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What Nature Wants Makes Possible…..

Eco Friendly Solutions for Waste Degradation

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Where it Can be Utilized

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Residential - Commercial - Industrial - Agricultural - Municipal - Portable Toilets - RV / Marine - Aquatic – Petrochemicals - Pipelines roots

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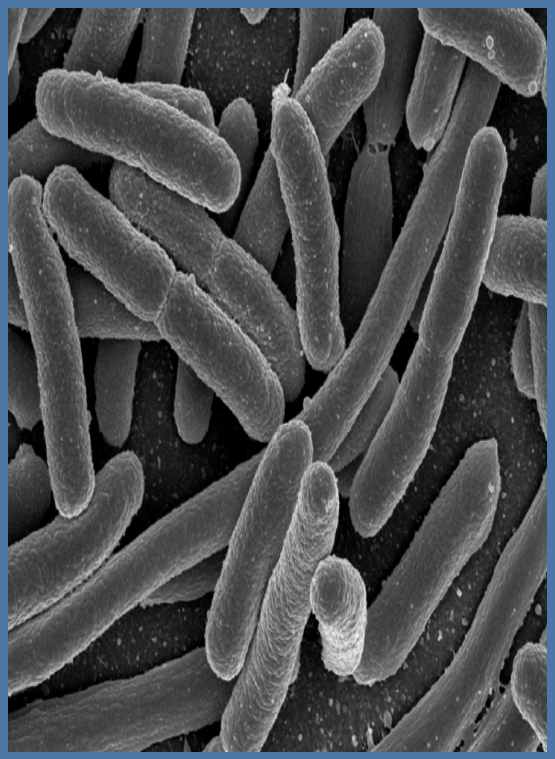
EXCELAGENT PRODUCTION LINE

- LIQUID SERIES
  - Concentrates
  - Surfactant
  - Bacterial/Enzyme
- POWDERED SERIES
  - l Multi-Strain Powders
  - l Water-Soluble Packaging
- SOLIDS



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EXCELAGEST TECHNOLOGIES

- Purpose of presentation is to provide introduction to Bacterial Digestants and their use in Grease Traps and other Grease Interceptor Devices in commercial applications.
- Waste water from Commercial Food Services have high loading of oil grease coupled with high surge volumes and high temperatures resulting in high FOG, BOD, COD, and TSS.

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COMMON QUESTIONS

- We will answer these common questions
  1. What is a Grease Trap or Interceptor?
  2. What are the Regulations and Who and How are they established?
  3. How is the device sized?
  4. What does a Grease Trap look like?
  5. How does it work?
  6. What is the responsibility of the Establishment to comply with the Regulations?

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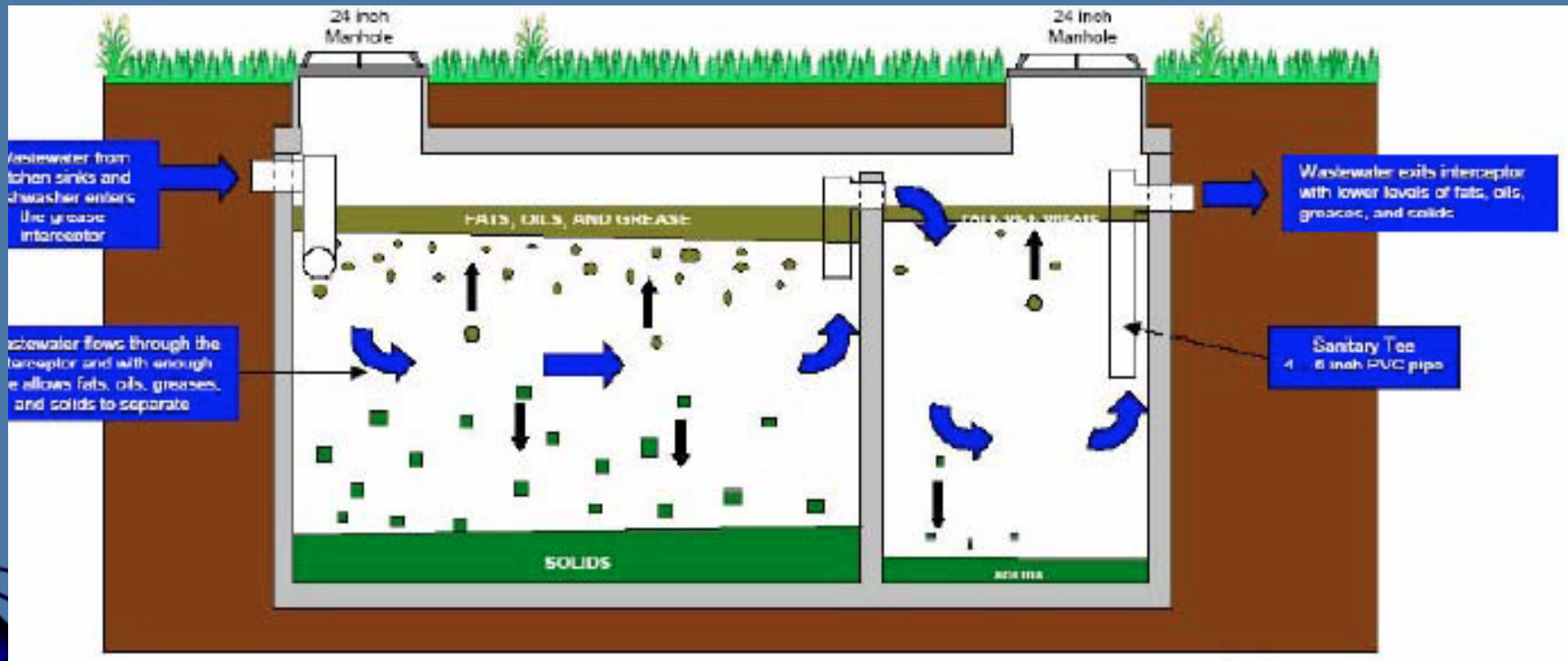
Answers

