SEWER GOBBLER®
PRESENTATION
PART 2

Sewer Gobbler® is a Partner company with Gobbler Ltd.

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THE PRODUCT

- Biologically active seed cultures are microbial strains of naturally occurring micro-organisms that have been isolated and trained to produce large amounts of digestive enzymes when introduced into a waste system.

- The special eco-friendly bacterial enzyme producing strains are cultured to be thousands of times more active than those found in nature and are chosen for their natural resistance to harsh chemicals and detergents. This is the reason why proper enzyme producing microbial strains in a product are so important.

- Our bacteria are uniquely derived from soil cultures, and therefore metabolize faster reproduce at superior rates and live for longer.

- Every bacterium in Sewer Gobbler® is a miniature powerhouse enzyme factory which produces enzymes 24 hours a day. It is the main thrust of biologically active seed cultures.

- Regular dosing of sewage, wastewater plants and sewers ensures dominance over naturally occurring Less active bacteria for the ultimate results.

- We have a resource, a natural resource that for years we have disposed of, Sewer Gobbler® has seen the benefit to be had from treating this resource in a manner that will bring benefits to communities.

AUTOMATED DOSING

A CHALLENGE IN ANY ENVIRONMENT IS THE ALWAYS UNPREDICTABLE HUMAN FACTOR.

Precise and accurate dosing is required on a literally per minute basis, hour by hour, 24 hours a day, 365 days of the year. When trying to administrate product in powder form this becomes a physical impossibility. Product theft is also unfortunately a reality in some environments.

Sewer Gobbler® is uniquely available in liquid as well as traditional powder form. In liquid form this means being able to precisely and accurately dose with the cost effective Ecozyme Advanced Dosing System with battery backup. Our systems are physically secured to eliminate the chance of theft leading to fake or scam products entering our supply chain. Once per month the bio-enzyme liquid can be replaced for completely and reliable autonomy.

EFFLUENT DISCHARGE RESULTS

SEWER GOBBLER® GETS RESULTS, PERIOD.

In case study after case study on actual sewer plant effluent, it demonstrates massive reductions in COD's, Ammonia, Nitrate, Nitrite, Phosphate, E-Coli, Faecal Coliforms and Odour in a very short space of time. **These test results are freely available, please request them.**

APPLICATION RATES

VARY ACCORDING TO THE LOAD ON THE SEWAGE PLANT.

Can be added to any aerobic or facultative anaerobic zones of the sewage treatment process to augment the biological activity of the natural treatment process.

The product should ideally be continuously dosed at the recommended rate and preferably added at the inlet point to the sewage treatment plant.

DOSAGE RATES

SHOCK DOSE

Concentrate: 1L – 5L per millions litre of daily flow rate

Super Concentrate: 100ml to 500ml per millions litre of daily flow rate

Powder: 100g to 500g per millions litre of daily flow rate
(additional nutrient pack included in the powder form for an extra performance boost)

