

FREQUENTLY ASKED QUESTIONS

about

Enzymes and the Bacta-Pur[®] System ©2007

Bacta-Pur[®], BACTIVATOR[®] & ECOPROBIOTICS[™] are trademarks of Aquaresearch Canada Ltd used under license.

ECOPROBIOTICS[™], of the Bacta-Pur[®] System, are beneficial communities of natural bacteria, which have been on earth for millions of years and have been selected for their synergistic ability to biodegrade pollutants and to improve water quality. ECOPROBIOTICS[™] increase biodiversity. Just as people take yogurt for its 'probiotic' ability to assure the presence of the optimal community for digestion and immunity, ECOPROBIOTICS[™] improve ecosystem health. EVERY PRODUCTION of Bacta-Pur[®] products is analyzed and cleared for shipment ONLY after passing all performance tests and being CERTIFIED PATHOGEN FREE using techniques from the food industry. ECOPROBIOTICS[™] are purely natural and beneficial; they NEVER contain added chemicals such as surfactants, emulsifiers or enzymes..., nor do they contain genetically modified (GMO) or deliberately mutated organisms. ECOPROBIOTICS[™] are safe and beneficial; disease causing organisms are never used, as others do or permit

- Q: What is an enzyme?**
A: An enzyme is a protein molecule, which can act as a catalyst of various biochemical reactions. Enzymes are a fundamental part of cellular metabolism; they can also be isolated and used in many industrial and domestic processes. Enzymatic activity is very specific. An enzyme, which solubilizes a specific protein, may not work on another and certainly not on grease.
- Q: Can enzymes be used in wastewater treatment?**
A: Yes, enzymes can be used to solubilize solids such as sludge or grease. There are two major classes of enzymes with respect to wastewater treatment:

 - Extracellular enzymes, which are liberated into the water and are not attached to microbial cells; and
 - Exoenzymes, which are associated with the exterior of the microbial cell wall.

Exoenzymes are often more efficient than those not connected to the microbial cell.
- Q: Do enzymes work for extended periods of time?**
A: No, activity of free enzymes can be quickly depleted. Beneficial microbes, however, in Bacta-Pur[®] cultures have been selected for their ability to both produce and supply essential biochemical requirements of enzymes. Enzymes do not reproduce; microorganisms do.
- Q: What are the byproducts of enzymatic activity in grease traps?**
A: This depends on the types and quantities of enzymes added. Theoretically, enzymes have the ability to convert all of the grease into free fatty acids. This rarely occurs, however, due to depletion of enzymatic activity. If the treatment is not complete, partially digested grease leaves the grease trap.
- Q: Does the addition of enzymes provide any benefit beyond the grease trap in the pipes?**
A: Not likely, huge amounts of enzymes would have to be added, to first solubilize all of the grease in the grease trap and still maintain enzymatic activity. A key to any treatment



Bacta-Pur / IET-Aquaresearch Ltd.
P.O. Box 689, Derby Line, VT 05830 USA
Phone: (877) bactapur [222-8278], Fax: (819) 842-2414

IET-Aquaresearch Ltd.
P.O. Box 2680, North Hatley, QC, J0B 2C0 Canada
Phone: (877) bactapur [222-8278], (819) 842-2494
Fax: (819) 842-2414

Email: bactapur@bactapur.com

website: www.bactapur.com

Bacta-Pur®

is cost-effectiveness. The BACTIVATOR® is designed to provide the most cost-effective treatment not only of grease traps but also of the down stream drain lines.

6. **Q: What is the difference between adding enzymes and Bacta-Pur® technologies?**

A: Enzymes alone can be rapidly inactivated. Bacta-Pur® XLG provides microbes, which are not only enzyme factories, but the exoenzymes produced by the beneficial microbes are reactivated by the living cells. Furthermore, the grease and sludge digesting ability of the Bacta-Pur® microbes continues beyond the grease trap to clean pipes and drains.

7. **Q: Can Bacta-Pur® decrease methane or hydrogen sulfide in drains and sewers?**

A: Yes, absolutely, Bacta-Pur® cultures actually reduce methane and hydrogen sulfide. Methane and sulfides are produced by microbes, which can grow only in the complete absence of oxygen; they can actually be harmed or even killed by oxygen. This occurs in sewers principally in grease and sludge accumulations, rather than in the water (particularly for methane). Regular use of Bacta-Pur® removes the grease and sludge accumulations thus removing the habitat of the trouble causing microorganisms. Furthermore, Bacta-Pur® cultures facilitate oxygenation of water. In addition to this, removal of scum and grease from the surface of the water brings the water into contact with the air and allows greater diffusion of oxygen into the water. This accomplishes two additional tasks:

1. The oxygen accelerates biodegradation of soluble wastes into carbon dioxide & water.
2. The oxygen also raises the redox potential thus inhibiting the production of both methane and hydrogen sulfide.

Regular use of Bacta-Pur®, with a BACTIVATOR®, floods the wastewater with the highest concentration of beneficial microbes, which have no ability to produce methane. Recent studies, in the literature, have shown that bacterial augmentation can reduce undesirable microbes (e.g. odor causing strains and pathogens) in aquatic systems by the combined pressures of predation and addition of high concentrations of beneficial strains. Bacta-Pur® cultures were developed to provide, at least, 10^{11} cells/mL. Regular additions provide the high numbers of beneficial microbes.

