Proposal

SuperX® Effective Microbial Application

ENZIMAS
Enviro care & Technologies

The SuperX® is a special form of bio-culture which was developed after intense research using various industrial wastewaters. The culture is a mixed form of specially screened microorganisms isolated and enriched from different wastewaters.

Product Details

Product Name	COD Range
1.SuperX	<5000
2.SuperXL	>5000

Applications

1. Higher COD & BOD effluents.
2. Effluents with minimum sludge production.
3. Sewage treatment systems with less efficiency.
4. High Toxicity industrial wastewaters.
5. Highly recalcitrant effluents.
6. Wastewater with less biodegradability index.

Features

Small Footprint: The system can successfully achieve BOD to < 5.0 mg/L, and enhanced nutrient removal performance, including total nitrogen (TN) < 3 mg/L without adding tanks to an existing plant. The high-rate treatment allows for a smaller footprint than conventional processes.

ENZIMAS
Enviro care & Technologies

Easy to Handle: The Enzimas SuperX® can be handled easily by less skilled workers also. The working instructions are simple and adequate training will be provided if needed.

Minimum Material Requirement: The bio-culture requirement is minimum for our SuperX® culture. Approximately 1 Kg/day is the requirement for a standard 100 KLD plant.

Improved Biological Indices: The MLSS content will be increased by using SuperX® culture which would facilitate sludge settling. The sludge formed will be chemically non-toxic and can further be anaerobically processed.

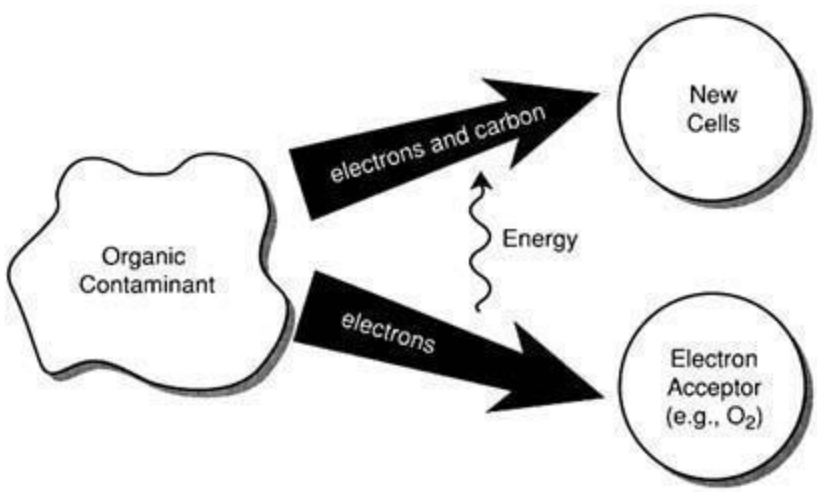
Shock Load Resistance: SuperX® culture is highly resistant to shock loads since they are enriched with higher pollutant concentrations during their strain improvement stage.

Cost Effective: SuperX® bio-culture is cost effective and it nullifies the use of chemicals which may further reduce the cost. Also, the post treatment developments would further cut the cost for processing sludge.

<u>Odour Control</u>: The odour problem in wastewater is eliminated by SuperX® culture organisms. The highest organic compound reduction is possible with our culture and colour and odour control is highly commendable.

Mechanism

Biological wastewater treatment confines high concentrations of naturally occurring bacteria in treatment tanks. These bacteria, along with protozoa and other microbes, form activated sludge. When the activated sludge bacteria "eat" small organic carbon molecules, the wastewater is cleansed. Biological treatment is widely used because it is more cost effective than other types of treatment processes, such as chemical oxidation or thermal oxidation.



Advantages

1. SuperX® is a mixture of dry organism with higher level nutrition. So, during initial inoculation prior to addition is highly effective compared to other cultures available in the market.

2. After 24 h of inoculation, the organism load is highly capable of handling organic load in the aeration tank. This organism will work along with the activated sludge available in the aeration tank.

3. Even if the activated sludge is not built up in the aeration tank, with in to cycles, SuperX® will form enough sludge in the system to handle organic loading and other toxic materials.

4. In case of shock loads, the organisms could easily handle the increased organic load. When we developed the organisms, they were trained to handle increased concentration of pollutants. Their genetic memory would make them work rapidly to handle high influent load.

5. SuperX® is a perfect consortium that it will handle all types of pollutants present in the wastewater. Organic and Inorganic pollutant loads will be equally digested by the microbes. Grease, oil, dyes, aromatic compounds, mineral salts, sugar, starch, fiber, milk, protein, sago, synthetics and any other chemical compound will be digested by the consortium under aerobic treatment mode.