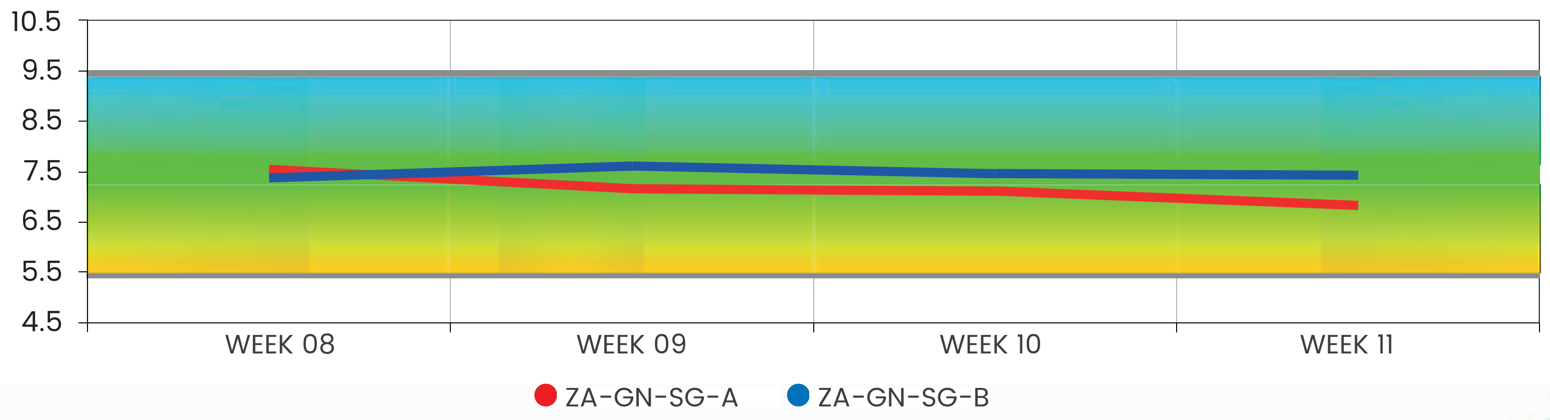
E-COLI, FAECAL COLIFORM TREATMENT SEWER GOBBLER®

SUMMARY

WEEK	pH (pH units)		Conductivity (mS/m)		Total Coliform		E. Coliform		Faecal Coliforms	
WEEK 08	7.54	7.37	96.1	91.8	10000	10000	5000	5000	1000	1000
WEEK 09	7.16	7.60	93.4	80.4	10000	10000	5000	5000	1000	1000
WEEK 10	7.11	7.46	108.3	105.5	3500	2500	3000	2000	300	500
WEEK 11	6.83	7.42	112.8	114.2	1500	1100	900	500	230	290

