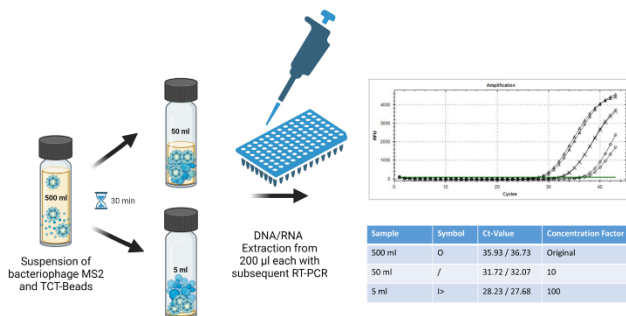


Figure 1/ Table 1: Target concentration out 500 ml down to 5 ml with a followed amplification to show the concentration effects

Streamline your workflow – maximize sensitivity.

The innuPREP TCT Target Concentration Kit Water is designed to efficiently concentrate a wide range of biomolecules—including DNA, RNA, viruses, and bacteria—directly from water samples. It can be applied to various types of water, such as drinking water, surface water, pool and aquarium water, as well as process water, and works with sample volumes ranging from 1 ml up to 1000 ml.

Unlike conventional approaches, this kit eliminates the need for filtration, ultracentrifugation, or PEG precipitation, making the workflow simpler and more time efficient. The concentrated material is then readily available for numerous downstream applications, including DNA/RNA extraction, microbial culture, immunoassays, cell-based assays, microscopy, spectroscopy, and flow cytometry.

Automated isolation of high-quality DNA/ RNA from freshwater samples

The recently developed “innuPREP Water DNA Kit (large) - PP Mini” is specifically designed for DNA extraction from large freshwater samples. This kit leverages two innovative technologies aimed at enhancing biomolecule enrichment. In the first step, the water sample is concentrated through a process known as Target Concentration Technology (TCT), which reduces the sample volume from 500 ml to 30-50 ml. In a second step, the Polymer Mediated Enrichment technique (PME) improves the capture and concentration of target biomolecules. PME selectively attracts and binds specific biomolecules such as viruses, bacteriophages, bacteria, environmental DNA (eDNA), algae, and other microorganisms or molecules of interest. After grinding with a special Lysis Tube the samples are then processed using a PurePrep Mini device for DNA/ RNA extraction. The combination of these technologies enables the efficient extraction of genetic material from low or even trace concentrations of target biomolecules present in large water samples. The extracted DNA is of sufficient quality for a broad spectrum of downstream applications, including amplification reactions and various analytical procedures.

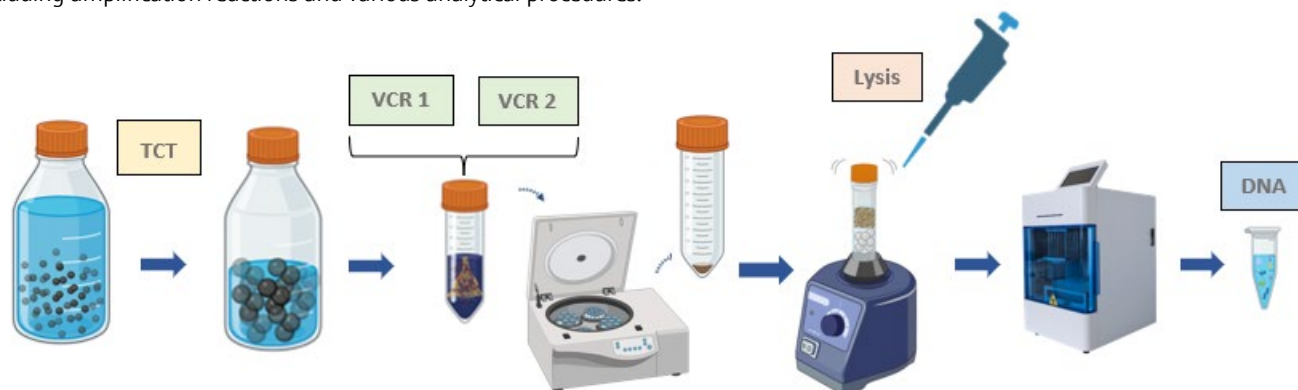


Figure 2: Workflow of the DNA extraction from freshwater samples with step 1 (sample concentration with TCT beads from 500 ml to 30 ml within 1.5 h), step 2 (polymer mediated enrichment), step 3 (dissolving of the bacterial pellet), step 4 (grinding), step 4 (automated DNA extraction using PurePrep Mini).

