BIO SCIENCES PHP

MULTIPLE SPORE BLEND OF BACTERIA

For Drain line, grease trap, odor control, Septic and waste treatment

BIO SCIENCES Waste treatment

- Digests organic mater, fibers, lignite, fats and waste solids in waste holding tank , septic tank, gutters, grease traps, disposals, sinks and drains.
- Unstops (unplugs) sink and drain lines.

BIO SCIENCES is added in a ready-to-use solution which is metered out by an automatic pumping system or poured with the hand in the holding tank to be treated. The pumping system provides accurate and precise delivery of the product at the appropriate time intervals. When treating lift stations and/or manure holding tank, it is better to add bacteria via a manhole a short distance upstream from the lift station. If this is impractical, the addition can be made directly to the holding tank. If possible, its better to add at the end of a pumping cycle near the manure pit . Of course, precautions must be taken to prevent addition while any toxic substances, such as disinfectants , chlorine, chrome, high caustics, etc. Where there are severe grease build-ups, it is advisable to add ammonium-phosphate for the first seven days, use the same quantity as the bacteria which is being added. One has to be careful that the bacteria are not added at the same time as the fertilizer solution which may be too “hot”. Chemical reactions usually produce heat and kill the bacteria . What is usually done, add the fertilizer into the holding tank of the lift station an hour or so before adding the **BIO SCIENCES** upstream.

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The cultures perform well in the range of 10°C (55ºF) to 50°C (105ºF). Domestic and agricultural sewage is usually not too cold unless snow melt, etc. Below 10°C (55ºF) the activity is merely slowed down but not stopped. With the addition of **BIO SCIENCES,** you will re-establish the activity and multiplication of the bacteria in your system. Care should be taken to prevent any bad storage of unused containers of the **BIO SCIENCES**: KEEP IT AWAY FROM HEAT 75°C (160° F) AND KEEP IT AWAY FROM FREEZING 0°C(32°F).

If the sewage is cold, particularly during winter, hot water should be added in higher quantities until the water temperature warms to the best range of bacterial activity. The cultures perform best at a pH of 7, from a practical standpoint, they will function in a range of 5.5 to 9.0. If the pH gets further away from 7, activities decline. The product has good shelf life of 2 years if it is kept away from heat and from freezing.

BIO SCIENCES is added to lines, septic tank, manure pit and lift stations. The new bacteria being added easily dominate the naturally-occurring microbes. In their new environment, the bacteria multiply, attach themselves and break down troublesome substrates such as fibres, lignite, grease and organic matter and break them apart. In gravity mains and feeder lines, treatment is started at the lowest downstream trouble spot and then upstream in increments of approximately every 500 to 1000 feet. This is because accumulations of grease and organic matter will slug off during initial treatment; if more than 1000 feet is attempted at a time, major blockages of the line can result as large chunks of grease are broken free. Later, maintenance doses will treat up to a mile of line in a single application. **BIO SCIENCES** repeated uses, will assure a constant proliferating culture , that will form a slime on the pipe surface. The slime, much like that found in the bed of a filter, helps prevent new greasy and organic build-ups.

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ADDITIONAL BENEFITS OF Waste Treatment STRENGHT BIO SCIENCES

Energy savings at lift stations

Since the restrictions within pipes are removed, less energy is required to pump the sewage from the main on lift station. In some cases, users of our bacteria can expect reductions of energy costs as much as 50%.

Cleaner treatment plants

When major portions of a city's collection system are on the **BIO SCIENCES** program, the waste treatment plant itself experiences considerably improved operating efficiency.

SAFE TO USE

BIO SCIENCES is made up of harmless bacteria (Class1, Non Pathogenic and non-opportunistic bacteria) which use only non-living organic matter as food sources. It is a completely natural product. Used as directed, it is not detrimental in plants or wild life, nor will it damage pipes or equipment.

This product is registered with the CFIA. In fact, **BIO SCIENCES** is used within treatment facilities for elimination of grease and suspended solids, increases the biodegradation of the lower sludge volumes, treatment of malodors, reduced hydrogen sulfide corrosion, increased safety for sewer workers, quicker recovery from shock loading or mechanical failures and restores in leach fields.