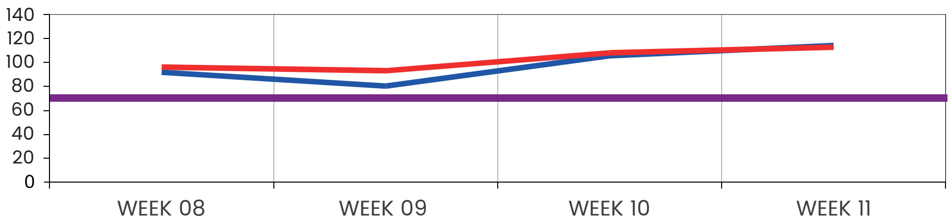
● Site ZA-GN-SG-A ● ZA-GN-SG-B

pH(pH UNITS) VALUES

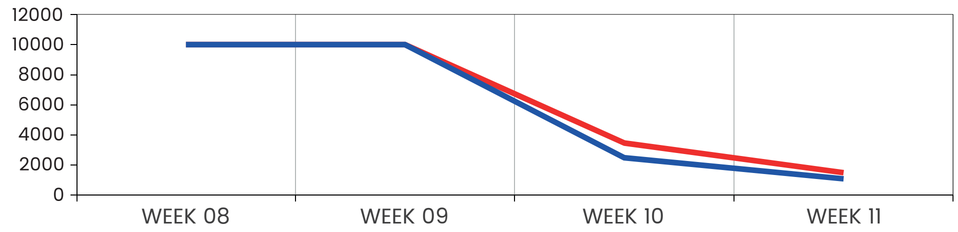


E-COLI, FAECAL COLIFORM TREATMENT SEWER GOBBLER®

CONDUCTIVITY (mS/m) VALUES

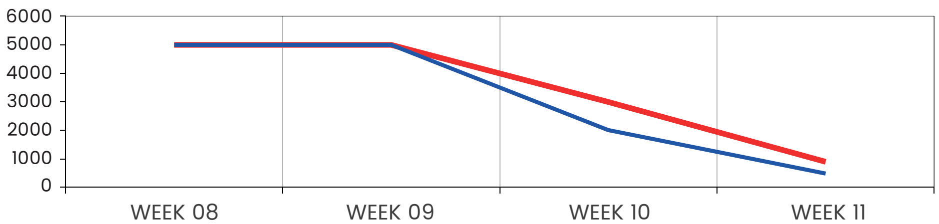


TOTAL COLIFORM (cfu/100ml) VALUES

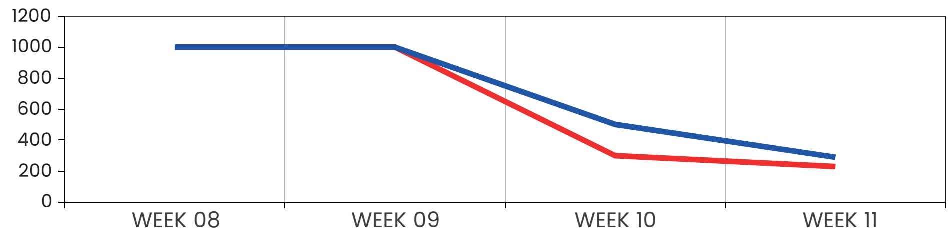


ZA-GN-SG-A ZA-GN-SG-B

E. COLIFORM (cfu/100ml) VALUES



FAECAL COLIFORM (cfu/100ml) VALUES



ZA-GN-SG-A ZA-GN-SG-B

CASE STUDY: ZA-FS-SG-0915C

SMALL SCALE FLASK DEMONSTRATION OF THE TREATMENT OF SEWAGE WASTE AT WASTE WATER PLANT

1. BACKGROUND

Sewage waste water contains high concentrations of COD (chemical oxygen demand) and other harmful waste components that have a detrimental effect to the environment. Sewage treatment facilities often face challenges with the safe and efficient removal of these waste substances.

Another problem that sewage treatment plants encounter is the sedimentation efficiency of the sludge once it is activated by the natural bacteria. The foul odour is also problematic.

By using specialized bacterial products to augment the sewage treatment process, enhanced bioremediation efficiencies can be realized. The bioremediation efficiency of a sample of sewage waste water was demonstrated by adding our proprietary bacterial mix Ecozyme Sewer Gobbler® in a bench scale static test.

This preliminary test focused on the analysis of ions such as nitrates, nitrites, phosphates and ammonia which contribute to problems in the environment due to lack of efficiency in the sewage treatment process. In addition the removal of COD was assessed.

The sedimentation of the treated sewage was also assessed to confirm that there would be no detrimental effect on clarifier performance downstream of the biological process.

Odour abatement was also evaluated. The experiment was designed as a crude assessment of the potential overall bioremediation achievable using a ready to use microbial effluent treatment product at a concentration of 1 x 108 CFU.ml-1.

CASE STUDY: ZA-FS-SG-0915C

SMALL SCALE FLASK DEMONSTRATION OF THE TREATMENT OF SEWAGE WASTE AT WASTE WATER PLANT

2. APPROACH

2.1 Bioremediation assessment:
Inlet sewage waste water to the effluent treatment plant as supplied (pH 4.6), was thoroughly mixed and 100 ml aliquots were added to 500ml Erlenmeyer culture flasks. The flasks were treated as follows:

Flask 1 Control: Un-inoculated flask that contained raw sewage sample

Flask 2 Test: Raw sewage sample inoculated with 1ml of Ecozyme Sewer Gobbler®

Yeast extract (0.5% m.v-1) was added to both flasks which served as a protein source. The flasks were closed using sterile drapes and were incubated at 30oC for 120 hours on an orbital shaker, without any supplementation of air.

Effluent samples taken from the flasks were analysed at time 0, 24, 48 and then at 120 hours after incubation, using standard water analysis tests kits. (Merck Spectroquant).

2.2 Sedimentation analysis
A sample of activated sewage as supplied (15 ml) was left to stand over a period of 168 hours to determine the natural sedimentation capacity, as a positive control. The same procedure was applied to the negative control and treated sewage waste water after 24, 48 and 120 hours. The clarity of the unsettled fraction was assessed by measuring the OD_{600nm} (optical density).