Protect what matters with IST Innuscreen water pathogen detection assays

Clean water is essential - for health, for the environment, for life itself. IST Innuscreen’s water pathogen assays make ensuring water safety fast, simple, and reliable. Designed to deliver precise results you can trust, helping you detect contaminants before they become a problem. With IST Innuscreen’s, safeguarding water quality has never been easier—because every drop counts. Reliable and efficient detection methods are essential for optimal action planning and management of hygiene and disinfection.

General control parameter: overall bacterial load

The total bacterial load is a key indicator for the hygienic quality of water. It can indicate potential fouling of both, drinking and industrial water.*

The innuDETECT Bacteria Quantification Assay is a semi-quantitative assay which detects universal bacterial target genes simultaneously with bacterial standard DNA included in the assay, too. Internal Controls, co-amplified during the PCR, give maximum assurance on results and validate negative findings.

To demonstrate the excellent quality of the innuDETECT Bacterial Quantification Assay, it was used to analyze the general bacterial load in DNA extracts obtained from a 1 mL water sample. The results are shown in Figure 3. Table 2 demonstrates bacterial loads obtained from real-time PCR, based on exact ct values. Detected bacterial targets can be quantified upon correlation with standard curves, in an unknown sample.

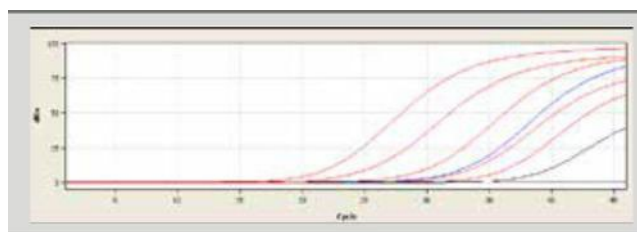


Figure 3/Table 2: Co-amplification of bacterial standard DNA (red) allows semi-quantification of an unknown sample (blue) via ct values. Negative control is shown in black.

Sample	Ct value	General bacterial load/reaction
Standard 1	21.5	1×10^6
Standard 2	24.8	1×10^5
Standard 3	28.4	1×10^4
Standard 4	32.6	1×10^3
Standard 5	36.1	1×10^2
Unknown sample	31.7	2.93×10^3
Negative control	40.2	-

* Deutsche Trinkwasserverordnung (2001) and 42. Bundesimmissionsschutzverordnung (2017) require determination of culturable microorganisms according to DIN EN ISO 6222:1999-07

Indicator organisms – a reliable approach for general hygiene control

The presence of specific gastrointestinal microorganisms in water are frequently used as indicator for fecal contamination. *Escherichia coli*, shiga toxin 1 and/or shiga toxin 2-producing *E. coli* (STEC) as well as shiga toxin-producing *Shigella dysenteriae* can get into water, e.g. via fecal contamination or fertilizers. As this bears the risk of causing severe dysentery, hemorrhagic colitis, and hemolytic uremic syndrome water quality evaluation regarding *E. coli* is obligatory**. Several assays, including innuDETECT *E. coli* O157 are designed for the highly specific detection of such pathogens. Figure 4 and Table 3 show a sample application with the combination of three innuDETECT Assays for the characterization of EHEC O104:H4[†].

