

WASTEWATER TREATMENT AND SLUDGE DISPOSAL FOR SMALL COMMUNITIES IN COLD CLIMATES

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INTRODUCTION.

This research project investigates a new type of wastewater treatment process for cold climates consisting of Primary Settling, Activated Sludge, Clarifier and separate Biological Aerated Filters based on fixed biofilms to address nitrification requirements [1]. The objective of the research is to determine the reliability, robustness and resilience to meet the specific needs of small communities in cold climates.

MATERIALS AND METHODS.

With respect to microbiological treatment processes, eight growth variables are investigated that affect the growth and metabolism kinetics of wastewater treatment process in cold climates. These variables are temperature, pH, BOD loading rate, viability of bacteria, nutrients, retention time, dissolved oxygen and toxins. A pilot plant at Astana Wastewater Treatment works is used to conduct a series of experiments

RESULTS AND DISCUSSION.

Our preliminary results demonstrate that the impact of temperature on fixed film nitrification rate is less significant than predicted by the van't Hoff-Arrhenius equation. In other words, the impact of temperature on the nitrification rate in a fixed film processes is greatly reduced due to influence on bacterial growth rate compared with its impact in a suspended culture process.

Further research is required to study and compare the impact of temperature on fixed film and MBR nitrification rates to determine whether these applications have sufficient reliability, robustness and resilience as a wastewater treatment process for cold climates.

CONCLUSIONS.

The preliminary results of this research show that expanded conventional treatment process for wastewater can be made more is reliable, robust and resilient by adding a separate Biological Aerated Filters based on fixed biofilms to address nitrification requirements.

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REFERENCES.

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