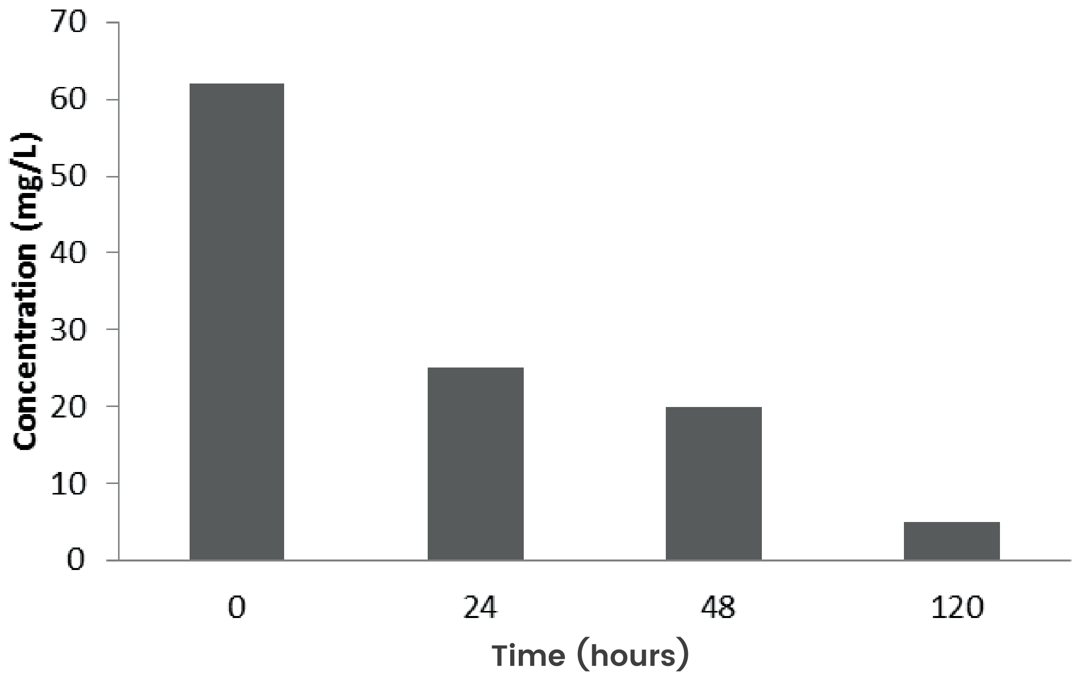
2.3 Odour control:
Odour was evaluated through a qualitative sensory assessment for the untreated sample and the test samples at the various sample points.

3. OBSERVATIONS

3.1 Bioremediation assessment:

Figure 1
After 120 hours of incubation, all the metabolites analysed decreased substantially in the test flask inoculated with Sewer Gobbler® Liquid.

Figure 1



CASE STUDY: ZA-FS-SG-0915C

SMALL SCALE FLASK DEMONSTRATION OF THE TREATMENT OF SEWAGE WASTE AT WASTE WATER PLANT

Figure 2 to 4 illustrates the reduction in nitrogen waste ions over the trial period.

There were fluctuations in the nitrate concentration while the decrease in the nitrite concentrations were delayed as nitrite is the intermediate of the nitrification and denitrification cycles. However there was an overall decrease in the concentrations of all ions over the 120 hour period indicating a promising solution for the bioremediation of sewage wastewater.