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SEPTIC TANK SYSTEMS

A septic tank is a water tight enclosure in which organic solids are decomposed by natural bacterial action. Sewage is detained and separated as it flows into the tank. Heavier solids settle to the bottom, forming sludge and the fats and grease float, forming a scum. The sludge and scum continue to be digested by bacteria, while clarified liquids are discharged to the absorption fields. Although a properly functioning tank digests all organic solids, a residue of inert material slowly accumulates and must be cleaned periodically.

Insufficient bacterial activity will result in the movement of undigested organic suspended solids from the tank into the distribution finger in the absorption of leach fields. The solids form a deposit that appears as a black slime concentrate. It progressively moves out along the distribution finger. As the deposit extends outward it also works its way up the side walls until it radically reduces the volume of water infiltrating into the absorption fields. Pressures caused by the blockage will force the liquid effluent either to the surface or to back up through the entire system to drains and toilets.

BIO SCIENCES will remove the crud and slime in the distribution tanks and the scum and grease in the sewer pipes, as well as in the tank itself and prevents the blockage of the plumbing lines which results in unpleasant and smelly pouring and costly repairs.

The material is actually digested, not emulsified or dissolved, and the ultimate end product is carbon dioxide and water.

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GREASE TRAPS

Greases and fats from kitchen waste are not water soluble. They float and stick to all surfaces. As a result, grease accumulation can occur in the sewer lines, pumps, valves and distribution lines.

Grease traps are designed as collection tanks in the waste lines where any volume of water is large. The traps prevent a large volume of grease from entering the waste disposal system. They do not prevent grease build-up in the waste lines. A major problem with the grease accumulation is their alteration by the air witch cause bad odours and the blockage of the sewage lines. **BIO SCIENCES** can be used for grease control in all problem areas.

With the bacterial activity resulting with the use of **BIO SCIENCES**, digestion and biodegradation of the fats, cleans the trap as well as the waste lines.

BIO SCIENCES CHEMESTRY OF ACTION

Fats are esters of glycerol and fatty acids. Bacteria utilizes fats only after hydrolysis of the ester bond and extra cellular enzymes called lipases are responsible for the reaction. The end result is a formation of glycerol and free fatty acids as shown in Figure 1.

Figure 1

H_2C – O - Fatty $Acid_1$ CH_2CH + Fatty $Acid_1$

C – O - Fatty $Acid_2$ HCOH + Fatty $Acid_2$

H_2C – O - Fatty $Acid_3$ CH_2CH + Fatty $Acid_3$

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The fatty acids released by the action of lipases are further degraded by the bacteria by a process called βeta Oxidation in which two carbons of the fatty acid are split off at a time.

The fatty acid is first activated with coenzyme H_2 oxidation results in the release of acetyl Co A and the formation of a fatty acid shorter by two carbons. The process of β oxidation is then repeated and another acetyl Co A molecule is completely oxidized. The acetyl Co A formed is then oxidized to carbon dioxide and water by the way of the tricarboxylic acid cycle or converted to cell constituents via the glyoxylate pathway. The glycerol is easily metabolized to pyruvic acid and then to acetyl Co A. The fats are completely degraded by the bacteria. They are not merely emulsified or solubilized and sent downstream to cause problems down line.

ENZYME ACTIVITY OF BIO SCIENCES GREASE DIGESTANT

Case in solubilization units (CSU)

A bacterial culture with an activity of 1000 casein solubilization units per gram will solubilize nine (9) times its weight of casein in one hour at 40°C and pH 8.

BIO SCIENCES Grease Digestant = 3000 CSU/Gram.

Fats and grease hydrolization Units (F-GHU)

There is no standard unit for Lipase activity except on olive oil. One part Lipase will hydrolyze 2.5 parts of olive oil. This is measured in our laboratory by measuring the degree of clearing of olive oil on the surface of an agar plate. One cm of clearing equals 1000 units.

BIO SCIENCES Grease Digestant = 2500 Fat-Grease Hydrolyzing Units.

Starch Liquefying Units (SLU)

A bacterial culture with 1000 units per gram will reduce the viscosity of 300 times its weight in potato starch in ten (10) minutes at 7°C and pH 6.7.

BIO SCIENCES Grease Digestant = 450 SLU/Gram.

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