



Speedy Breedy - Lab Memo 10

Determination of *Pseudomonas* activity using Speedy Breedy, in samples with varying paint concentrations containing biocide.

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Principle & Background

Microbial contamination is a significant problem in paint manufacture, particularly in final product where stability and shelf life may be compromised leading to separation of the paint components, discolouration and offensive odours.

Key manufacturing components including the process water may contain microbial contamination at significant levels and many studies implicate *Pseudomonas* as a potential cause of batch failures. Biocides are used to overcome the problem with varying levels of success so rapid, on-site monitoring of materials and processes and subsequent biocide efficacy are advantageous.

This investigation aimed to show that the Time to Detection in Speedy Breedy is closely linked to bacterial growth and reflective of inhibition by Biocides in the sample. We investigated the correlation between the Time to Detection (TTD) in Speedy Breedy and the volume of paint sample applied to a fixed quantity of nutrient available to a controlled number of *Pseudomonas aeruginosa*. We aimed to demonstrate that Speedy Breedy provides a simple, rapid, portable solution to measure the inhibitory effects, and therefore efficacy, of biocides in paint products.

Speedy Breedy determines contamination by measuring sensitive pressure changes within a closed culture vessel due to microbial respiration. Speedy Breedy assigns a Time to Detection using an internal algorithm that defines a significant pressure event following exponential growth to a critical mass of organisms.

Experiment

Vessels containing sterile powdered Tryptone Soya Broth medium (Oxoid CM0129) equivalent to 50 ml of final working volume were filled with varying volumes of a well-known emulsion paint and sterile RO water used to bring the final working volume to 50 ml. The final nutrient quantity (excluding the paint itself) was therefore constant across the test range.

Each vessel was then inoculated with *Pseudomonas aeruginosa* (NCTC 10662) at a controlled cfu value of 500 per vessel using dilution from Lenticule discs (Public Health England).

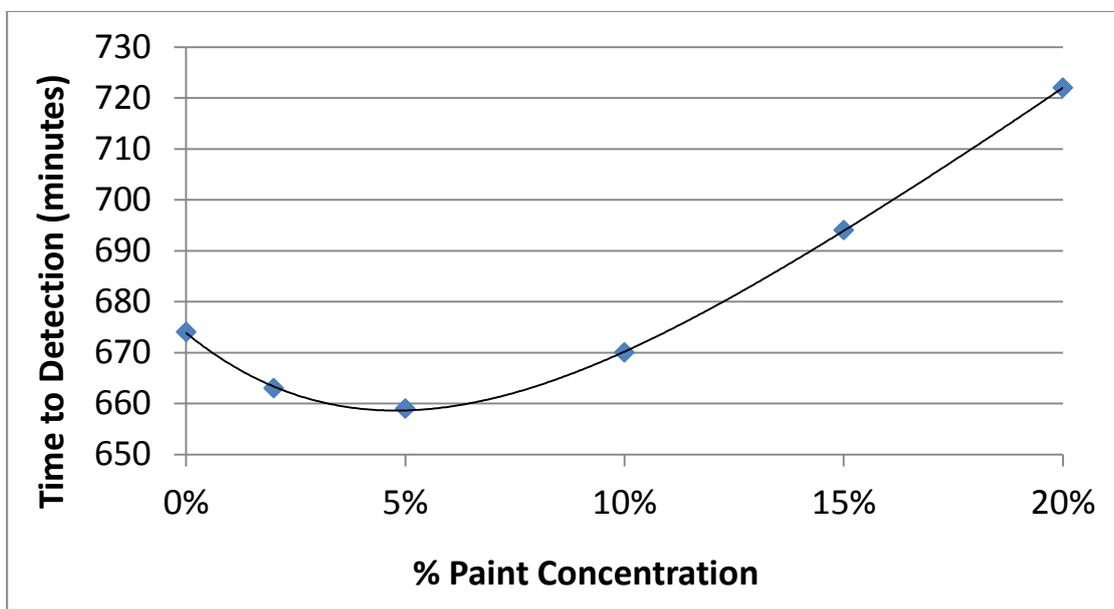
The cultures were run in Speedy Breedy at 36 oC and mixed continually at 60 rpm according to a commonly used Speedy Breedy "General Contamination" protocol within the instrument.



Results

Paint Volume added (%)	Time to detection (minutes)
0 (negative control)	674
2	663
5	659
10	670
15	694
20	722

Effect of Paint concentration on growth of *Pseudomonas* (Time to Detection)



Conclusions

- Speedy Breedy demonstrates a high degree of correlation between the Time to Detection and the paint concentration in a test sample.
- For low concentrations of paint the correlation demonstrates a decrease in the Time to Detection compared to the negative control culture (with no paint). This may be due to the mode of action of the biocide or reflecting increased growth due to paint availability as a food source.
- For higher concentrations of paint in the test sample, time to detection is increased above the negative control value suggesting inhibition of *Pseudomonas* by the biocide.
- There is a correlation between the Time to Detection in Speedy Breedy and the effect of paint addition to a nutrient medium seeded with a control culture of *Pseudomonas* reflecting the growth promoting and inhibiting characteristics of the paint.



- Speedy Breedy represents a sensitive, rapid method for monitoring efficacy of biocide activity in paint samples.
- Speedy Breed represents a potential Quality Control methodology for paint products.
- With Speedy Breedy tests can be started immediately, at any time of the day by unskilled operatives, a feature that enables tests to be begun on the factory floor for rapid release of stock.