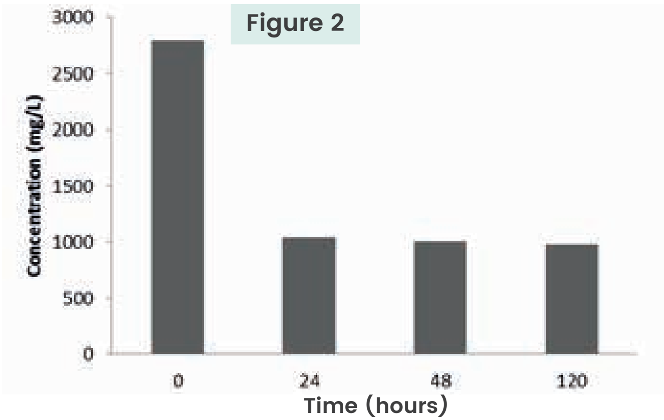


Figure 2: Concentration of Ammonia over 120 hours

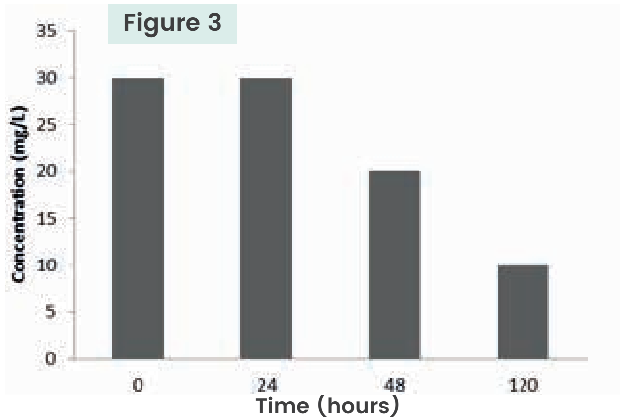


Figure 3: Concentration of Nitrite over 120 hours

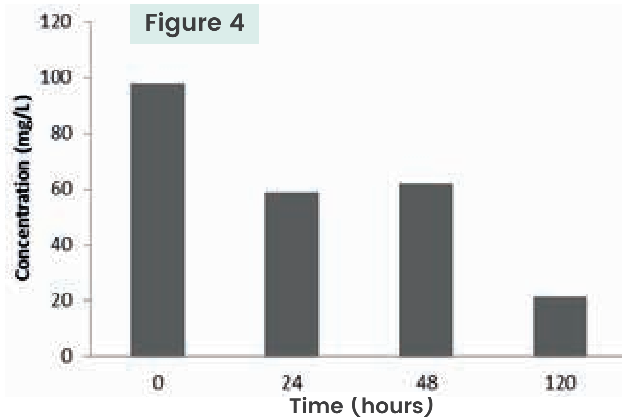
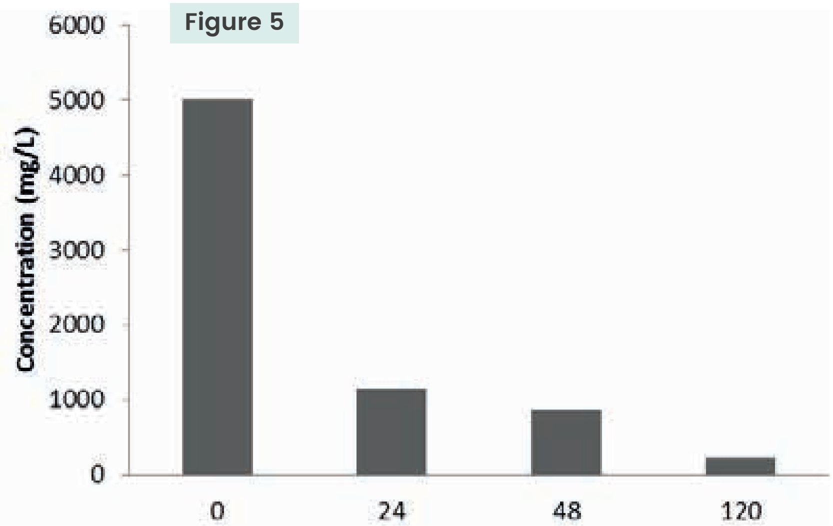


