BiOWiSH® TECHNOLOGIES

Case Study

BiOWiSH® Aqua

Treating High Ammonia Leachate in a Wastewater Treatment Plant - South Korea

Background

A wastewater treatment plant operator in South Korea approached BiOWiSH local partner Smart Bio Korea (SBK) with an objective to explore a new business opportunity of treating high ammonia leachate.

Objectives

The main objective of conducting the trial at this facility was to explore the technical feasibility of treating the high concentration of leachate delivered from a nearby landfill.

The leachate had the following effluent characteristics:

Parameter	Current	New High TN WW
BOD (mg/l)	800 ~ 1000	14,000
COD (mg/l)	2000	9,600
Total Nitrogen (mg/l)	1000 ~ 1200	4000 ~ 4500
Salinity (% m/v)	5%	20%

Effluent characteristics (current and new high TN leachate)

The customer wanted to process the current influent load, combined the new concentrated wastewater ,while maintaining compliance with effluent discharge standards (TN levels < 50ppm).

Implementation Program

The BiOWiSH® trial was conducted for a period of 12 weeks (May 8, 2017 to July 31, 2017). The flow of high TN leachate to the treatment plant was gradually increased, beginning at week two.

A 1m^3 BiOWiSH® solution was prepared for the week and drip dosed into the chosen reactor using a solenoid pump.

By the end of trial, the total daily flow treated in the plant was 150 m^3/d of which, 130 m^3/d were the regular effluent and 20 m^3/d were the new high TN leachate effluent.

BiOWiSH® Aqua

- Rapid nitrification and denitrification in aerobic and anaerobic conditions
- Reduces sludge production
- Increases plant treatment capacity
- Reduces odors
- Reduces aeration requirements
- Reduces need for chemical additives
- Improves plant stability
- Pre-treats influent in collection systems
- Natural and non-toxic

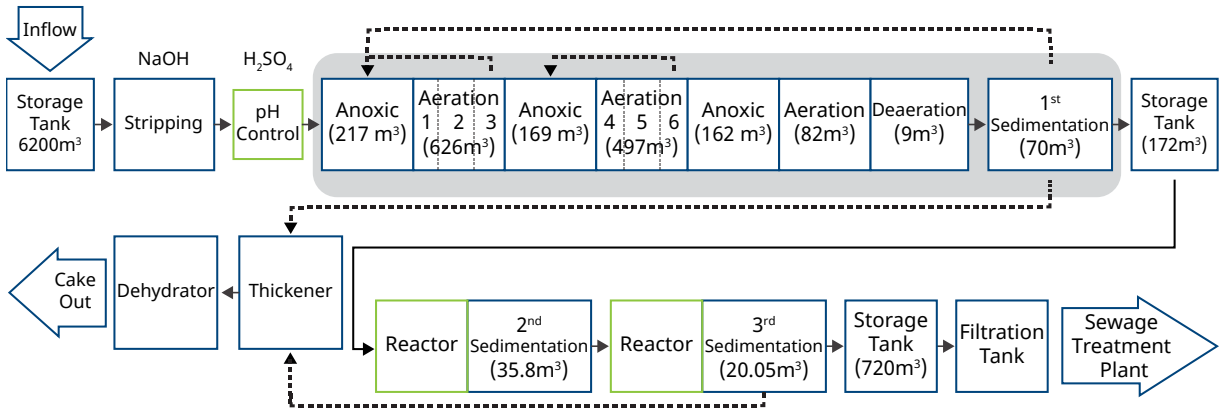
Available Sizes

- 100g/3.5oz
- 1kg/2.2lbs
- 5kg/11lbs
- 10kg/22lbs

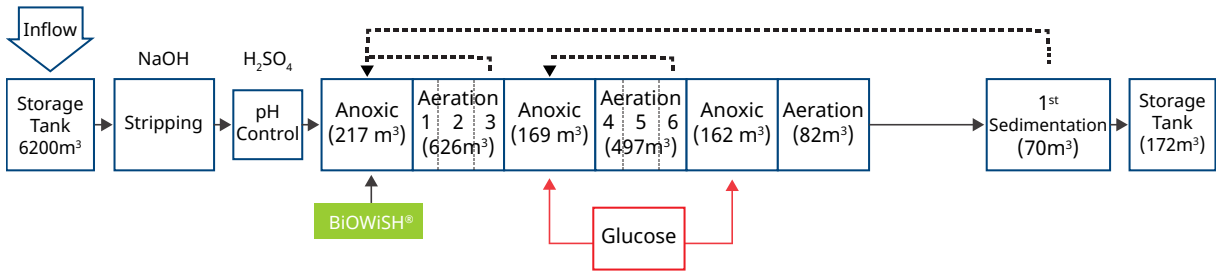
A few process modifications were made during the trial to improve the plant's overall performance:

- Redefined/modified each bioreactor to maximize biological treatment – nitrification, denitrification – aerobic & anoxic tanks, RAS route, etc.
- Increased sludge age by modifying Return Activated Sludge process
- Improved aeration efficiency by increasing agitation
- Added glucose to provide an additional carbon source
- Optimized DO level in each bioreactor
- Installed an additional physical/chemical treatment process before biological treatment to reduce the process load (pH & SS)