- Grease traps or Interceptors are Passive Mechanical Devices required by Municipalities to stop grease, animal fats, vegetable oil (FOG's), or grit/sand from entering the city's Sanitary Sewer System. Pre-treatment for Septic Systems are a requirement to prevent overloading the Septic System.

1. The local Dept. of Public Works and/or Health? Federal Guidelines are outlined in CFR-40 part 403
2. The Uniform Plumbing Code along with the Local Ordinances provide the criteria for sizing new and existing establishments? Factors include seating, fixtures, type of cooking, retention time, water usage, etc..
3. Figure 1. shows a typical device?

Figure 1



- Grease interceptors allow wastewater flows to slow down
- With sufficient time fats, oils, greases, and solids separate from wastewater
- Fats, oils, and greases are less dense than water and float
- Solids are denser than water and sink
- Grease interceptors are designed in a variety of sizes, shapes, and constructed of various materials

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Answers

4. Liquid containing FOG's from the sinks, drains and washing devices enter the trap through the inlet drain line. The principle of operation is mechanical/hydraulic separation by the difference in specific gravity of the water, oils and grit. The grit and sand settles to the bottom and the oils and grease rise to the top. The water flows through the first compartment into the second compartment where the same process occurs. Some of the liquor contains emulsified and dissolved oils. The separation time depends on time, temperature, and turbulence the mixture. Also, high pH liquids, and emulsifiers like soap and pumps can affect the sizing and performance of the trap requiring a longer retention time.

5. Each Commercial Establishment is required permit, maintain, and prevent overflows from the Grease Trap into the Sewer or on the surface of roads and parking lots. Local Municipal Ordinances may require pumping the traps at specified schedules.

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More Provoking Questions

- We will answer these questions:
  - What is a Bacterium?
  - What is an Enzyme?
  - Why use Bacterial Digestants in Grease Traps? Does it make a difference what bacteria is utilized?
  - How does all this work to benefit the Establishment and the Local Municipality?

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Bacterial Digestants

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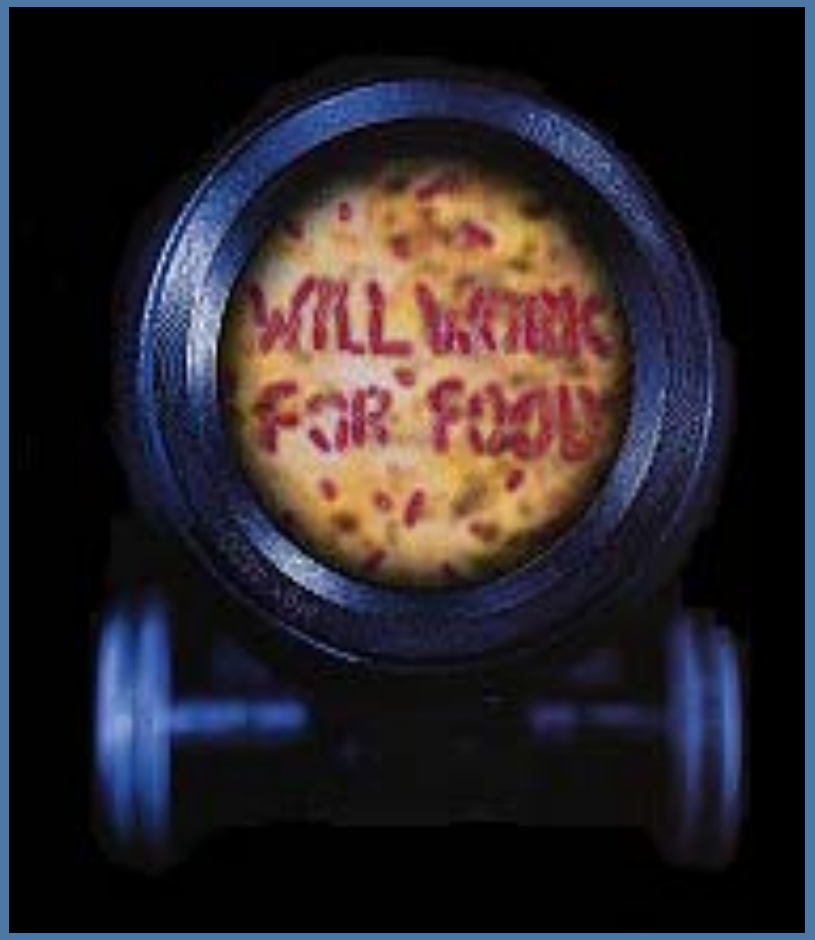

