Energy-efficient and decentralized biological wastewater treatment

In recent years biological wastewater treatment by fermentation has gained more and more interest. By utilizing anaerobic treatment biogas (energy) is produced as a by-product, which is a real benefit both economically and environmentally. For these reasons anaerobic wastewater treatment is installed in many industries, such as in the paper, milk and breweries.

Challenge

Nowadays, biological wastewater treatment can efficiently remove carbon sources. The challenge lies in the purification and elimination of nitrogen sources. Currently, a step-wise purification process having many different consecutive steps with different reactors and ponds are in use. This step-wise and serial process is complex and needs a lot of space for the different treatment units. Thus, for an on-side and decentralized biological wastewater treatment a compact and efficient system is badly needed.

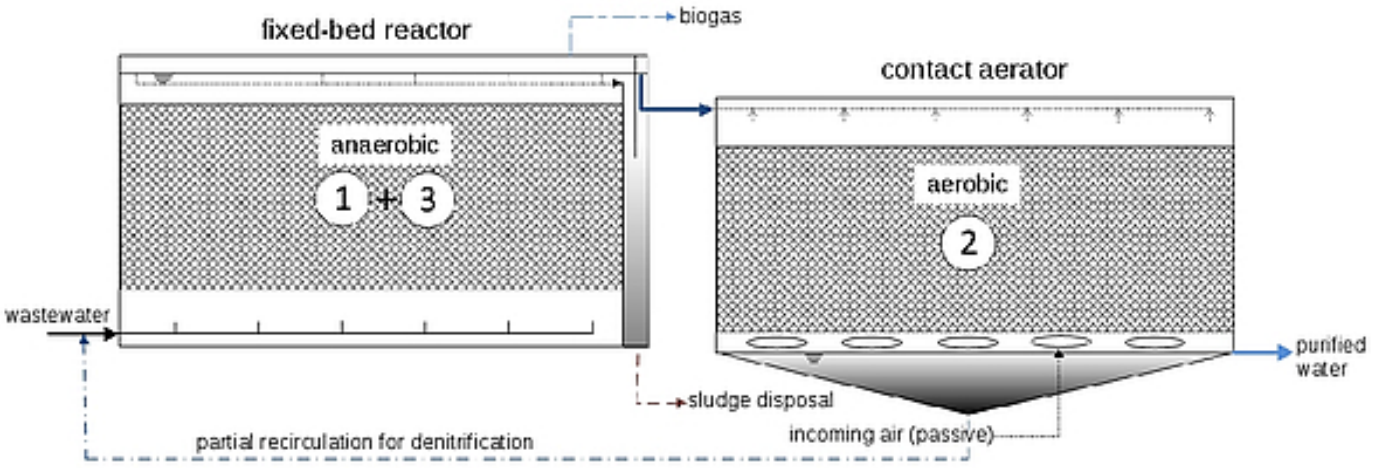
Our Solution

Scientists at the HAWK University of Applied Sciences and Arts, department of resource management, developed a compact on-side and and energy-efficient biological purification system for a decentralized wastewater treatment.

Advantages

- Flexible and compact system – only two units for three purification steps.
- High purification efficiency by removing carbon as well as nitrogen sources.
- Innovative combination of anaerobic and aerobic treatments.
- Decentralized and energy-efficient biological wastewater treatment.
- Energy-optimized process with passive aeration and production of biogas as valuable by-product.
- Production of biogas for a sustainable on-side waste water purification.

MBM Science Bridge GmbH
Hans-Adolf-Krebs-Weg 1
37077 Göttingen / Germany
www.sciencebridge.de



Schematic representation of energy-efficient and compact biological wastewater treatment (2-reactor-3-steps-process). Step 1: biodegradation, Step 2: biodegradation and nitrification, Step 3: Denitrification. Step 3 is performed in first reactor by partial recirculation. Source W. Ganagin.

Applications

Compact biological wastewater treatment particularly for decentralized on-side use in e.g. beverage or farming industry.

Developmental Status

A first prototype is currently being installed for commercial application at first local customer.

Patent Status

A German priority patent application has been filed (Applicant: HAWK University of Applied Sciences and Arts).

Contact

Dr. Stefan Uhle
Patent Manager Life Science
E-Mail: suhle(at)sciencebridge.de

Tel: +49 551 30724 154
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