

間欠ばっ気小型合併処理浄化槽の 実証実験について

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概 要

現在, 公共用水域の生活排水による汚濁対策として普及しつつある小型合併処理浄化槽をさらにコンパクト化, 高性能化, 省エネルギー化することを目標として, 間欠ばっ気型嫌気汚床・接触ばっ気方式の実験槽を設置し, 実証実験を行ない, 加えて汚泥の減容化と, それに伴う嫌気汚床槽のコンパクト化を図る目的で不織布を用い汚泥の汚過実験を行なった。得られた成果は以下のようにまとめられる。

①従来の小型合併処理浄化槽と比較して容量が約20%小さくても, 性能的には良好で処理水のBOD, COD, SS等は安定期で常に20mg/l以下であった。②今回の実験槽では嫌気汚床槽内の汚材の充填率は約20%であったが, 汚材の種類と配置のしかたによっては, この程度の汚材充填率であっても, 固形物および有機物の除去(実験期間中の平均除去率はSSで73.8%, BODで62.9%)は充分期待できることがわかった。③本装置の最大の特徴はエネルギー消費を大幅に減少させ得たことで, 送風機による電気使用量が, 現在市販されている小型合併処理浄化槽と比較して80%程度減少した。これは, 市販の単独処理浄化槽のそれと比較しても半分以下の電気使用量となった。④さらに, 嫌気汚床槽内に蓄積した汚泥を定期的に汚泥濃縮貯留箱で汚過減容化することにより, 長期にわたり処理性能を良好に維持し, かつ清掃の頻度を下げることが可能になると考えられた。

Performance of a Small Scale Sanitary Wastewater Treatment System, "Household Gappei Johkasou", under Intermittent Aeration Condition

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Abstract

Small scale sanitary wastewater treatment systems, "Household Gappei Johkasou", have been spreading widely and are recognized as more important from the viewpoint of protection of water pollution. The objective of this work was to improve the performance of this system (reduction of volume of anaerobic filter tank, saving energy consumption, and improvement of effluent quality), so that an experimental system was developed, which was practical scale and was composed of an anaerobic filter tank and an aerobic reactor operated with intermittent aeration. Additionally, filtration of the anaerobic sludge was examined with non-woven fabric material in order to reduce the sludge volume produced and the volume of the anaerobic filter tank. As the result, the following points were clarified.

- (1) Although the volume of this system was 20% less than that of conventional systems, the effective performance was attained. The levels of BOD, COD and SS were less than 20 mg/l at the stable conditions, respectively.
- (2) Particulate and organic matter were removed effectively, i.e. SS: 73.8% and BOD: 62.9%, by the anaerobic filter tank equipped appropriate packing material with effective packing conformation, where the packing volume ratio

of the filter was only 20%.

- (3) A major superior characteristic of this system was low energy consumption: the electrical energy used by aeration was reduced more than 80% compared to that of conventional systems, and was less than 50% of those of conventional toilet wastewater treatment systems.
- (4) Since the accumulated sludge in the anaerobic filter tank was periodically filtered with the collection and concentration vessel, the performances of this system were kept longer time and the frequency of sludge withdrawing operation was reduced.

Discussion

The anaerobic filter tank with the collection and concentration vessel was operated for 10 months. The results of the operation are summarized in Table 1. The operation was successful in terms of the removal of organic matter and the reduction of sludge. The removal of organic matter was about 90% and the reduction of sludge was about 80%. The operation was successful in terms of the reduction of energy consumption. The electrical energy used by aeration was reduced more than 80% compared to that of conventional systems, and was less than 50% of those of conventional toilet wastewater treatment systems. The operation was successful in terms of the reduction of sludge withdrawing operation. The frequency of sludge withdrawing operation was reduced to about 20% of that of conventional systems. The operation was successful in terms of the reduction of sludge. The amount of sludge was reduced to about 20% of that of conventional systems. The operation was successful in terms of the reduction of energy consumption. The electrical energy used by aeration was reduced more than 80% compared to that of conventional systems, and was less than 50% of those of conventional toilet wastewater treatment systems. The operation was successful in terms of the reduction of sludge withdrawing operation. The frequency of sludge withdrawing operation was reduced to about 20% of that of conventional systems. The operation was successful in terms of the reduction of sludge. The amount of sludge was reduced to about 20% of that of conventional systems.