

Wastewater Treatment Microbes

LS 4000

Lagoon Spikes 4000

Applications

LS 4000 is used in wastewater lagoons to reduce sludge volume and lower dredging costs. **LS 4000** contains a combination of beneficial, facultative microorganisms, fast-acting enzymes, and essential nutrients, working both aerobically and anaerobically.

Benefits

Lagoons offer an economical way to treat wastewater. Despite effective treatment, solids accumulate at the bottom of the lagoon, resulting in short-circuiting, reduced hydraulic retention time, and ultimately poor treatment. The most common way to alleviate this problem is through costly dredging.

LS 4000 offers a biological alternative to dredging. The combination of beneficial microorganisms, enzymes, and essential nutrients stimulates biological activity in the sludge and provides a cost-effective way of reducing sludge volume and improving treatment. The dense **LS 4000** is applied at the water surface and drops directly into the settled sludge layer. They are easily applied over a broad area and to target “hot spots” where sludge has accumulated.

The microorganisms and nutrients in the **LS 4000** stimulate biological activity in the sludge layer allowing floc particles to become larger and more dense. Denser floc particles



water and lead to greater compaction. The enzymes in **LS 4000** help to degrade substances that hold decaying biomass together at the lagoon bottom. Beneficial microorganisms further complete the degradation of decaying biomass and result in a lower and more compact sludge layer.

Usage

LS 4000 applied over a broad area reduces the overall sludge layer in a lagoon.

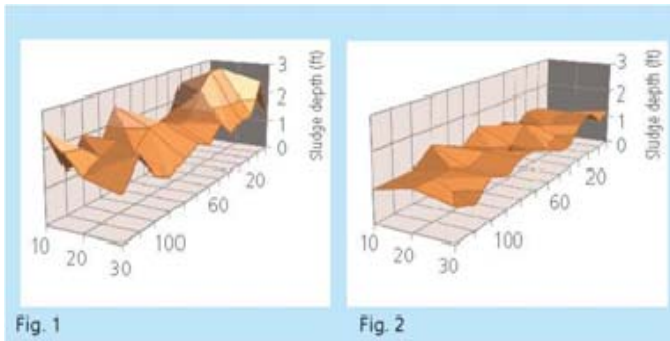
LS 4000 applied at a higher dose in problem areas or hot spots yields greater sludge reduction. The dense **LS 4000** sinks to the bottom of the lagoon and is easily applied at the lagoon surface from a boat. PVC piping can be used to position **LS 4000** in hot spot areas where accuracy is critical.

Sludge quality varies with system design, sludge age, amount and type of inert material and compaction. This affects the degree to which the sludge depth can be impacted, dosing, and dosing frequency. Most initial applications reduce the sludge layer by 0.3-0.9m (1-3 ft), depending on dosage and sludge characteristics.

Performance

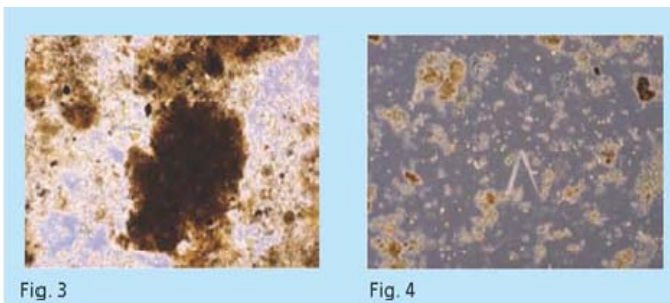
LS 4000 has proven effective at reducing the volume of sludge in lagoons. Individual results vary according to the sludge makeup and the initial volume.

Figures 1 and 2 are 3D representations of the sludge later in a municipal lagoon. The figures show pre-and post trial plots at a municipal lagoon. The use of **LS 4000** resulted in a 38% reduction of sludge volume. The graphs were developed by mapping a 30 ft x 130 ft section of a lagoon that was treated with **LS 4000**. Each data point represents a 10' x 10' area. Measurements were taken before and 30 days after application.



Figures 1 & 2. The application of Novozymes BioSpikes® resulted in a 38% reduction in sludge volume in the treatment area over 30 days.

Figures 3 and 4 show difference in floc size and density in sludge samples taken from treated and untreated areas. Floc particles appear larger and denser, which suggests the sludge more readily compacts. These changes occurred in parallel with a reduction in the sludge layer depth.



Figures 3 & 4. Floc particles from treated areas (Fig. 3) are much larger and denser than floc particles from untreated areas (Fig. 4).

Figure 5 shows the difference in color between treated and untreated sludge samples. Increased biological activity results in a further oxidized and darker sludge.



Figure 5. Treated settled sludge samples from the bottom of a lagoon appear darker than untreated settled sludge and mixed liquor suspended solids (MLSS). The dark color of the treated settled sludge sample (left) shows that it is further oxidized, which is an indication of increased biological activity compared to untreated areas (center). A drop of the MLSS (right) is shown for comparison purposes.

Dosage

For applications over broad areas, an initial dosage is recommended to reduce the existing sludge volume. Follow-up applications at reduced dosages are recommended every 30-90 days, depending on the sludge accumulation rate and compatibility. Hot spot dosing is recommended for areas where sludge has a tendency to accumulate at an accelerated rate and lagoon efficiency is impacted.

Your IFM representative will help you design a dosing program for your system.

BioSpikes® 4000	Cases per acre	Cases per 1,000 m ²
Initial dose	16	4
Maintenance dose	8	2
Hot spots	16	4

Product Specifications

Components: Microorganisms, enzymes, filler, binder, micronutrients

Color: Light tan

Physical form: Dry solid

Size: 13.5 length x 11 cm diameter (5.3 in x 4.5 in)

Weight: Approximately 150 g

Fragrance: Mild fermentation odor

Product Characteristics

Each **LS 4000** is 13.5 cm long x 11 cm in diameter (5.3 in x 4.5 in), and weighs approximately 150 g.

Available Packaging

125 **LS 4000's** per case
Each weighs 18.75 kg (41.34 lb)

Safety and Handling

Store in a cool, dry place at 10-35°C (50-95° F) . Avoid inhalation of dust. Wash hands thoroughly with soap and water after handling. Avoid eye contact.

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