

PolySeed®

Technical Report

PolySeed Sporulation Process

PolySeed Up Close & Personal

When working with PolySeed it helps to understand the process in which bacteria become active. Inside every capsule there are millions of endospores that must become vegetative cells before the growth phase can begin.

What is the process?

1. Endospores
2. Endospores become vegetative
3. Vegetative cells start the microbial growth phase

What is an endospore?

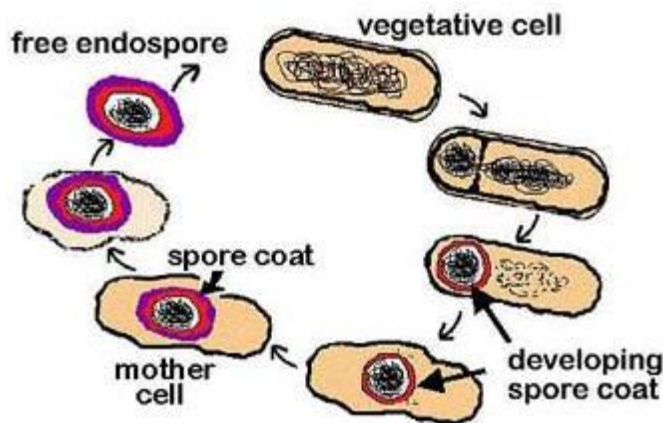
Endospores are formed by vegetative cells in a process called sporulation. Sporulation happens when the vegetative cell is placed under environmental stress.

What is a vegetative cell?

A vegetative cell is one which is capable of actively growing, consuming food and oxygen.

How do endospores become vegetative cells?

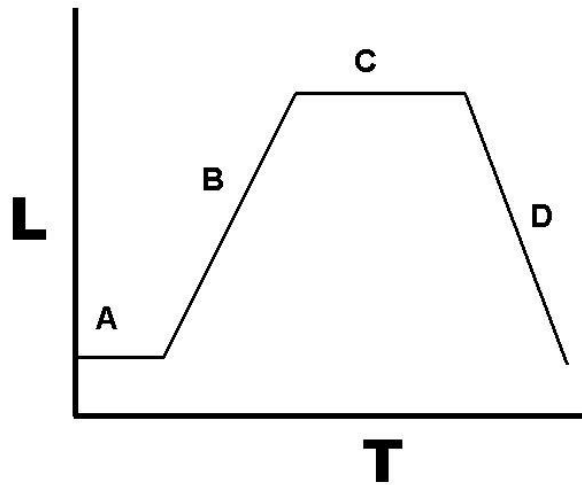
Endospores can remain dormant for years, but when environmental conditions become favorable, they can convert back to vegetative cells very quickly. This process takes 3 steps: activation, germination, and outgrowth. You can see an example of this basic cycle below.



NOTE: PolySeed comes in "spore form" and with a few basic elements will become vegetative cells rapidly.

What is the microbial growth phase?

The microbial growth phase can be modeled in four phases: Lag phase (a), Log phase (b), stationary phase (c), and death phase (d)



Understanding the phases

- a. Lag phase – bacteria are becoming acclimated to their environment (the BOD bottle).
- b. Log phase – rapid growth phase, bacteria begin oxidizing the available food supply
- c. Stationary phase – plateau phase, decrease in food and nutrients
- d. Death phase – bacterial death rate exceeds the production of new cells, forcing the bacteria to metabolize their own protoplasm. This is also known as the endogenous phase.

Putting it all together

Providing the perfect environment is crucial for bacterial growth. Bacteria require six elements in order to grow/reproduce: food, acidity, temperature, time, oxygen, and moisture. You provide these elements when you add the contents of each capsule to the nutrient water. Simulating the perfect environment will ensure your bacteria have a shorter lag time, consuming the available food supply sooner providing you with optimal results.