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Bacteria Definition

A bacteria is a single cell life form - each individual cell is a separate, unique organism. Bacteria often grows into colonies that appear as jelly - like masses, but each cell remains an independent, individual life. Bacteria reproduce by a process called cell division. A mature bacteria reproduces by dividing into two "daughter" cells, each identical to each other and the parent bacteria. Under ideal conditions, bacteria can reproduce very rapidly, producing a new generation every 20 - 30 minutes.

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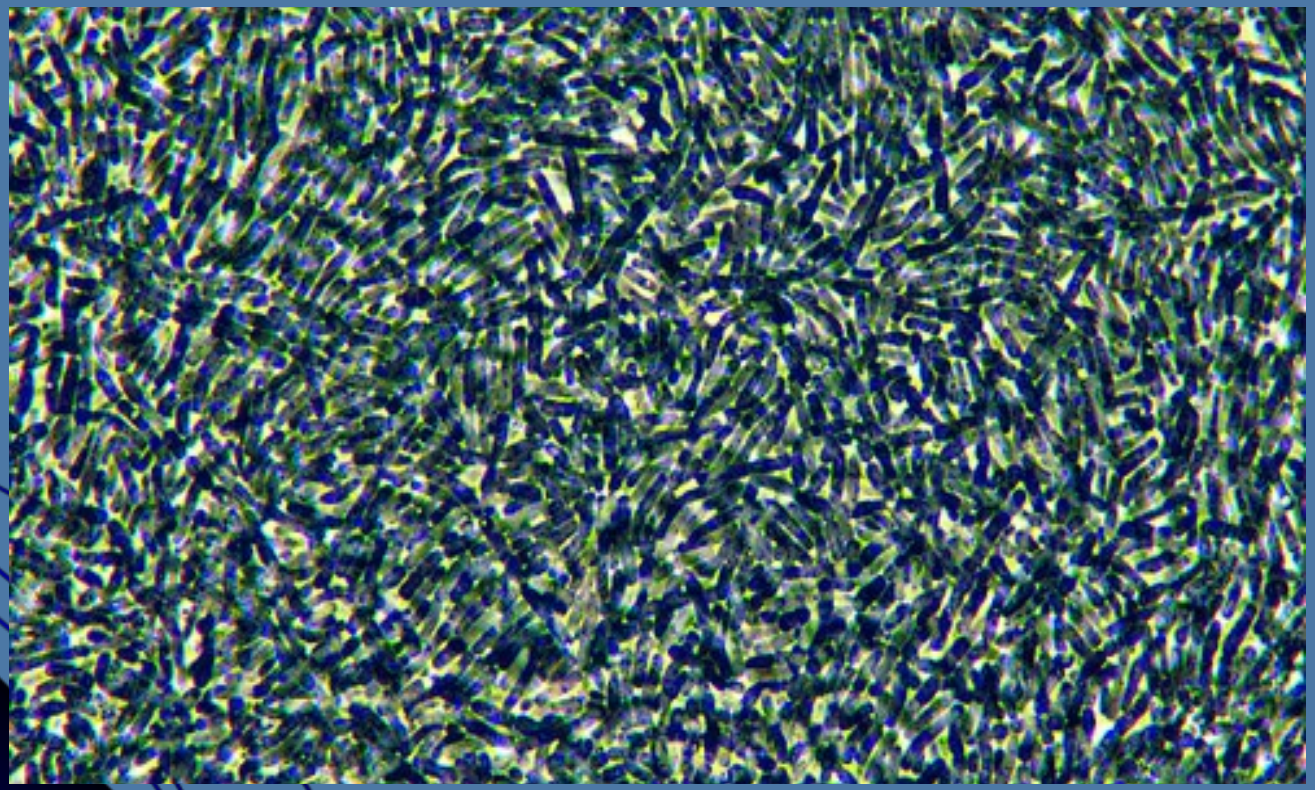
Bacillus Megaterium



