GGT Waste AG Manure Treatment System
Pathogen Facts

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A Green Growth Technology

Natural Biotechnology and GGT Waste, affiliates of Green Growth Technology, Inc. have created a Confined Animal Feeding Operations (CAFO) Manure System that essentially turns organic wastes to water. This is one of several fact sheets that explain that system and its benefits to CAFO operators.

The GGT Waste AG Manure Treatment System uses a proprietary mixture of microorganisms called NBT-100 that:

- **Addresses concerns about lagoon pathogens, disease and their becoming targets for regulatory action.**
- **Produces bacteriocins and enzymes to attack pathogens and accelerate chemical processes.**
- **Generates *nisin,* a bacteriocin and antimicrobial protein containing three disease-inhibiting amino acids.**
- **Also produces other substances with antibiotic effects such as hydrogen peroxide and Diacetyl.**
- **Creates a combined pathogen-fighting action that is the most effective of its kind available today.**
- **Is transferable across variable environments and lagoon conditions.**

Addresses Pathogen Concerns
The proprietary NBT-100 formulation of microorganisms is especially selected to address concerns arising from the growth of numerous pathogens in CAFO lagoons. Many bacteria and protozoa common to livestock waste are known to be human pathogens. These include bacteria such as certain strains of *E. coli* such as 0157:H7, *Streptococcus, Clostridium, Campylobacte* and *Salmonella,* and protozoa such as *Giardia* and *Cryptosporidium*.

Experience has shown that CAFO runoff and seepage can cause human illness and death if some *E. coli* strains find their way into municipal wells or other drinking water sources. A 1996 EPA study of rural wells found forty percent were contaminated with *E. coli* – an indicator of fecal contamination. Pathogens are also becoming targets for regulatory action which could increase costs and add to the burden of CAFO operations. Application of NBT-100 removes concern about such runoff, seepage and their health effects.

Produces Numerous Pathogen-fighters
The proprietary NBT-100 strain of microbes produces a combination of pathogen-fighting bacteriocins and digestive enzymes. Bacteriocins kill or inhibit the growth of pathogenic bacteria and are similar to antibiotics, while enzymes act as catalysts to accelerate chemical processes. The bacteriocin and antimicrobial protein *nisin* releases three different disease-inhibiting amino acids that attack pathogens. Other substances with antibiotic effects produced by NBT-100 include hydrogen peroxide and Diacetyl. The combination of these various pathogen-killers is more effective than any single agent.

NBT-100 Effectiveness
Testing of bacteria from New Orleans flood waters treated with NBT-100 showed Total Coliform bacteria reduction of up to 99.9%. Other bacteria in New Orleans flood waters that have been eliminated during testing with NBT-100 include: *Aspergillus niger ATCC 16404, Bacillus cereus, Bacillus megaterium, Acinetobacter iwoffi, Stenotrophomonas maltophilia, Escherichia coli, and Pseudomonas stutzeri.* These test results demonstrate the effectiveness of NBT-100's combined bacteriocin/enzyme action in destroying pathogens.

Transferable Results
NBT-100 microbes have been specifically selected and developed to function in the variable conditions that CAFO lagoons represent. They are effective over a broader range of pH levels than others currently available and have been proven in northern climates with lagoon temperatures in the 35-39 °F range. NBT-100 can effectively fight pathogens in virtually any lagoon environment.

NBT-100, developed to address multiple issues associated with animal waste disposal, has been shown to be especially effective in eliminating the pathogen problem in CAFO operations over a wide range of conditions, removing concerns about runoff, groundwater contamination and resulting health problems.