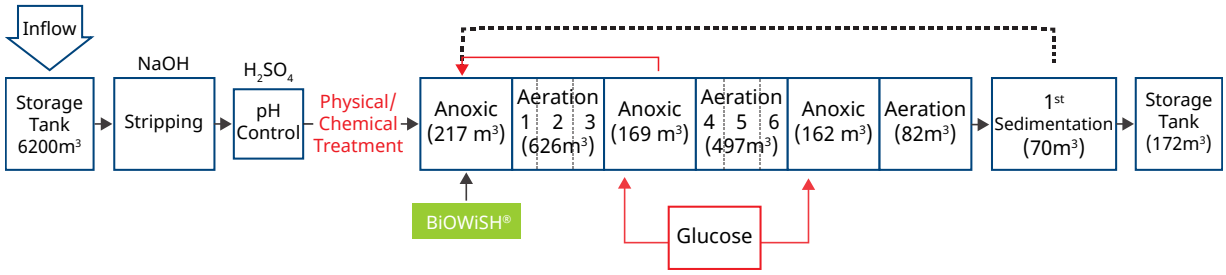
BiOWiSH® Dosing Plan		
Week	Daily Dosage (kg)	Weekly Total (kg)
1	3	21
2	1	7
3	1	7
4	1	7
5	1	7
6	1	7
11	0.7	5



Process flow diagram of the wastewater treatment plant



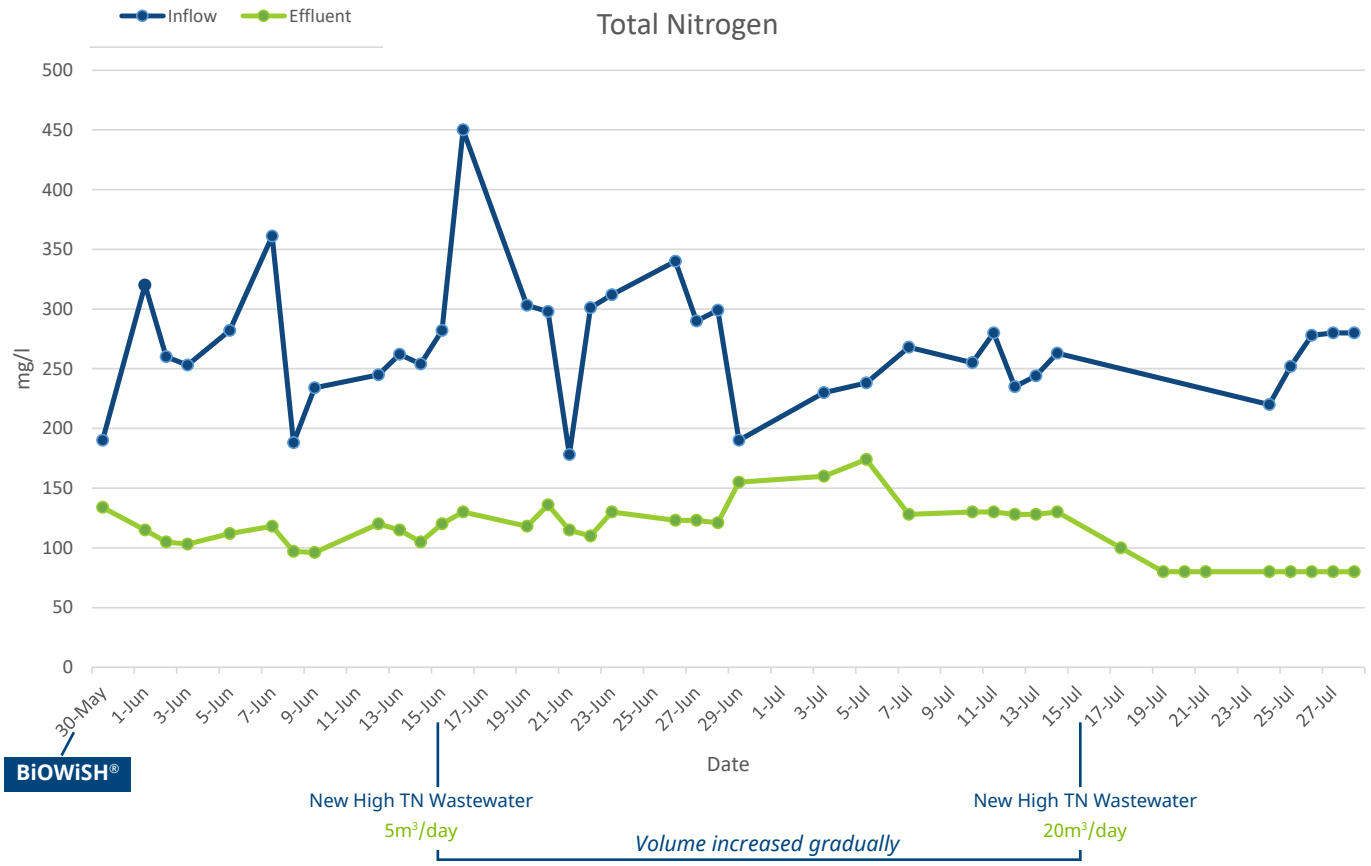
Initial trial



Final modification

Results

BiOWiSH® proved to be very effective under high process loading and salinity. With the help of BiOWiSH®, the plant was able to achieve stable total nitrogen < 70 (mg/l) despite the addition of high TN concentration leachate feed.



Reduction in total nitrogen levels without any impact from increased flow

Conclusion

The use of BiOWiSH® bioaugmentation technologies allowed the plant to process additional high-nitrogen feed with minimal changes to their existing operation and no additional capital costs.

The continuing use of BiOWiSH® will allow the plant to achieve even lower effluent TN concentrations in the future.

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