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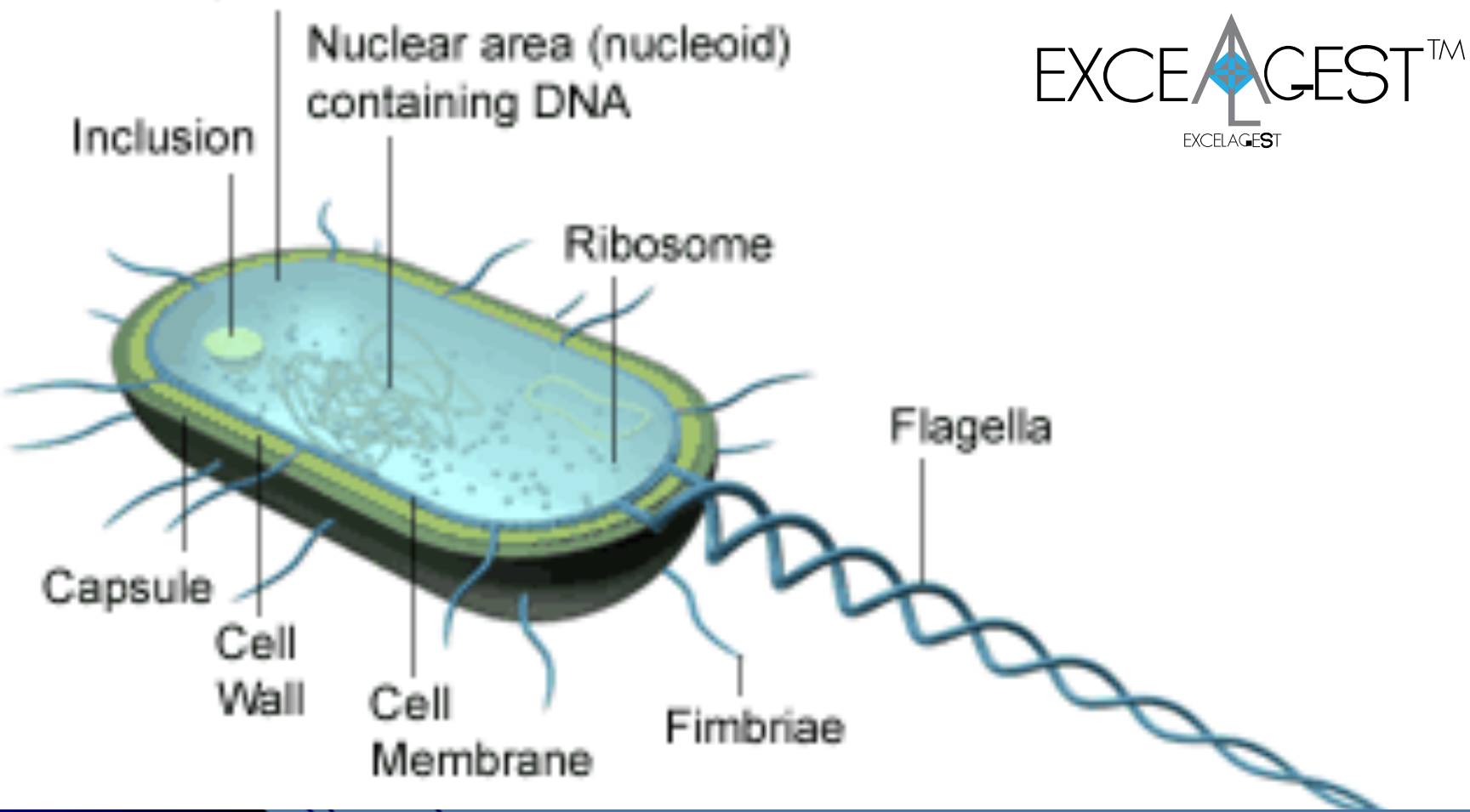
Bacterial Cell



