

About Powerzyme™

Confidential, 2016-09-09

1 Introduction

Powerzyme is Power Knot's proprietary mixture used in its LFC (Liquid Food Composter) to rapidly digest waste food, resulting in an output that is largely CO₂ and water.

All bacteria in Powerzyme are naturally occurring, non-pathogenic, and harmless to the environment and animal life. Power Knot uses a novel proprietary combination of newly improved high strength viable mixed bacterial cultures, white rot fungi enzymes, micro- and macro-nutrients, surface tension suppressors, and bio-surfactants formulated to liquefy and breakdown a variety of compounds such as fat, protein, starch, cellulose, carbohydrate, detergents, odor sources, ammonia, oil, grease, and many other compounds that are highly persistent to natural biodegradation.

Powerzyme:

- rapidly digests grease and fat to decrease the amount of accumulated grease and fat in plumbing and traps
- reduces key waste water parameters monitored by regulatory agencies such as BOD, COD, FOG and TSS
- degrades a wide range of complex chemicals
- eliminates unpleasant odors
- reduces hydrogen sulfide (H₂S)
- is safe to handle and easy to use



2 Preparation

The Power Knot Powerzyme is prepared under specific manufacturing guidelines subject to batch and lot control. Each product lot must pass stringent quality control tests, including tests for the presence of Salmonella, Shigella, and Coliform bacteria.

The composition is given below:

	Approximate Composition	
	Range (low)	Range (high)
Non-Active		
Water	15.8627125%	25.6549444%
Polyactic acid	17.8359397%	28.0611666%
Hydrogel polymers including gelatin & agarose	5.5150508%	9.4812288%
Polysaccharides	2.8912758%	4.6187992%
Bacteria		
Rhodopseudomonas rhodospirillum	5.5331526%	9.6712364%
Thiobacillus novellus	1.1686405%	1.8367080%
Alcaligenes denitrificans	3.7535575%	5.8384827%
Flavobacterium oceanosedimentum		
Micrococcus luteus	0.5168813%	0.9283299%
Micrococcus roseus	1.0385815%	1.7183880%
Nitrobacter winogradskyi	1.0901423%	1.8330381%
Nitrosomonas Europaea	4.5561005%	8.3553498%
Fungi		
Phanerochaete chrysosporium	7.0164872%	13.6348532%
Phanerochaete sordida	4.4778166%	7.3522842%
Rhodococcus chlorophenolicus	3.7346607%	6.3662470%
Enzymes and Proteins		
Beta amylase	0.0252968%	0.0471161%
Diacylglycerol lipase-beta (DAGL-β)	0.0194020%	0.0333062%
Cellulase	0.0133536%	0.0205260%
Lysozyme chloride	0.0106356%	0.0187618%
Other		
Neutroleum Gamma	0.0195163%	0.0341130%
Saccharomyces cerevisiae	0.0078304%	0.0131558%
Other natural proteins and free amino nitrogen	0.0130851%	0.0215857%

3 Safety

The bacteria in Powerzyme are completely safe. None of the organisms used in the Powerzyme is genetically engineered or pathogenic for animals, plants, or humans. No incidence of adverse health effects relating to the use of Powerzyme, or by-products, has ever been reported. The micro-organisms pose no danger to skin, clothing, or equipment.

If spilled, the micro-organisms are easily wiped up. If the products come in contact with skin, they can simply be washed off with soap and water.

The Powerzyme is cultured using standard microbiological nutrients and minerals for growth. No secret catalysts or other mysterious ingredients are ever used in the product or its production.



According to the June 26, 1986 statement of EPA biotechnology policy (PDF obtained [here](#)):

It is not necessary to report the environmental release of microorganisms which are naturally occurring, non-engineered, and non-pathogenic.

The Powerzyme poses no danger to piping, tanks, or other equipment employed in wastewater treatment plants. Powerzyme has been used for many years in many cities with no detrimental effects observed.

Since the micro-organisms in Powerzyme do not emulsify or promote the passage of fats and oils through traps and holding tanks, they do not contribute to grease deposition down stream, as experienced in using some other types of surfactant cleaners.

4 Conclusion

Powerzyme has proven effective in the digestion of waste food quickly, efficiently, and safely. In addition, entities that produce waste food, such as food service facilities and food processing operations can assist municipal wastewater treatment plants by using biotechnology in Powerzyme that augments and accelerates the natural recycling process.

Power Knot provides the food industry with Powerzyme for use in the LFC – a 100% natural biological product that reduces contaminant levels in wastewater, degrading wastes at the source.



Power Knot provides safe and economically sound solutions for commercial, industrial, and military customers globally seeking to reduce their carbon footprint. The LFC (Liquid Food Composter) allows customers to reduce the expense, inconvenience, and mess of disposing of waste food that would otherwise be hauled to a landfill. Models are available that process from 20 kg (40 lb) per day to 1800 kg (4000 lb) per day of waste food. Our technologies are proven, available today, have been in reliable use for many years, and offer a payback period typically of less than three years. Power Knot is a profitable company and we design, develop, and assemble the LFCs at our headquarters in Silicon Valley, California. For more information, access www.powerknot.com. Copyright © 2011 ~ 2016, Power Knot LLC. All rights reserved. 2016-09-09.