** Deutsche Trinkwasserverordnung (2001) requires determination of coliforms and *E. coli* according to DIN EN ISO 9308-1:2017-09 & DIN EN ISO 9308-2:2014-06

† strain causing the HUS epidemic in Germany 2011

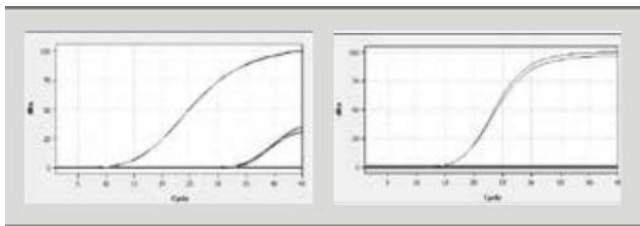


Figure 5/4: Differential detection of *Legionella* in water samples obtained from cooling towers. *Legionella* spp. (left) are detected in the Cy5 channel and *Legionella pneumophila* (right) in the FAM channel.

	<i>Legionella</i> spp.	<i>Legionella pneumophila</i>
Water sample 1	positive	negative
Water sample 2	negative	negative
Water sample 3	positive	negative
Positive control (PCR)	positive	positive
Negative control (PCR)	negative	negative

Advanced pathogen detection – Ruling out specific hazards

Clostridia spp. are bacteria generally found in all environmental habitats including water. Its detection is obligatory according to drinking water regulations***. The detection via conservative cultivation entails several critical issues. That is why PCR-based assays offer an indispensable alternative. Moreover, *Yersinia enterocolitica* is widely present, especially in animal reservoirs and contaminations are observed in drinking and surface water bearing a severe risk to health. Both innuDETECT *Clostridium perfringens* Assay and innuDETECT *Yersinia enterocolitica* Assay offer the perfect solution for fast and sensitive detection of respective pathogens whereby included internal controls ensure result reliability. This is clearly shown in Figure 6 and Table 5.

*** Deutsche Trinkwasserverordnung (2001) requires determination *Clostridium perfringens* according to DIN EN ISO 14189:2016-11

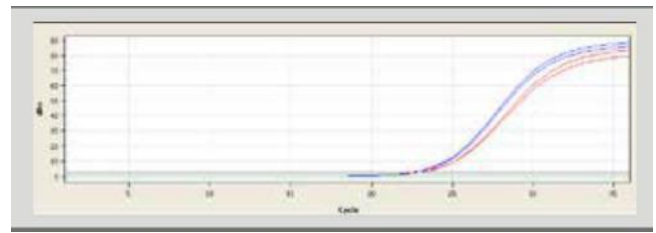


Figure 4/3: Characterization of *E. coli* O104:H4 by real time PCR via combination of innuDETECT Assays for *E. coli* O104 (red), Shiga Toxin 1 (green), and Shiga Toxin 2 (blue). Shown are signals detected in FAM channel and corresponding results (positive/negative).

innuDETECT Assay for	Signal FAM channel
<i>E. coli</i> O104	positive
Shiga Toxin 1	negative
Shiga Toxin 2	positive

Differential pathogen detection – Co-identification of most relevant subspecies

The presence of *Legionella* needs to be tested in drinking and process water, whereby the subspecies *L. pneumophila* plays a major role. Legal regulations such as the 42. BImSchV require the evaluation of this Legionnaires' disease-causing pathogen and aims to prevent its emission from evaporation coolers and cooling towers. Identification of *Legionella* by conventional methods is highly challenging and hampered by co-presence of other microorganisms. The innuDETECT *Legionella* Assay overcomes these issues and allows the simultaneous detection of total *Legionella* spp. and *L. pneumophila* according to the ISO/TS 12857 within a single reaction. Figure 5 shows a *Legionella* detection and differentiation within water samples from industrial cooling towers.

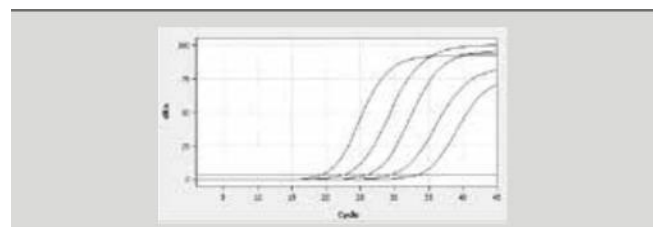


Figure 6/5: Detection signals and ct values in FAM channel during real time PCR were obtained from *C. perfringens* DNA dilutions using the innuDETECT *Clostridium perfringens* Assay in FAM channel.

