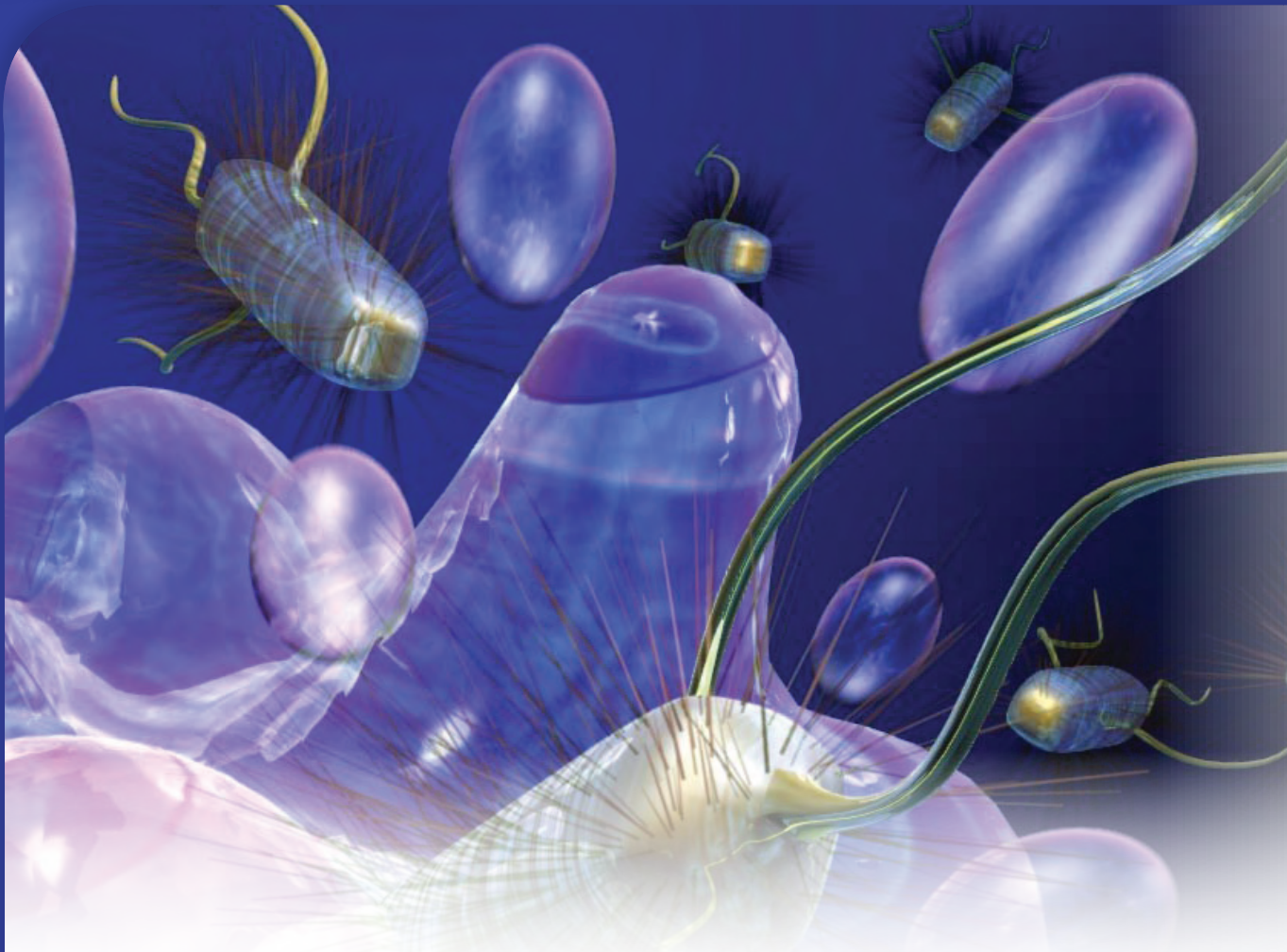


Bacteria & Enzyme Battalion



What exactly are bacteria?

They are microscopic organisms of various shapes, constituting some of the smallest and most elemental forms of life. They are almost everywhere in nature and multiply with remarkable rapidity. Bacteria consist of single cells with a nucleus and typically a tough cell wall. Inside the wall is the cell matter, which contains enzymes that help break down food for digestion and build cell parts. When the bacteria collide with a food source, the enzyme punctures the outer shell allowing the nucleus to enter the food source and devour it. An enzyme is the catalyst that allows the bacteria to function. The use and development of enzymes is still relatively new and until recently was cost prohibitive. Enzymes as a whole are the 'take charge' catalysts.



They each perform a very specific action but do not become part of the action. Enzymes are the key to the life of bacteria through their powers of being able to digest and promote assimilation and reduction. Without enzymes, bacteria would not exist. In ponds, waste materials such as slime, sludge, algae and other organic contaminants are attacked by enzymes and turned into a form that can later be eliminated by natural bacteria. Enzymes work more effectively with aeration and help decompose toxic hydrogen peroxide and release healthful oxygen from poisonous waste. These small biochemical digesters have the individual power to break apart vitamins, minerals, proteins, carbohydrates, fats,

etc., and make them absorbable. Remember that enzymes do not become part of the end product but they do make the process possible. Processed enzymes are able to exert a unique reaction that will do more than dissolve accumulated toxins and prepare them for elimination. With the use of enzymes you can stimulate and

improve water's natural appearance.