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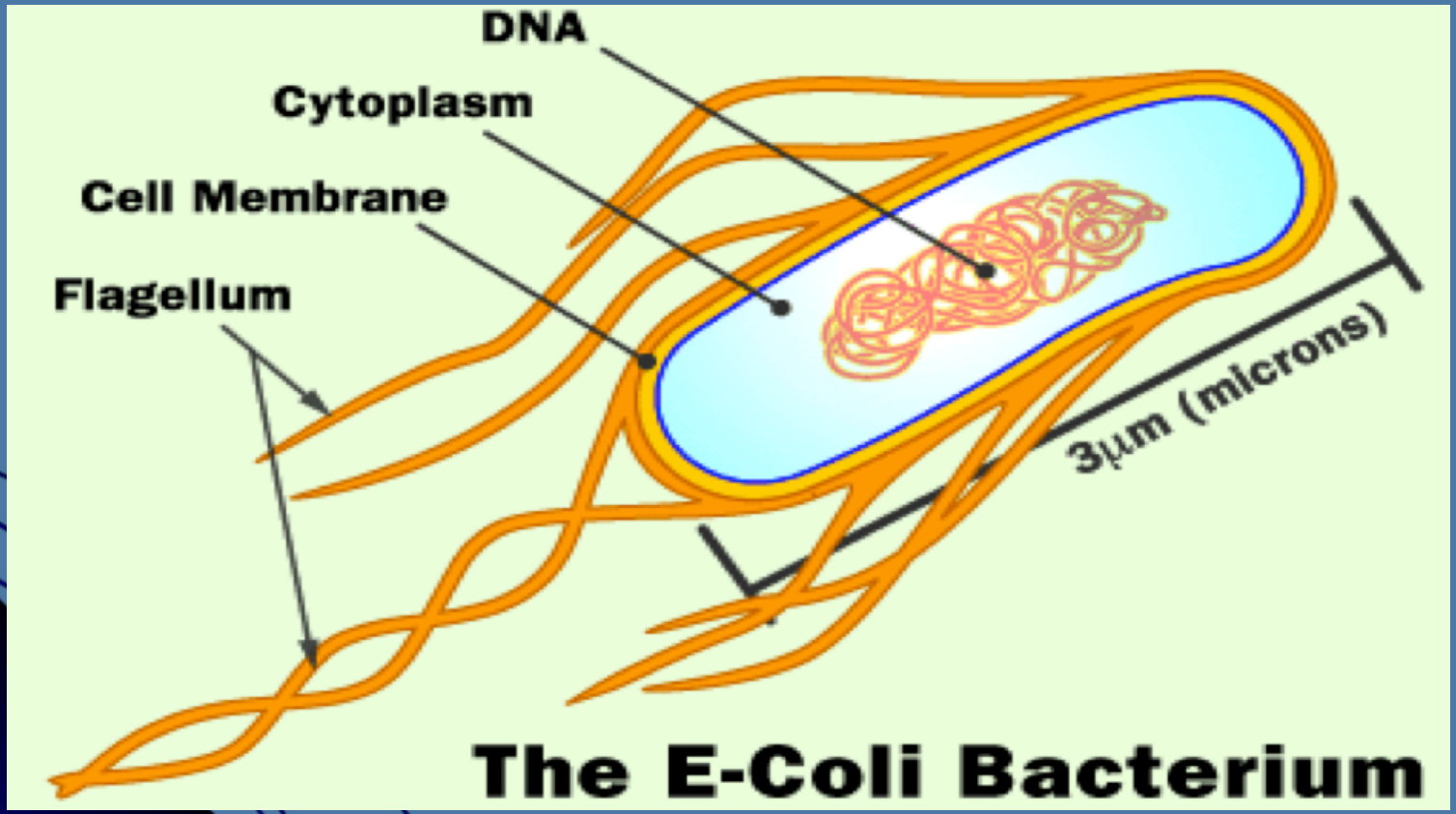
E-Coli Bacterium



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Bacteria Characteristics

- Bacteria can be classified into different types: aerobic types, (which require oxygen to live) and anaerobic (which can live without oxygen). Facultative types can thrive under both aerobic and anaerobic condition.

- For waste digestion, we can identify several beneficial characteristics that we want our chosen bacteria to have. The "good" bacteria that we will choose must:
  1. Digest waste quickly and completely, without producing significant odors or noxious gas.
  2. Consume (digest) a wide variety of organic material that are present in wastes.
  3. Grow and reproduce quickly and readily in the environmental conditions found in waste disposal systems.
  4. Not cause any disease in man or animals - they must be “nonpathogenic“ and do not produce foul odors or gas as they digest waste.

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Bacillus Bacteria

- Certain bacteria belonging to the Bacillus family (and others) have these desirable characteristics. They consume organic waste thousands of times faster than the bacteria that are naturally present in the waste. They grow and reproduce easily, are nonpathogenic, and do not produce foul odors or gas as they digest waste.

- These "good" bacteria are grown by artificial means on a liquid or dry nutrient medium. These cultured bacteria are then freeze dried to put them in a state of suspension. They remain alive, ready to swim, eat and reproduce as soon as they are activated and put into the proper environment.

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Healthy Environment

The proper environment needed for a speedy growth and reproduction of these good bacteria must have the following characteristics:

1. Dissolved oxygen (for the aerobic types that require it) in sufficient quantities.
2. A water medium containing food (organic waste) for them to eat.
3. Moderate temperatures, between 10 deg.C and 40 deg.C.
4. Proper pH - not too acid nor too alkaline - between 6 & 9 on the pH scale is ideal.

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Minimize Disinfectant Use

- All disinfectants are toxic to Bacteria and humans.
- Disinfect only where needed.
- Chlorine (Bleach) use should be used sparingly. One (1) gallon in a 2,000 gallon grease trap can kill the live bacteria.
- Quaternary Ammonium Compounds are even more potent than bleach on live bacteria.

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Bacteria at Work

- Organic waste + Oxygen --bacteria---> Water + Carbon Dioxide
- Organic waste is consumed by the bacteria, used as nutrients by the bacteria and is no longer present to produce blocks, odors, slurry, pollution or unsightly mess.

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Enzyme is a Key

- A protein that acts as a catalyst, speeding the rate at which a biochemical reaction proceeds but not altering the direction or nature of the reaction.
- Enzymes are a by- product by the biological reduction of organic matter.