DNA amount	Ct value <i>Clostridium perfringens</i> (FAM)
1 ng	18.44
100 pg	21.69
10 pg	25.28
1 pg	28.99
100 fg	33.56
Negative control (PCR)	No ct

Order Information

innuPREP Extraction Kits

Order number (24 or 96 reactions)	Product name	Starting material	Assay time	qPCR detection channels
845-TC-0020010 845-TC-0020050	innuPREP TCT Target Concentration Kit Water	Water 1 – 1000 ml	~ 60 min up to 1 day	<ul style="list-style-type: none"> ■ Only concentration ■ No extraction
845-TC-0010010 845-TC-0010050	innuPREP TCT Sewage Water Viral DNA/RNA Extraction Kit	Sewage water 100 – 500 ml	~ 90 min up to 1 day	<ul style="list-style-type: none"> ■ Concentration ■ Extraction ■ Magnetic bead-based
845-PS-0120016 845-PS-0120096	innuPREP Water DNA Kit (large) – PP Mini	Water 500 ml	~ 2 h	<ul style="list-style-type: none"> ■ Concentration ■ Automated Extraction

innuDETECT Assays

Order number (24 or 96 reactions)	Product name	Starting material	Assay time	qPCR detection channels	Sensitivity
845-IDF-0031024 845-IDF-0031096	innuDETECT Bacteria Quantification Assay	Extracted bacterial DNA	~ 60 min	<ul style="list-style-type: none"> ■ FAM (Bacteria) ■ HEX (Internal Control) 	Dependent on background of negative control
845-IDF-0033024 845-IDF-0033096	innuDETECT Legionella Assay	Extracted bacterial DNA	~ 90 min	<ul style="list-style-type: none"> ■ FAM (<i>Legionella pneumophila</i>) ■ Cy5 (<i>Legionella spp.</i>) ■ HEX (Internal Control) 	<ul style="list-style-type: none"> ■ <i>Legionella pneumophila</i>: up to 10 DNA copies/PCR ■ <i>Legionella spp.</i>: up to 20 DNA copies/PCR
845-IDF-0034024 845-IDF-0034096	innuDETECT Clostridium <i>perfringens</i> Assay	Extracted bacterial DNA	~ 90 min	<ul style="list-style-type: none"> ■ FAM (<i>Clostridium perfringens</i>) ■ HEX (Internal Control) 	Up to 10 DNA copies/PCR
845-IDF-0032024 845-IDF-0032096	innuDETECT Yersinia <i>enterocolitica</i> Assay	Extracted bacterial DNA	~ 90 min	<ul style="list-style-type: none"> ■ FAM (<i>Yersinia enterocolitica</i>) ■ HEX (Internal Control) 	Up to 1 copy/PCR
845-IDF-0027024 845-IDF-0027096	innuDETECT E. coli O157 Assay	Extracted bacterial DNA	~ 60 min	<ul style="list-style-type: none"> ■ FAM (<i>E. coli</i> O157) ■ HEX (Internal Control) 	Up to 5 DNA copies/PCR
845-IDF-0028024 845-IDF-0028096	innuDETECT E. coli O104 Assay	Extracted bacterial DNA	~ 60 min	<ul style="list-style-type: none"> ■ FAM (<i>E. coli</i> O104) ■ HEX (Internal Control) 	Up to 5 DNA copies/PCR
845-IDF-0025024 845-IDF-0025096	innuDETECT Shiga Toxin 1 Assay	Extracted bacterial DNA	~ 60 min	<ul style="list-style-type: none"> ■ FAM (Shiga toxin 1) ■ HEX (Internal Control) 	Up to 5 DNA copies/PCR
845-IDF-0026024 845-IDF-0026096	innuDETECT Shiga Toxin 2 Assay	Extracted bacterial DNA	~ 60 min	<ul style="list-style-type: none"> ■ FAM (Shiga toxin 2) ■ HEX (Internal Control) 	Up to 5 DNA copies/PCR

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