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## **New Study Proposes Robust Statistical Methods for Validating Safe Water Reuse**

A recent study by Kompetenzzentrum Wasser Berlin addresses a critical challenge in agricultural water reuse: how to validate that water treatment plants are able to meet regulatory performance targets. The research examines statistical methods for compliance with the European Union's Regulation 2020/741, which requires 90% of water samples to meet strict safety thresholds. While the regulation sets high standards, it lacks clear guidance on how to prove compliance, creating challenges for scientists and water treatment facilities.

The study compared statistical approaches, including binomial evaluations, tolerance intervals, and Bayesian methods, to assess their effectiveness in validating treatment performance. Data from a German wastewater treatment plant were analyzed over a year, focusing on three key indicators of water quality to compare statistical methods: *Escherichia coli* bacteria, spores of *Clostridium perfringens* and somatic coliphages, a type of virus that infects bacteria.

Results highlighted the strength of Bayesian tolerance intervals, which accommodate real-world complexities such as unequal sample sizes, non-normally distributed data and measurements below detection limits, while rigorously accounting for statistical uncertainties. Thereby, this approach offers the opportunity of achieving reliable and valid results even with smaller data sets.

The findings suggest that regulatory bodies could benefit from considering the adoption of tolerance intervals within water reuse guidelines. This would create a more robust and adaptable framework, encouraging wider adoption of water reuse practices to combat global water scarcity.

Beyond water reuse, the study underscores the broader applicability of these statistical tools in environmental monitoring and public health, where high percentiles are used for setting quality standards, like bathing water or irrigation water quality assessment. By refining statistical methods for evaluating safety, this research contributes to the discussion of applying the best available science for ensuring microbial safety in water reuse practices, thus advancing sustainable practices and addressing critical resource challenges.

[Click here to view the publication!](#)

## About KWB

Founded in 2001, the Berlin Centre of Competence for Water (KWB) integrates science, research, and consultancy to promote sustainable water management. We focus on applied research across the entire water cycle, collaborating with partners in academia, industry, and public administration to develop innovative solutions for future-ready cities.

KWB connects national and international stakeholders within the water sector through targeted networking, knowledge exchange, and public outreach, disseminating the latest trends in water research to both professionals and the wider community. With years of expertise, we also organise specialised conferences and workshops to foster dialogue within the water sector.

By linking innovative research with practical application, we support municipalities, policymakers, and infrastructure operators, driving forward creative water solutions for a sustainable future.

## Contact

Moritz Lembke-Özer  
Group Lead Communications  
[moritz.lembke@kompetenz-wasser.de](mailto:moritz.lembke@kompetenz-wasser.de)  
<http://www.kompetenz-wasser.de/en>

KWB Kompetenzzentrum Wasser Berlin  
Grunewaldstraße 61-62  
10825 Berlin



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