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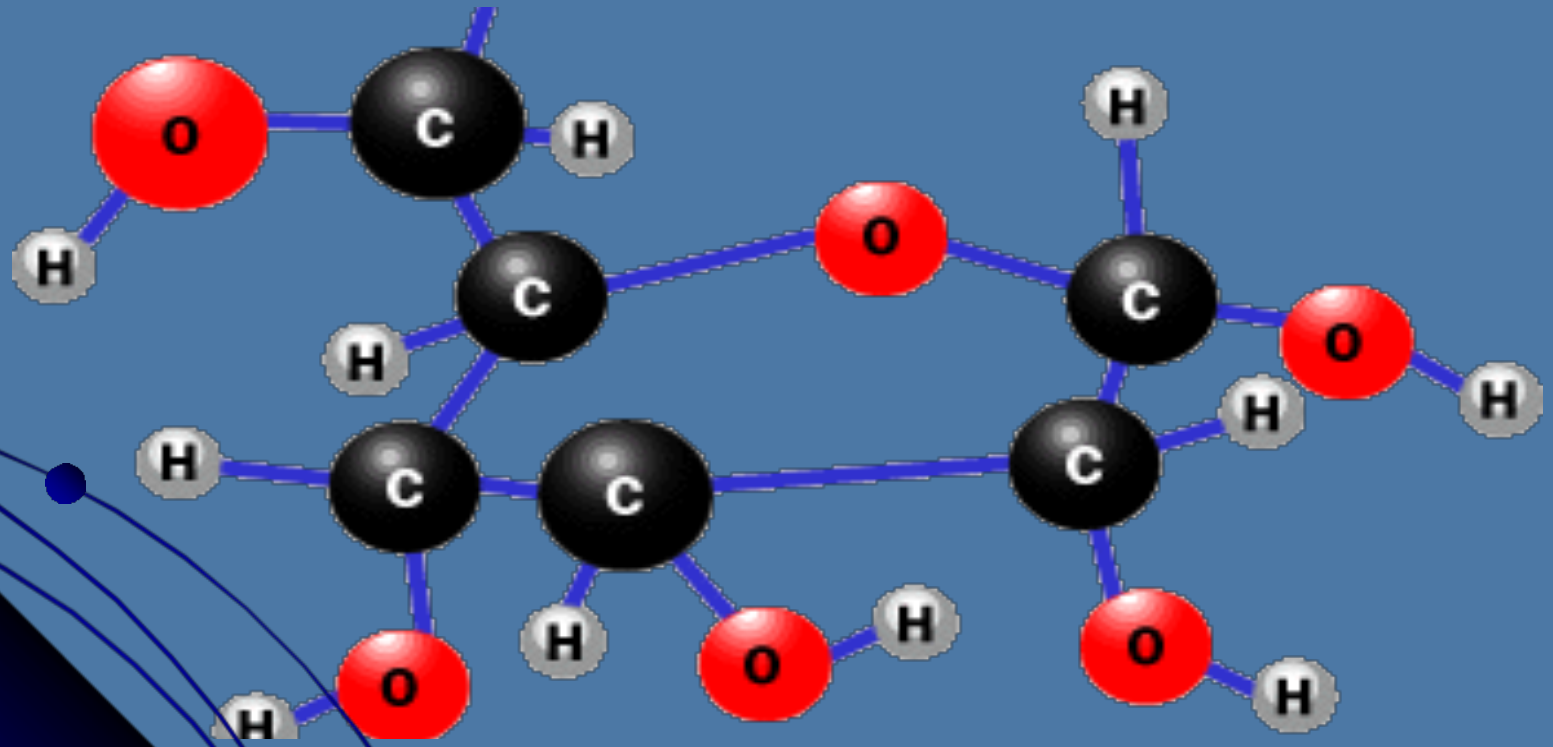
Food-Gucose Molecule



