Pilot of Small Waste Water Treatment Plant for Danube Region

Idea of the pilot

In order to find out the degradability of substances in waste water of a certain origin two transportable waste water treatment plants are going to be built. Due to sizes of 2.5 or 5 m³ and PE as material for the tank the plants can be transported to different locations easily. Using highly concentrated activated sludge (ca. 60 g/l) for getting the plant started the efficiency of the treatment plant is on full scale 4 weeks after installing. The sizes of the plants are sufficient to treat the waste water of 10 and 20 people or their equivalents.

By putting the treatment plant directly to the origin of the waste water the biological treatablility and the feasibility of the applied process can be tested on real circumstances. While tests on laboratory scale can only deliver a tendency, the described medium scale plant can reproduce the real process under in-situ conditions. This ensures success when applying the process to this origin of waste water in bigger scale later on.

Description of the technique

The plant is based on the patented BioTopp-Process. This is a modified SBR-System developed by Ökoservice GmbH. By improving the processes the system has been developed in this way, that a mechanical pre-treatment is not necessary anymore. This gives the advantage of not having any faecal sludge in the system, which would cause odour and have to be treated further. On the other hand the system combines two biological reactors that ensure different living conditions for bacteria. So, a very high purification grade can be achieved.

Fig. 1: Tank for a BioTopp-WWTP. Can be installed underground or above ground

For testing purposes the plant can be run in different modes. Carbon degradation, nitrification, denitrification as well as biological phosphorus removal can be implemented into the process by modifying the program. The BioTopp waste water treatment plant is the very first plant on market that can remove phosphorus biologically without adding any precipitation or flocculation agents. By adding biochar or activated carbon to the reactor additionally micro pollutants can be bound and be eliminated from the water. As an additional step the water can also be sanitized afterwards. Therefore an extra tank will be necessary. This would be filled with the cleaned waste water and equipped with a membrane. A pump sucks the water through the membrane which then can be reused for irrigation, cleaning or toilet flushing purposes.

Compared with conventional systems the BioTopp-process has the advantage of having no faecal sludge. Only biologically stabilized excess sludge appears which can be pumped onto a sludge drying bed. By doing so, the sludge will be transformed into a soil-like matter. By sun radiation, natural heat and dryness the sludge will be sanitized. This can be given to plants which will act as fertilizer. In comparison to the 500 l faecal sludge per person and year getting from conventional treatment plants only 1 kg of dried sludge appears. This can be removed easily by hand. As a consequence no sucking wagon is needed which reduces operation cost drastically.

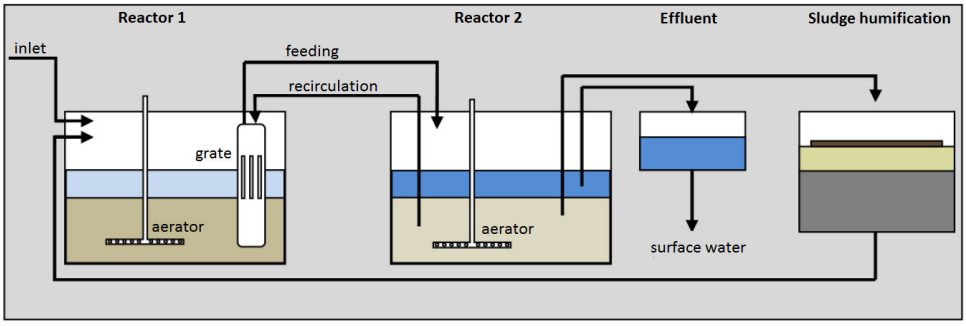

Fig. 2: Scheme of the BioTopp-Process

Additionally the reactor size of the plant can be chosen much smaller compared to conventional systems. Due to a constant optimization of the process a concentration of solid matter of up to 14 g/l can be kept in the first chamber. So, the added oxygen is used up very quickly here, which enables the anaerobic processes to take place. This ensures a proper biological phosphorous removal as well as denitrification and degradation of organic pollutants. The second reactor can be driven with a concentration of dry matter of up to 8 g/l. So, here nitrification and further degradation of organic pollutants take place.

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