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Material Safety Data Sheet (MSDS)

Powerzyme™ – Microorganisms and Enzymes

Section 1. Product and Company Information

Product Name: Powerzyme
Product Number: 90-10201, 90-10203, 90-10204
Company: Power Knot LLC, 2290 Ringwood Ave San Jose CA USA
Information Telephone: +1-408-889-8433

Section 2. Product Composition Information

Trade Secret; proprietary formula: A blend of naturally occurring mesophilic and thermophilic microorganisms, enzymes, nutrients, and stabilizers. Specific bio-chemical identities are withheld as a trade secret under the provisions of OSHA hazard communication standard 29 CFR 1910.1200.

Section 3. Hazards Identification

Exposure Limits: None listed.
Potential Health Effects: Excessive ingestion may cause nausea or diarrhoea. May cause eye or skin irritation.
Cancer Information (IARC, NTP, ACGIH): Not listed as a carcinogen.
Primary Route(s) of Entry: Digestion
Toxicity Data: None
California Prop 65: This product does not contain an ingredient(s), above the safe harbor limits, which are known to the state of California to cause cancer, birth defects, or other reproductive harm.
List of Lists: Does not contain substances on the US EPA Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(r) of the Clean Air Act.

Section 4. Effects of Overexposure

No known long term effects. This product are practically non-toxic.

Section 5. Emergency and First Aid Procedures

Skin: Wash exposed area with water. Launder clothing before reuse.
Eyes: Immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart.
Ingestion: Do not induce vomiting; drink plenty of water. Wash out mouth and throat with water provided person is conscious. Seek medical attention.
Inhalation: No hazard. Prolonged inhalation may cause irritation. Move person to fresh air.

Section 6. Fire and Explosion Information

NFPA, HMIS rating: Health =1 (minor); Fire = 0 (will not burn); Reactivity = 0 (none)
Flash Point: N/A
Auto-ignition Temperature: N/A
Extinguishing Media: Any
Unsuitable Media: None
Hazardous Decomposition Products: Will not occur.
Special Fire-Fighting Procedures: As in any fire, wear human protecting clothing and self-contained breathing apparatus in positive pressure mode with confined face piece
Unusual Fire and Explosion Hazards: This product is not defined as flammable or combustible

Section 7. Physical and Chemical Data

Boiling Point (760 mm Hg): 220°C (248°F)
Vapor Pressure: equivalent to water
Specific Gravity (Water = 1): 1.07
pH (water = 7.0): 6.5 to 8.0
Appearance: Milky liquid, off white to pale cream color
Odor: odorless with slight perfume odor

Section 8. Reactivity Data

Solubility in Water: 99.5%
Stability: Stable
Hazardous Polymerization: Has not been reported and is not expected to occur
Incompatibility: Avoid contact with strong acids, oxidizing agents, open flame, pure oxygen.
Shelf life: 18 months. Discard if older.

Section 9. Environmental Information

Toxicity: The product contains natural bacterial strains to break down cellulose, fats, oils and greases, proteins and starch through enzymatic metabolism. Small releases will not pose any hazard to the local environment.
Mobility, Persistence, and Degradability: The product is highly dispersible in water, not harmful to the environment, and does not present any dangers regarding persistency and degradability..

Section 10. Handling, Storage, and Disposal

Handling: Avoid prolonged or repeated skin contact. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Avoid ingestion. If handling large volumes, gloves and eyeglasses are recommended. If mist is formed or exposure limit of product is exceeded, it is recommended to use a respirator approved by NIOSH or MSHA.
Storage: Containers should be stored in a dark and dry location under 30°C (86°F), away from foodstuffs to avoid accidental ingestion. Do not store near heat, flame, or strong oxidants.
Spill and Leak Procedures: Wash spillage site with water.
Disposal: Dispose of in accordance with all local, state, and federal regulations. This product according to the EPA's criteria, is not listed as hazardous waste (RCRA) CFR 261. Empty package can be recycled

Section 11. Additional Information

U.S. DOT Shipping Name: Product is not regulated during transportation for under 120 gallons.
EU Regulations: This preparation does not meet the criteria for classification as dangerous in accordance with Directive 1999/45/EC. There are no special labelling requirements. No hazard symbol, R or S phrases are required for labelling, in accordance with CHIP 3 regulations.
Air Transportation (ICAO/IATA): Product is not regulated during transportation
Marine Transportation (IMDG/IMO): Product is not regulated during transportation
EPA TSCA: All ingredients listed or exempted from on the TSCA 8(b) Inventory (40CFR 710).
Not Hazardous Waste: as defined by RCRA 40 CFR 261 since it does not have the characteristics of subpart C; not listed in subpart D. Not subject to Federal regulation

To the best of our knowledge, the information contained herein is accurate. However, we do not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. To determine applicability of any law or regulation with respect to the product, users should consult a legal advisor or governmental agency.