8. **Q: What are the byproducts of treatment with Bacta-Pur® XLG, in grease traps?**

A: Bacta-Pur® XLG first converts the grease into free fatty acids with lower melting point so further digestion produces short free fatty acids, which are water soluble. Thus reducing accumulations. Further digestion by the beneficial microbes in Bacta-Pur® XLG converts the fatty acids into carbon dioxide and water. The process continues beyond the grease trap resulting in cleaner drains, sewers, lift stations and waste water plants downstream.

9. **Q: Does use of Bacta-Pur® decrease the fat and grease leaving a grease trap?**

A: Yes, fat, oil and grease (FOGs) content of wastewater is measured by extracting the FOGs from the water using a solvent such as chloroform/methanol. The solvent is mixed with the waste water and then allowed to separate into two phases: the solvent phase containing the FOGs and the water phase. The solvent phase is evaporated leaving the



Bacta-Pur / IET-Aquaresearch Ltd.
P.O. Box 689, Derby Line, VT 05830 USA
Phone: (877) bactapur [222-8278], Fax: (819) 842-2414

IET-Aquaresearch Ltd.
P.O. Box 2680, North Hatley, QC, J0B 2C0 Canada
Phone: (877) bactapur [222-8278], (819) 842-2494
Fax: (819) 842-2414

Email: bactapur@bactapur.com

website: www.bactapur.com

Bacta-Pur®

FOGs, which are then often quantified by weighing. The first step of the treatment with Bacta-Pur® XLG converts the FOGs into smaller molecules called free fatty acids, many of which are water soluble and no longer part of the FOGs. Thus the waste water leaving the grease traps contains reduced fat, oil and grease. Most importantly material fatty acids, produced by biodigestion of fats, do not stick to surfaces of pipes or pumps...

10. **Q:** Can free fatty acids produced by treatment with Bacta-Pur® block pipes down stream?
A: Absolutely not, Bacta-Pur® cultures convert saturated fats into unsaturated ones. This is the first step of biodegradation of fats. The unsaturated fats are of a nature that they can not stick to the walls of a drain or sewer with their turbulent flow. Bacta-Pur® cures arteriosclerosis of drains & sewers.
11. **Q:** I have tried adding bacterial products to my grease trap, even products with timed dosing pumps, but it was a waste of money — nothing consistently worked; how is a Bacta-Pur® System different?
A: There are many products on the market, but they only contain dormant cultures. Many hours are required before the cultures wake up. First of all, the retention time of water, in a grease trap, is very short; additions of dormant cultures result in microbes leaving the trap before they even wake up. Secondly, kitchen operation results in intermittent addition of very hot water and/or multiple disinfectants entering the trap. A BACTIVATOR®D is an on-site growing system, which overcomes both of these problems. A continuous supply of active & famished cultures is added to the grease trap 24 hours per day. The cultures enter the system in an optimal physiological condition to clean the trap and drains, and the continuous additions provide constant reinoculation to overcome loss of colonies due to the disinfectants and hot water.
12. **Q:** I have added various products to my grease trap, which have reduced grease, but my drains still keep backing up and smell of putrefaction, will a BACTIVATOR®D help me with these head aches?
A: Yes, the benefits of using a BACTIVATOR®D are not limited to the grease trap. The beneficial microbes continue to work down stream removing grease, cleaning pipes biologically and improving water flow. Virtually all other products, on the market, contain surfactants, emulsifiers and other products, which simply send the grease down stream.
13. **Q:** Do all bacteria produce enzymes to solubilize sludge? What happens to the solubilized pollutants?
A: Not all bacteria produce exoenzymes nor extracellular enzymes capable of solubilizing grease and sludge. Pollutants, which are solubilized, by the enzyme-producing bacteria, are used not only by these microorganisms but also by ones, which do not produce the enzymes. This is the concept of water purification by a balanced community.
14. **Q:** I've heard that bacterial additives can upset waste water treatment plants; do Bacta-Pur® cultures have this effect?



Bacta-Pur / IET-Aquaresearch Ltd.
P.O. Box 689, Derby Line, VT 05830 USA
Phone: (877) bactapur [222-8278], Fax: (819) 842-2414

IET-Aquaresearch Ltd.
P.O. Box 2680, North Hatley, QC, J0B 2C0 Canada
Phone: (877) bactapur [222-8278], (819) 842-2494
Fax: (819) 842-2414

Email: bactapur@bactapur.com

website: www.bactapur.com

Bacta-Pur®

A: Absolutely not, the opposite is true. Bacta-Pur® cultures improve waste water treatment performance. Most other products only contain spore-forming bacteria (bacilli). An overdose of these microbes can reduce the settling of solids causing them to leave the back end of a plant. Bacta-Pur® cultures are much more complex than simple spore formers. Cells have been selected for their ability to improve settling; this has been reported by many users. The Bacta-Pur® community used to digest grease also contains members with the ability to digest hydrocarbons (street runoff), to digest sludge and to enhance BOD removal.



Bacta-Pur / IET-Aquaresearch Ltd.
P.O. Box 689, Derby Line, VT 05830 USA
Phone: (877) bactapur [222-8278], Fax: (819) 842-2414

IET-Aquaresearch Ltd.
P.O. Box 2680, North Hatley, QC, J0B 2C0 Canada
Phone: (877) bactapur [222-8278], (819) 842-2494
Fax: (819) 842-2414

Email: bactapur@bactapur.com

website: www.bactapur.com