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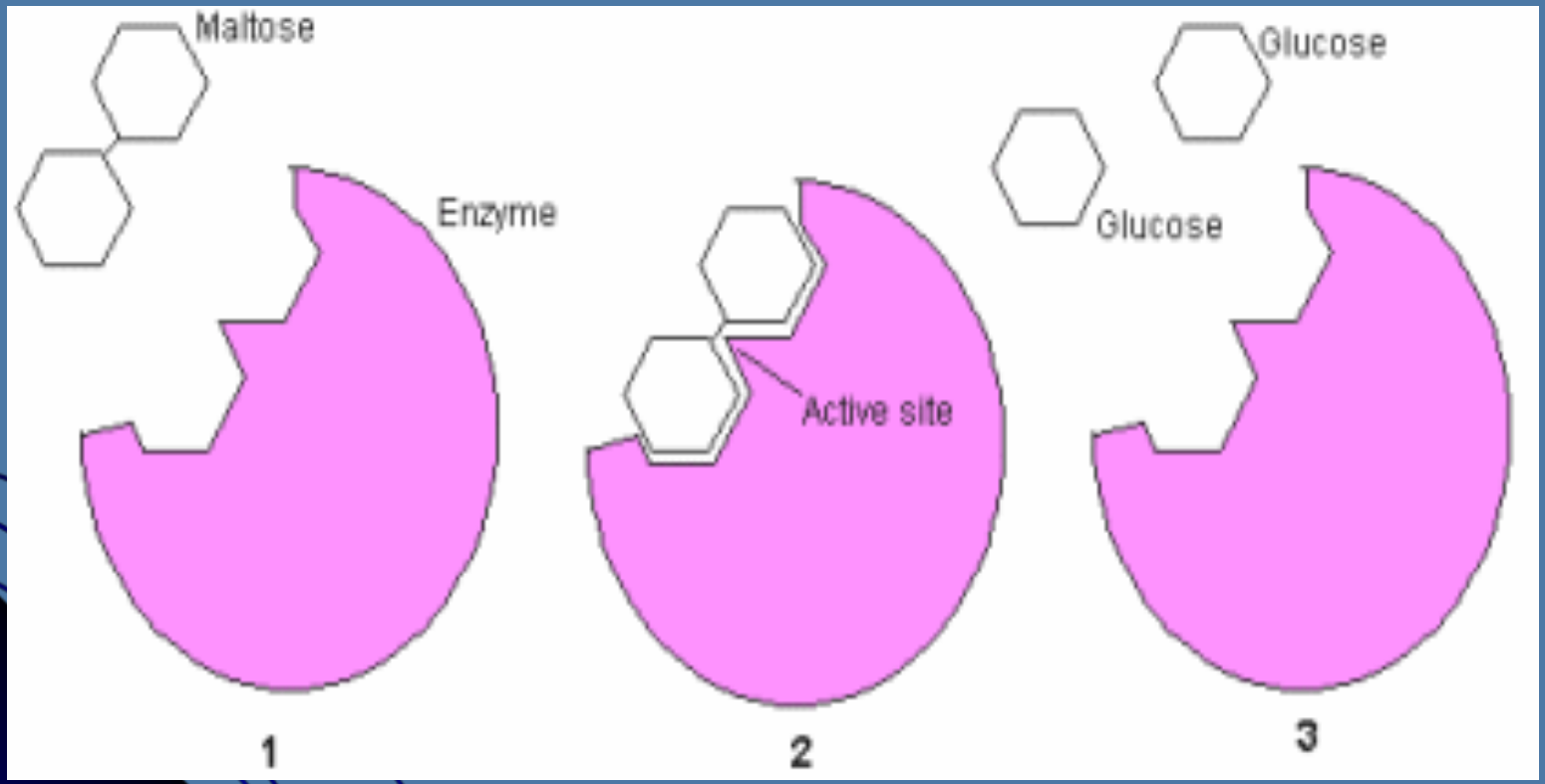
Enzyme at Work



Enzymes, The Catalyst

- Enzymes are chemicals
- An enzyme is a chemical catalyst that breaks up complex waste molecules into smaller pieces.

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Bacteria Products Use Three Main Ingredients

NUTRIENTS

ENZYME PRODUCTION

BACTERIA

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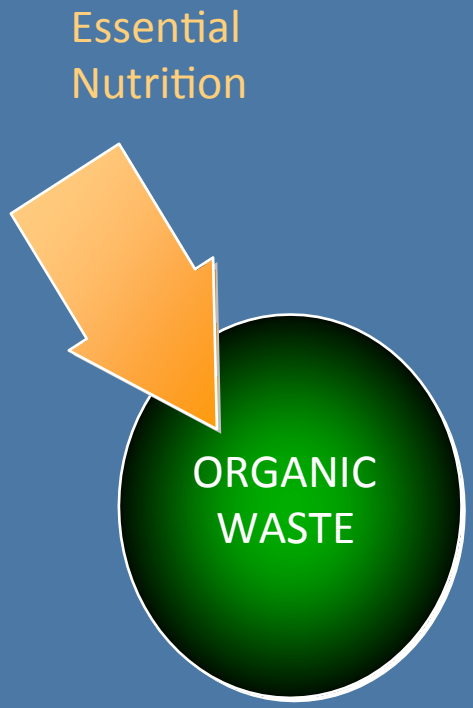
Essential Nutrients

Vitamins & Minerals

1. Encourage fast growth and greatest activity of the bacteria.
2. Keep Bacteria Strong
3. These vitamins and

ESSENTIAL NUTRIENTS

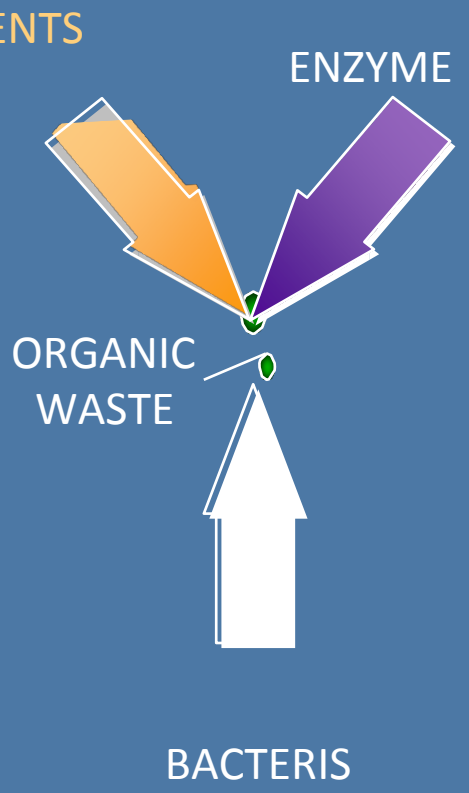
Minerals may not be present in the organic waste, which may inhibit bacterial growth, reproduction and waste digesting performance.