6. This culture reduces the chemical dosage for sludge formation. The effective microbes also contain floc forming microbes, which will aid the process of bio-flocculation and thus make the sludge settling process easier.

Industrial Studies

Pulp & Paper Industry

The pulp and paper industry produces effluents with large BODs and CODs. One of the specific problems that has not yet been solved is the strong black/brown color of the effluent, which is primarily due to lignin and its derivatives released from the substrate and dis-charged in the effluents, mainly from the pulping, bleaching and chemical recovery stages. The brown color of the effluent may increase water temperature and decrease photosynthesis, both of which may lead to decreased concentration of dissolved oxygen. Chemical recovery is not carried out in small paper mills due to economic reasons. Several methods have been tried for the removal of chloroorganic materials, but all are quite expensive and are not feasible in common practice. Physical and chemical methods of removing chloroorganic materials, although quite effective in decolourization of pulp and paper mill effluents, are unattractive for industrial applications because of the high costs.

Biological treatment systems are particularly attractive, since in addition to colour they also reduce the BOD and COD of the effluent. Among various microorganisms used in the SuperX and SuperXL have proved their potential in the lignin/phenolic wastewater treatment. We have proved ideal organisms for decolourization as well as for the reduction of absorbable organic halides (AOX) and the chemical oxygen demand (COD). Several researches have also shown that kraft mill effluents can be partly decolorized by SuperX and SuperXL culture.

Our SuperX and SuperXL culture produce isoenzymes, including lignin peroxidise and MnP-dependent peroxidises (MnPs) and laccases, which are capable of degrading lignin as well as the chlorinated lignin's found in pulp bleaching effluents demonstrated that purified lignin peroxidise and man-ganese peroxidise were effective in the decolourization of kraft bleach plant effluent and observed the decolourization of olive mill waste waters by these two purified enzymes. The results are assessed in terms of colour removal, reduction of COD and increase in the inorganic chloride content.

Pharmaceuticals Industry

Pharmaceutical wastewater is generally characterized by high toxicity and the presence of refractory compounds that limit its biodegradability, making it a potential threat to the natural environment and to wastewater treatment plants, if not handled properly. The manufacturing of pharmaceutical compounds typically involves a variety of stages including conversion of natural substances into pharmaceutical ingredients through fermentation and extraction processes and mostly chemical synthesis. The amount and variety of wastes generated during the production of pharmaceuticals is significantly higher than the amount of the actual finished product and it has been reported that 200 to 30,000 kg of wastes can typically be generated for every kilogram of active ingredient produced (NRDC). The composition of these pharmaceutical by-products varies as it depends on the type of drug manufactured, the materials used in the production and the actual operations involved.

The effluent generated by the formulation process is more heavily polluted and usually referred to as a strong stream. This is because the formulation effluent has low biodegradability due to the high level of active substance. These pharmaceutical by-products from the various production lines of the pharmaceutical manufacturing facilities eventually become part of the overall pharmaceutical wastewater which can have chemical oxygen demand (COD) as high as 80,000 mg L.

Several categories of pharmaceuticals raise particular concerns and among them antibiotics have significant impact in the environment where they can disrupt waste-water treatment processes and adversely affect ecosystems. Furthermore, pharmaceutical wastewater resulting from the manufacturing of antibiotics may contain bio refractory materials that cannot be readily degraded. Yet, biological treatment can still be a viable choice for treatment in combination with physico-chemical processes. Because of the elevated COD content of pharmaceutical wastewater, anaerobic treatment could be a suitable option. **With the help of SuperX and Super XL biological oxidation method, it was found that the wastewater could be processed at all organic loadings and phenol concentrations encountered in wastewater. Our biological technology allows transforming the organic and inorganic contaminants into gases and digested sludge**. Moreover, biological reactors have less construction cost, easy operational and maintenance procedures.

$$\textbf{Organic matter} + NH_4 + O_2 \longrightarrow \textbf{cellular material} + CO_2 + H_2O$$

$$\textbf{Cellular material} + O_2 \xrightarrow{\text{bacteria}} \textbf{digested sludge} + CO_2 + H_2O + NO_3$$

Dye and Textile Industry

In textile industry different types of dyes and chemicals are used in weaving, dyeing and garment washing plant. This waste water is treated in effluent treatment plant with the help of biological treatment process.

Our main objective of industrial wastewater is to remove, or reduce the concentration of, organic and inorganic compounds. Biological treatment process can take many forms but all are based around microorganisms, mainly bacteria. These microorganisms use components of the effluent as their "food" and in doing so break them down to fewer complexes and less hazardous compounds. In the process the microorganisms increase in number.