Some products promote bacteria with enzymes but the majority of the product is really bacteria. Enzymes do not contain bacteria and should not be confused with bacteria-based products.

A bacterium is a single cell life form with each cell being a separate, unique organism. Bacteria grow in colonies and use a process of cell division as a method of reproduction. The mature bacterium reproduces by dividing into two sister cells, with each cell being identical to the other. Under ideal pH, oxygen and temperature conditions, bacteria can duplicate in 20-30 minutes. This allows the population of microorganisms to explode logarithmically. At some point when the bacteria's food source is depleted or other changes occur in temperature, oxygen or pH, the growth in the population of bacteria will slow and may eventually die.



Bacteria & Enzyme Battalion

NWC's Bacteria and Enzyme Technology:

NWC's battalion of bacteria and enzyme populated products use microorganisms that are prequalified populations engineered to work on various types of odor causing organics in the landfill, waste water treatment plant, on contaminated sediment remediation projects, or in transfer stations. NWC's systems are designed to support and enhance microbial action already occurring that is breaking down waste organics. The genetic capabilities of the microbes that comprise the biomass control the ability of the system to breakdown specific components of the waste.

The purpose of using bacteria for odor control is to immobilize and transform the odor causing organics to other chemical forms that no longer release or carry odor. For example, instead of using chemicals such as sodium hydroxide (lye) or sodium hypochlorite (laundry bleach) to degrade hydrogen sulfide, NWC's Odor Colonel's microbes convert the hydrogen sulfide into odorless hydrogen sulfate, which is carried away by water percolating through the waste. Sewage-plant operators would really like to get rid of the chemicals because they are corrosive and dangerous. These chemicals can also be very harmful ("poisonous") to the indigenous populations of beneficial bacteria found in these environments.

NWC's bacteria and enzymes go after what is causing the odors, as opposed to encapsulating them. This technology is more expensive than neutralizers and absorbents, but eliminates the source of the problem. Application of these materials, such as Odor Colonel, Odor Major or Odor Ranger, are done topically on the waste, and can be applied daily or as required.

Odor Ranger (waste containers, compactor and waste boxes, animal and pet odors)

- Surfactants and selected bacteria with lemon fragrance



Odor Ranger

Application: Topically	Bacteria Concentrations: 200 billion per gallon
Mixing Ratio: 8 oz to 1.5 gallons of water	Versions: • Standard

- Excellent for neutralizing odors In garbage bins, waste roll off boxes and compactors for waste industrial setting
- Bacteria continue to fight odors, long after Odor Ranger has been applied
- Superb cleaner for the home, office or industrial setting





Odor Captain

Application: Typically	Bacteria Concentrations: 7.6 billion per gallon
Mixing Ratio: 0.25% - 2% active solution	Versions: • Standard • HCI (hydrocarbon bioremediation)

- Biodegradable biostimulants and cleaners
- Use of proprietary blends of naturally occurring



Odor Colonel

Application: Typically	Bacteria Concentrations: 300 billion per gallon
Mixing Ratio: 0.5% - 2% active solution	Versions: • Odor Colonel 15 • Odor Colonel 20 • Odor Colonel 21

Odor Colonel 15 (pulp and paper mill applications)

- Synergistic blend of selectively adapted bacteria for application to pulp and paper mill
- Promotes stability through enhancement of organic removal efficiencies as measured by BOD and COD
- Minimizes impact of toxic shock loads



Odor Major

Application: Typically & Misting	Bacteria Concentrations: 150 billion per gallon
Mixing Ratio: 0.5% - 3% active solution	Versions: • Standard

Bacteria that digest:

- grease, short chain and long chain fatty acids, proteins, lipids
- Environmentally friendly - non-corrosive to plant & equipment
- Available in liquid and dry powder form

bacterial cultures adaptive & tolerant to high contamination concentrations

- Special biodegradable surfactants and bionutrients for added efficacy
- Decontaminates soil and ground water containing hydrocarbons resulting from leaking underground storage tanks
- Can tolerate petroleum concentrations inhibitory to many indigenous bacterial populations
- Rapidly degrades all major organic components of #4, #5 & #6 fuel oils, crude oil and coal tar

• Accelerates start ups that follow scheduled shut downs

• Reduces effluent toxicity

Odor Colonel 21 (municipal wastewater environments, sewage sludge ponds)

- Consortium of bacteria designed to help reduce lagoon sludge
- Controls H₂S via competitive inhibition of SRB's
- Reduces filamentous (bacteria) abundance
- Accelerates start up of new systems and accelerates recovery after upset
- Enhances flocculation in activated sludges

Odor Colonel 20 (municipal and industrial fats, oils and greases applications)

- Proprietary Blend of selectively-adapted bacteria designed to reduce and dissolve greases & oils
- Effective in controlling rancid, foul-odorous volatile fatty acids in septic or anaerobic environments

Odor Major (landfills, composting, transfer stations, rail car, poultry & dairy farms, sludge ponds)

- Consortium of facultative bacteria and biostimulants that control and suppress H₂S gas
- Controls H₂S via competitive inhibition of SRB's
- Excellent for applying topically to composting piles to reduce the odors
- Powerful combination of fast acting chemical neutralizers and reactants complimenting selective adaptive bacteria
- Active against an array of nitrogen and sulfur containing compounds