FACULTY OF BIOSCIENCE ENGINEERING

ILVO

The Chancellor of Ghent University has the honour of inviting you to attend the public defence of the doctoral dissertation of

ir. Ulric Van Rossum

Title of the doctoral dissertation:

BIOFILM COMMUNITIES AND CONTROL IN PIG AND BROILER DRINKING WATER SYSTEMS: IMPLICATIONS FOR DRINKING WATER QUALITY

The public defence will take place on **8 DECEMBER 2026** at **17:00** in **AUDITORIUM E2** (subject to change) at Campus Coupure, Coupure Links 653, 9000 Ghent.

There will be a contiguous reception afterward, to which you are heartily invited.
Please confirm your attendance before **01/12/2026** by filling in this form.

DISSERTATION SUPERVISORS

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ABSTRACT OF THE DOCTORAL RESEARCH

Livestock drinking water quality can be compromised by biofilm development within drinking water systems, which may harbor microorganisms, reduce treatment efficacy, and increase the risk of infection, particularly in chicks and piglets. This dissertation investigated the composition, development, and control of biofilms in broiler and pig production. Biofilms and drinking water sampled from broiler barns and pig nurseries were analyzed for microbial water quality indicators. Microbial identification revealed a shared core microbiota in both sectors dominated by *Proteobacteria*, *Firmicutes*, and *Actinobacteriota*, with *Staphylococcaceae* and *Pseudomonadaceae* as the dominant families, although species composition varied between farms. Most isolated microorganisms could form biofilms, and multispecies biofilm analysis indicated only a limited number of synergistic interactions. These combinations were used as worst-case biofilm models to evaluate cleaning, disinfection, and water treatment strategies, which were also tested on a pilot broiler farm. Chlorine-based and peracetic acid treatments were effective *in vitro*, whereas hydrogen peroxide-based products showed limited efficacy against certain microbial groups. Under farm conditions, cleaning and disinfection resulted in inconsistent reductions in biofilm cell numbers, with frequent regrowth to pre-treatment levels. Chlorine-based water treatment improved water quality during production but had only a limited impact on established biofilms. Overall, the results highlight the need for routine monitoring, representative biofilm models, optimized control strategies, and a better understanding of multispecies interactions to support sustainable livestock production and reduce antibiotic use.

CURRICULUM VITAE

Ulric Van Rossum (30 August 1998, Ukkel, Belgium) obtained both his Bachelor's and Master's degrees in Bioscience Engineering: Agrobiotechnology from Vrije Universiteit Brussel. In 2022, he started his PhD at the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO) and the Faculty of Bioscience Engineering at Ghent University. His doctoral research was conducted within the BiofilmPrevent project, funded through the VLAIO-LA program by NextGenerationEU. He supervised several bachelor's students and is the (first) author of multiple publications in international peer-reviewed journals. He has also presented his research at various national and international conferences and seminars.