Biological treatment plants must be carefully managed as they use live microorganisms to digest the pollutants. For example some of the compounds in the wastewater may be toxic to the bacteria used and pre-treatment with physical operations or chemical processes may be necessary.

Like humans, microorganisms need a "**balanced diet**" with sources of carbon, nitrogen, phosphorus and sulphur. While textile wastes have enough carbon and sulphur (sulphate) they are generally lacking in nitrogen and phosphorous containing compounds. If the microorganisms are to grow and work effectively they are likely to need addition of nutrients. For this reason, **we are giving nutrients along with our SuperX and SuperXL culture to develop our microorganisms in your plant.**

Automobile / Automotive Industry

Automotive/Automobile industry is a major consumer of water for various production process and production stages where vehicles are treated, washed, rinsed and painted and hence generating mass volume of wastewater.

Those most commonly found contaminants/pollutants in effluents are:

1. Total suspended solids such as metals, oils, grease, dyestuff, detergents, chromium and phosphates, paint residuals, hydrofluoric acid and ammonium bi-fluoride products etc.
2. Organic and Inorganic pollutants.
3. BOD (Biological Oxygen Demand) and COD (Chemical Oxygen Demand).

Wastewater from automobile industry consists of high organic and inorganic matter with oil, grease and heavy metals. If partially treated or untreated wastewater is discharged, it causes a great damage the geo-environment. The waste of motor vehicle industries is mainly the result of washing, colouring and various stages of chassis manufacturing which include oil, grease, dyestuff, chromium, phosphate and other pollutants. The liquid wastes discharged from these industries are not voluminous, but are extremely dangerous because of their toxic contents.

Bioremediation functions basically on biodegradation, which may refer to complete mineralization of organic contaminants into carbon dioxide, water, inorganic compounds, and cell protein or transformation of complex organic contaminants to other simpler organic compounds by biological agents like microorganisms. Many indigenous microorganisms in water and soil are capable of degrading hydrocarbon contaminants.

Soil contamination with hydrocarbons causes extensive damage of local system since accumulation of pollutants in animals and plant tissue may cause death or mutations. The process of bioremediation, defined as the use of microorganisms to detoxify or remove pollutants owing to their diverse metabolic capabilities is an evolving method for the removal and degradation of many environmental pollutants including the products of petroleum industry. In addition, bioremediation technology is believed to be non-invasive and relatively cost-effective.

The use of microbial oil-degrading agents over the years has also revealed some problems, among which are the lack of equal effectiveness of existing bioremediation agents under different climatic conditions; gradual loss of specific activity of the microbial strains forming the basis of a particular bioremediation agent; and the frequent discrepancy between commercial products and the declared characteristics of bioremediation agents, not only in oil-degrading activity, but also in microbial composition. At the same time, it has been noted that the bioremediation agents based on natural hydrocarbon oxidizing microorganisms isolated in a specific climatic zone are the most effective, because the introduced microflora that is not characteristic of a particular ecosystem can be suppressed by indigenous microbial populations. All the above-mentioned indicates that the search for new strains of oil degrading microorganisms and the development of alternative bioremediation agents based on them remain relevant, because their application in environmental biotechnology is still in demand with environmental organizations.

Enviro care & Technologies

Our Research & Development team has put the whole effort and introduced the combined strains of bacteria for oil-degrading microbial strains isolated from oil-sludge and oil-contaminated rhizosphere soil were studied in this work for use in bio-and phytoremediation technologies.

For the above issues, we are giving **biological process (SuperX and SuperXL bio culture) and removes about 90% of BOD and COD**. Biological process can be aerobic or anaerobic depending on the quality of the effluent. But most of the ETP's use aerated sludge process (aerobic process) for effective treatment of wastewater. It removes dissolved and suspended biological matter.

Specifications

Appearance	: Available in Powder and Liquid Form
Bacterial Count	: Probiotic blend of high potency
pH range	: 5.5 – 9.5
Temperature range	: 5°C - 55°C
Self Life	: Six months from date of manufacturing
Minimum Package	: 30 Kgs(1 Kg per Day)

ENZIMAS
Enviro care & Technologies

Methodology

Initial water level:
50 L / 100 KLD

↓

Add 1 Kg of SuperX®NM Powder

↓

Add small pouch of SuperX®BC

↓ ← 1 Kg of Biological Sludge

Aerate for 24 hr

↓

Load it in aeration tank

Enzimas Enviro Care and Technologies
No.3/64,East Street, Muthiyampalaiyam (Po),
Thuraiyur(Tk),Tiruchirappalli(Dt) – 621004.
Tamil Nadu, India.
Ph.No:+91 9384980172, +91 9384980173, +91 9384980174
MailId:eectenzimas@gmail.com