Figure 4: Concentration of Nitrate over 120 hours

CASE STUDY: ZA-FS-SG-0915C

SMALL SCALE FLASK DEMONSTRATION OF THE TREATMENT OF SEWAGE WASTE AT WASTE WATER PLANT



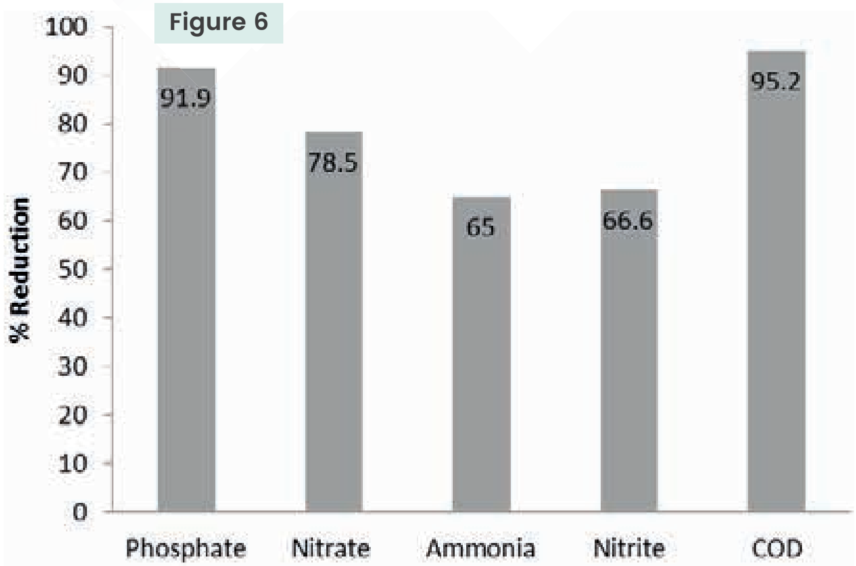


Figure 5 COD was reduced from ~5000mg.L-1 to ~240mg. L-1 within the 120 hour period.

This treatment efficiency can be expected to improve based on treatment system design and residence time.

Figure 6 shows the percentage reduction in waste ion concentration over the 120 hour period.

The data indicates significant reduction in the concentrations of all ions, showing that bio-augmentation using the product is extremely promising for this effluent.

3.2 Sedimentation analysis:

Figure 7 The optical density (OD) measurement is directly proportional to the clarity of the solution. From the sedimentation studies, the settled test sample (120 hours) was clearer than the settled activated sewage sample from the actual plant. In addition the activated sewage sample provided did not settle efficiently as there was a layer of sludge floating at the surface.

Figure 7

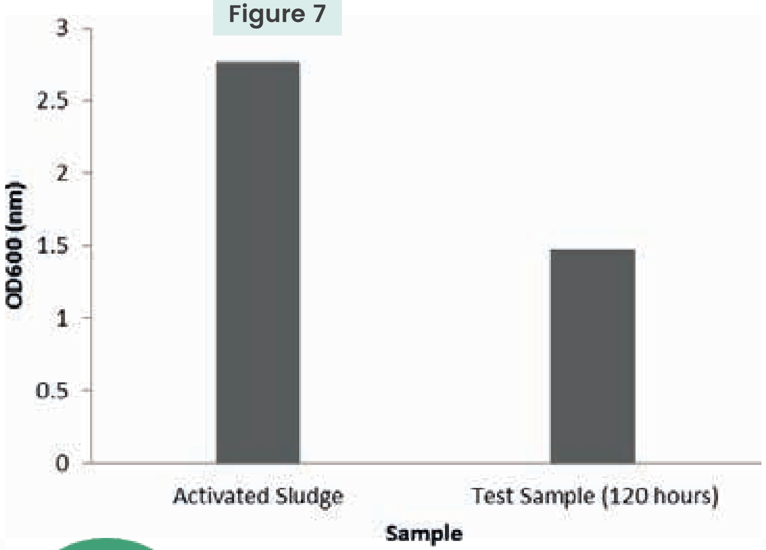
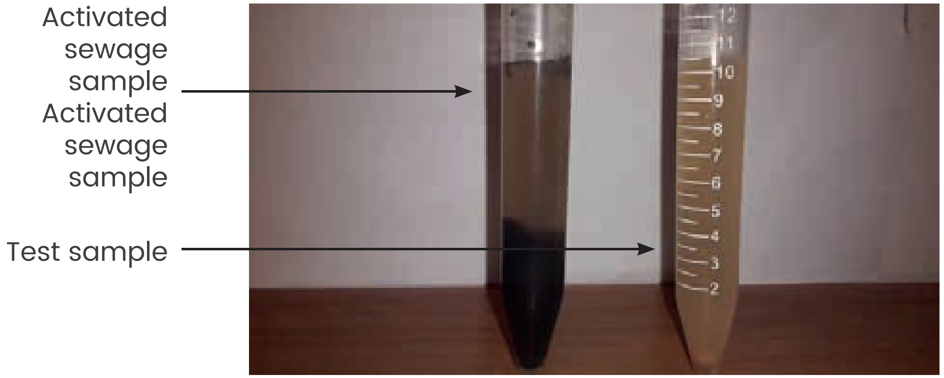


Figure 8: Sedimentation profile of activated sewage and the treated sample (120 hours)



3.3 Odour control: The odour was undetectable after the 24 hour treatment period.

RECOMMENDATIONS

This crude assessment shows the potential for bio-augmentation using the Sewer Gobbler® product in the sewage treatment process. Potential next steps for consideration include a pilot scale evaluation of the treatment efficiency under process conditions or a direct trial at a selected sewage treatment plant.