EXCELAGEST's Superior Microbe Species

- Replicate faster and more often

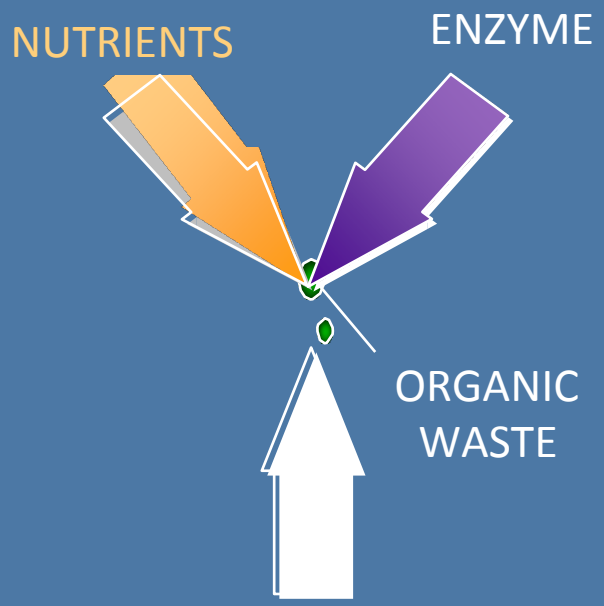
- **EXCELAGEST's** bacteria replicate every 20-30 minutes and consume organic waste thousands of times faster than naturally occurring bacteria.



EXCELAGEST's Superior Microbe Species

- Spore form

Many of our digestants are packaged in a freeze- dried, spore form (not a vegetative adult form) which are not active in the bottle. This results in greater stability and longer shelf life.



- Vegetative form

We also offer specific selective strains in vegetative state.

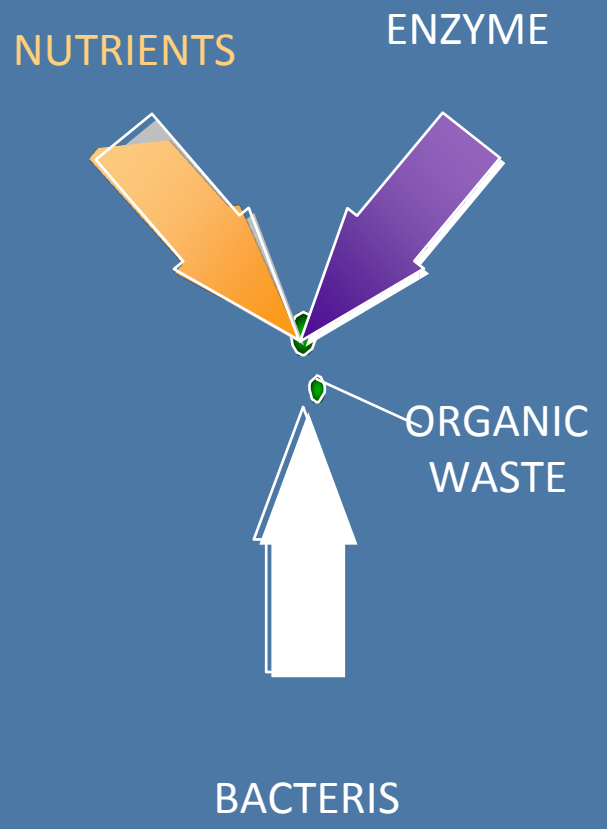
EXCELAGEST's Superior Microbe Species

- Non-pathogenic

This simply means Excelagist's bacteria will not cause disease in man or animals.

- Facultative

Excelagest's bacteria can exist and be effective under both aerobic and anaerobic conditions 9reuiring and not requiring oxygen, respectively).



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Some Bacteria Strain

	Bacillus amyloliquefaciens	Bacillus licheniformis	Bacillus subtilis	Bacillus megaterium	Bacillus pumilus
Growth	Facultative	Facultative	Aerobic	Aerobic	Aerobic
pH range	6-10	5-10	4-10	5-10	6-10
Temperature (°F)	10-50	10-55	10-50	4-45	10-50
Protease	**	**	****	***	***
Amylase	**	**	****	*	*
Lipase	**	**	****	***	***
Esterase	**	**	****	***	***
Cellulase	**	*	****	***	****
Xylanase	**	*	****	***	****
Urease	***	**	**	***	**

**** = Excellent *** = Very Good ** = Good * = Moderate

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Some Bacterial Applications

- Odor Control
- Drain Maintenance
- Grease Trap Maintenance
- Septic Systems
- Waste Water Treatment
- Farm Lagoons
- Portable Toilets

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Excel Water Technology, Inc.

Excel Water Systems, Inc.

Excel Renewable Energy, LLC

EXCEL AID GUIDING SYSTEMS, LLC™

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Thank you for giving us the opportunity to explore our methods in cleaning the waste systems in the KSA

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AQUASPHERE®

EXCELAGS™

WaterFinder THE WATER GENERATOR™