Production of Endospores

Endospores have increased resistance to:
(1) Temperature, (2) Dessication, (3) Radiation

Endospore Preparation

1) Sporulation
2) Purification
3) Concentration Determination

Real-Time Spore Detection based on Tb-DPA Luminescence

10⁻⁴⁷ moles DPA
[DPA] ~ 1 M (inside spore)
~ 1 pM (1 spore in 1 ml)

Tb-DPA Complex Photophysical Properties
Fluorimeter—Spex Fluorolog T322

Excitation and Emission Spectra

Germination of Endospores

Spore Detection Limit

Quantifying Luminescence Turn-On Factor

- Spore Detection Limit: LOD = 5000 spores/ml
- Germination of Endospores:
  - Time (min): 0, 20, 40, 60, 120
  - Luminescence Intensity (arb. units): 10^6, 10^5, 10^4 spores/ml

- Spore Detection Limit:
  - LOD: 5000 spores/ml
  - 10^6 spores/ml, 10^5 spores/ml, 10^4 spores/ml

- Quantifying Luminescence Turn-On Factor:
  - Tb + DPA $\rightarrow$ Tb-DPA
  - $F_{Tb} = F_{Tb-DPA}$
  - $F_{Tb} = F_{Tb-DPA}$
  - $F_{Tb-DPA} = F_{Tb}$
  - $TOP = \frac{F_{Tb-DPA}}{F_{Tb}}$
  - $TOP = \frac{F_{Tb}}{F_{Tb-DPA}}$