CASE STUDY: SANDTON, JOHANNESBURG

This was a sewage spill 3 kilometres upstream, which resulted in the river being contaminated.

The river runs through a park area, with a feature stream and pond, surrounded by a number of up market townhouses. The resultant outcry about the contamination and odour from the residents and businesses was without exception.

The spill happened on the Tuesday, we were called in to assess the situation and make proposals to overcome the problem.

We proposed that the river and pond be treated with 50 litre **Sewer Gobbler®** organic waste degrader diluted with 300 litres of water. The proposal was accepted and the application was done on the Thursday.

TREATMENT

The river was treated intermittently from approximately 1 km upstream, concentrating on areas were the organic waste had accumulated. This flowed through to the feature pond.

The surround of the pond was treated, concentrating on areas where the flow and circulation was being restricted by plants and reeds. The follow up inspection was done on the Sunday.

The water had started to clear and the odour had virtually dissipated. Subsequent inspections showed that the condition of the water was constantly improving and that the odour had completely gone. By the following Thursday the water had cleared.

See next to pages for results of application →

CASE STUDY: FREE STATE PROVINCE, SOUTH AFRICA

The resort has 30+ rooms and executive rooms, restaurant and staff village. All the water passes through the system. To process their sewage waste and general water, there is a large conservancy tank, this is pumped into a small processing plant.

The processed water is then pumped into a oxidation pond allowing the water to evaporate. As with a previous job, the oxidation pond had died off and needed to be reactivated. A program was set up to treat and maintain the system.

PROGRAM

The system was shock dosed with 20 litres of Sewer Gobbler® 1E8 waste degrader, then treated with 2 litres per day for 7 days. The system is then maintained once a month with 10 litres of Sewer Gobbler® waste degrader.

In addition to the above, housekeeping, at regular intervals, apply Sewer Gobbler® waste degrader and odour control to all the water outlets. This breaks down the soaps and body oils, reducing pipe blockages.

The kitchen grease and fat traps are treated weekly with Fat Trap Gobbler (an enzyme and bacteria based grease, oil and fat degrader).

They have been on the program for the past 5 years without having to have the conservancy tank sucked out.

The following pictures show progress of treatment:

Oxidation pond six weeks after shock treatment, algae growth, indicating that the system was switching from anaerobic state (little or no oxygen) to an aerobic state (increased oxygen).

Oxidation pond six weeks months and one year after shock dosing. Through maintenance this quality of pond is maintained.

CASE STUDY: MAGALIESBURG

The sewage oxidation pond was found to be dying, giving off a strong organic waste odour and loaded with years of dead organic waste. This resulted in numerous complaints from neighbours, guests and staff. It was also found that the waste water was being treated with sodium hypochlorite (liquid chlorine).

The sodium hypochlorite was used to kill off the E-coli and other pathogens. In addition to these bacteria being destroyed, it also killed the natural enzymes and bacteria, that would normally maintain the pond in an active odour free state.

We were requested to re-stimulate the pond, and eliminate the odour.

CASE STUDY: MAGALIESBURG

TREATMENT

Firstly we stopped the chlorine dosing, diverting it to a new point on the outlet side of the system. We then treated the pond with 20 kg of liquid **Sewer Gobbler** organic waste degrader, following by one kg every day for 5 days.

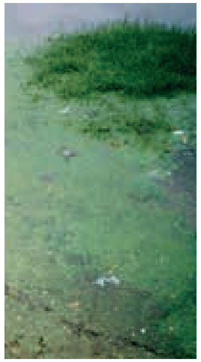
Oxidation pond before treatment

Treatment being administered

Close up of Oxidation pond before treatment

4 WEEKS LATER

The oxidation pond showing returned activity, returning to its natural state. The odour reduced substantially. The green being algae growth, indicating that the system had changed from an anaerobic state, little or no oxygen available, to aerobic state, increased oxygen levels.



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