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## **Innovative Wastewater Treatment System Enhances Efficiency and Sustainability**

A novel approach to wastewater treatment has been developed, aiming to improve efficiency and sustainability. Within the ULTIMATE Project, researchers from the Berlin Centre of Competence for Water (KWB), Novonesis and Kalundborg Forsynin have introduced a system that implements a joint control system for two interconnected wastewater treatment plants. This system is designed to provide a cost-effective and environmentally sustainable solution.

The Joint Control System (JCS) facilitates a coordinated operation of an industrial and a municipal wastewater treatment plant (WWTP). The industrial WWTP releases pre-treated wastewater from the biotech industry to the municipal WWTP, which treats in addition also municipal wastewater. By enabling data sharing, the JCS optimizes the wastewater treatment process of the municipal WWTP. The JCS allows for improved efficiency of the aeration process, particularly in predicting nitrogen loads coming from the industrial WWTP, a critical parameter in wastewater treatment on which the aeration intensity depends and that can pose environmental risks if not managed effectively.

Nitrogen control was addressed using a predictive equation to estimate nitrogen loads in order to control the aeration process in the municipal WWTP. This method provides an early warning mechanism, enabling municipal plants to adjust their processes accordingly. Additionally, advanced computer simulations were employed to optimize the system, ensuring accurate oxygen delivery to treatment tanks and enhancing nitrogen removal. Experimental testing demonstrated measurable results. The nitrogen concentration in the municipal WWTP effluent was reduced by 50%, and the municipal plant achieved a 15% reduction in the energy consumption of the total plant per kg nitrogen removed. For nitrogen removal specifically, energy efficiency increased by 18%.

Our study highlights the role of collaborative frameworks and data-driven technologies in addressing environmental challenges. Further research is required to evaluate the long-term performance under varying and extreme conditions, but the findings indicate a practical avenue for advancing wastewater treatment methodologies.

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

## About KWB

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

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

By bridging innovative research and practical application, we support municipalities, policy makers, and infrastructure operators, driving innovative water solutions for a sustainable future.

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