Tersus Environmental, LLC
Products and Technical Support
for Soil and Groundwater Remediation
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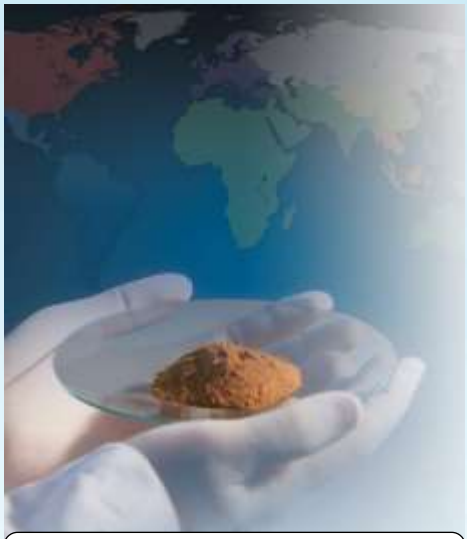
Nutrimens®



- All-natural fermentation product
- Cost-effective effective solution
- Increases efficiency of electron donor utilization
- Can aid in maintenance of circumneutral pH

Principle

Nutrimens® is an all-natural fermentation product produced during the anaerobic fermentation of an unmodified strain of botanical classification *Saccharomyces cerevisiae*. It includes fermentation agents, residual yeast cells and yeast fragments, and the media necessary for fermentation.

Nutrimens® provides reduced carbon and an array of beneficial vitamins, minerals, and metabolites to microbes for the enhanced bioremediation of contaminated sites. It can be utilized in groundwater remediation efforts using a liquid or granular formulation or in bioreactors and constructed wetland treatment systems to improve the remediation of effluents and surface waters for various metals. *Nutrimens*® increases removal rates of many priority pollutants and aids in maintaining circumneutral pH.

Advantages

- Increases bioremediation and reduces remediation time
- Reduces amount of substrate required
- Food-grade product
- Multiple application methods (e.g. direct-push, wells, excavations, drip feed, etc.)

Field Application Design

Some practitioners add yeast extract to promote the activity of contaminant degrading bacteria in the bioremediation of halogenated hydrocarbon-impacted groundwater. Yeast extract, however, may support fermentative heterotrophs while limiting the abundance of methanogens and sulfate reducers that catabolically use acetate from slow release donors such as *EDS-ER*™, thus limiting the potential for a fast, complete dehalogenation.

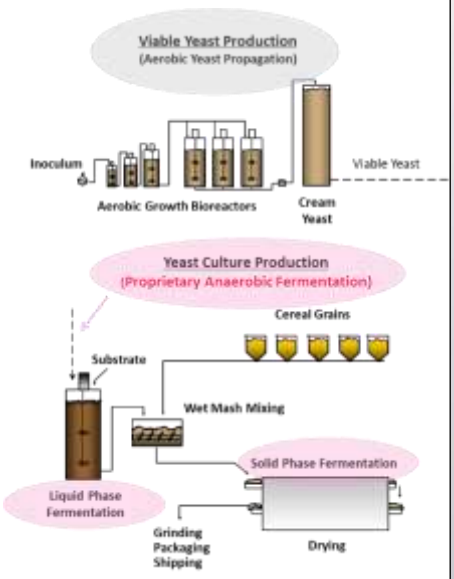
Nutrimens® is a better choice than yeast extract. In addition to increasing the rates of bioremediation, it boosts the efficiency of electron donor utilization. *Nutrimens*® provides a source of sugars, proteins, vitamins, and amino acids contained in yeast cells and extracellular metabolites, which will decrease the remediation time. At adequate doses, bench scale tests have shown that *Nutrimens*® aids in the maintenance of circumneutral pH.

Many practitioners simply add *Nutrimens*® to contaminated environments to improve the microbial treatment of the contaminated material. *Nutrimens*® works with microbes and electron donors to improve the rate of degradation of the contaminant, making the remedy faster, better, and cheaper.

Not a single compound

Composed of numerous beneficial metabolites (amino acids, peptides, antioxidants, polyphenols, organic acids, vitamins, minerals and nucleotides), beta-glucans and mannans.

Production Process



70 years manufacturing experience

Rev: 1/17/2019

Product Content

Parameter	Liquid	Granular
Moisture, not more than	80%	10%
Ash, not more than	NA	10%
Total Carbon*	12.71%	40.38%
Total Nitrogen (N)*	0.96%	2.52%
Carbon/Nitrogen ratio (C/N)*	13.1	16:1
Total Kjeldahl Nitrogen (TKN)*	7,172 mg/L	22,585 mg/kg
Chemical Oxygen Demand (COD)*	325,000 mg/L	732,000 mg/kg
Total Phosphorus*	2,397 ppm	4,405 ppm
Other Constituents		
Modified Culture Media	Oiligosaccharides; Peptides	
Yeast Cells	Proteins; Amino Acids; Peptides; Vitamins; Minerals; Proteinates; Nucleic Acids; Beta-Glucans; Lysine; Leucine	
Extracellular Metabolites	Peptides; Organic Acids; Oligosaccharides; Nucleotides; Amino Acids; Esters; Alcohols	

*Approximate Value

Product Characteristics

Parameter	Specification Liquid	Specification Granular
Specific Gravity	1.08-1.14	552-601 kg/m^3
Solubility in water	Miscible	Not Soluble
Flash Point	Will not burn, unknown	Slightly Flammable NFPA rating=1
Appearance	Tan to brown liquid	Tan to Brown granular product
Odor	Fermented, yeast aroma	Fermented, yeast aroma

Packaging Options

Liquid
- 5-gallon pails
- 55-gallon poly drums
- 275-gallon IBC containers
- 3,000 - 5,000-gallon tankers

Granular
- 50-lb bag
- 2,000-lb super sac

Safety

No protective equipment is necessary under normal use conditions. All ingredients consist of food or food grade additives.

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