

NEWSLETTER**Best Practices in Blood Culture Collection****Fluorescent Technology in the
BD BACTEC™
Automated Blood Culture System**

Detection of blood-borne pathogens is one of the most important functions of the microbiology laboratory. Cultures of blood are essential in identifying bacteria responsible for bacteraemia and sepsis. Several automated blood culture systems are available commercially nowadays. The advantages of all such systems are elimination of the need for blind subculture and the shortening of the usual incubation period of five to seven days. It is very important for the hospitals to choose a reliable system that can give them the best outcome in terms of turnaround time and improves patient outcome by decreasing morbidity and mortality .

The **BD BACTEC™ Automated Blood Culture System** utilizes fluorescent technology in detecting the growth of organisms in the blood culture bottles. When microorganisms are present in the cultured vials, they metabolize nutrients in the culture medium, releasing carbon dioxide into the medium. A dye in the sensor at the bottom of the culture bottles will react with CO₂. This modulates the amount of light that is absorbed by a fluorescent material in the sensor. The instrument's photo detectors measure the level of fluorescence, which corresponds to the amount of CO₂ released by the organisms. Then the measurement is interpreted by the system according to preprogrammed positivity algorithms.



The figure next explains how the **Fluorescent Technology** works on the BACTEC™ systems.

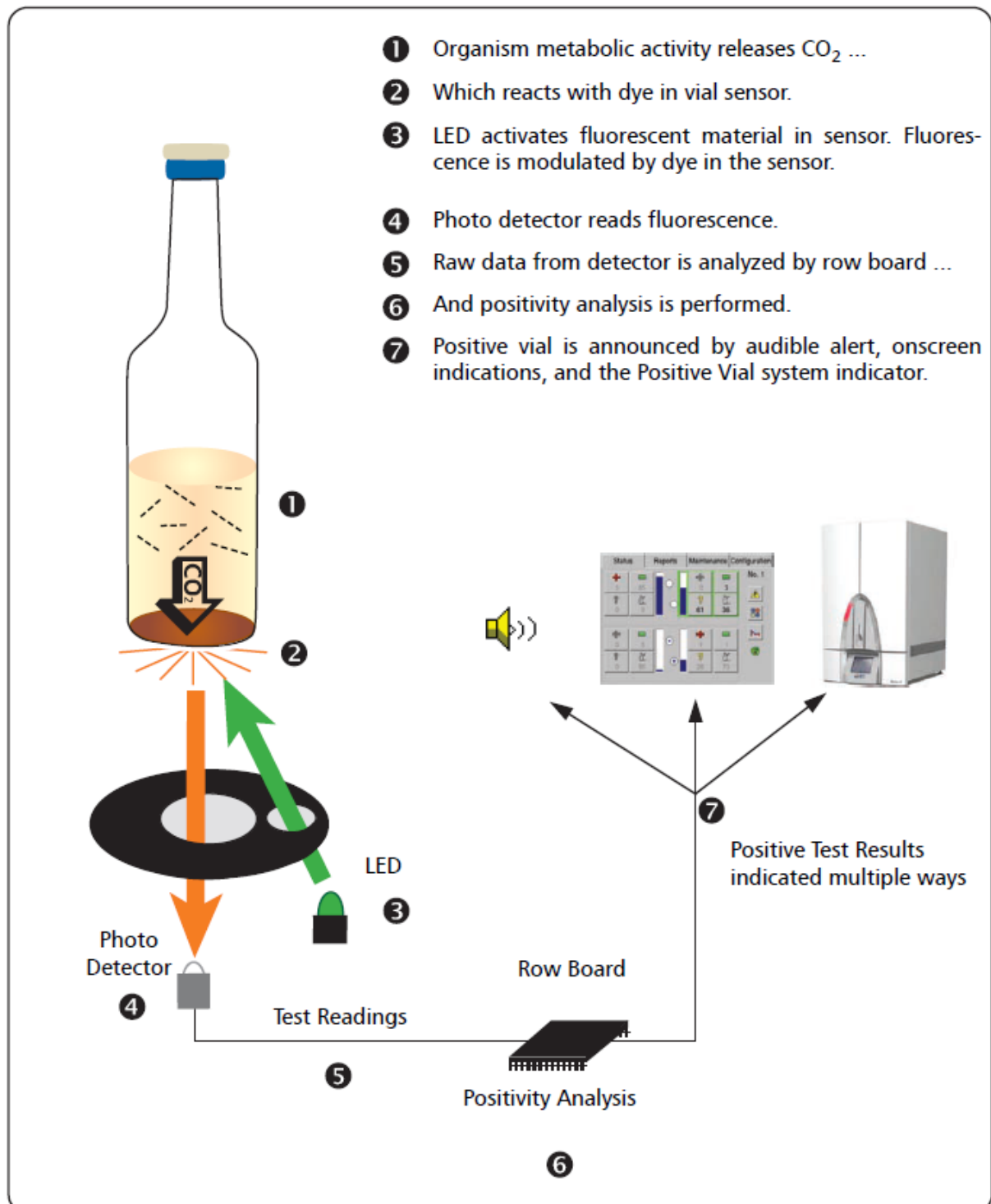


Figure 1 BACTEC Fluorescent Test Technology

The uniqueness of BACTEC™ fluorescence sensor technology allows for fully-automated, walk-away testing using a continuous-monitoring instrument that agitates and incubates BACTEC blood culture bottles, resulting in earlier detection of positives blood culture. The system also provides advance algorithms for each media types, for special circumstances such as low blood volume, pediatric specimens or to detect slow growing organisms such as *Haemophilus* and *Neisseria*. The algorithms provide rapid detection of pathogens in blood culture.

The combination of **media-specific algorithms** with **growth phase-specific algorithms** enhances the sensitivity and time to detection, even in the case of **delayed vial entry** (≤ 48 hours if are not incubated or held at room temperature) and for bacteria that only generate limited amounts of carbon dioxide (e.g. *Pseudomonas aeruginosa*)

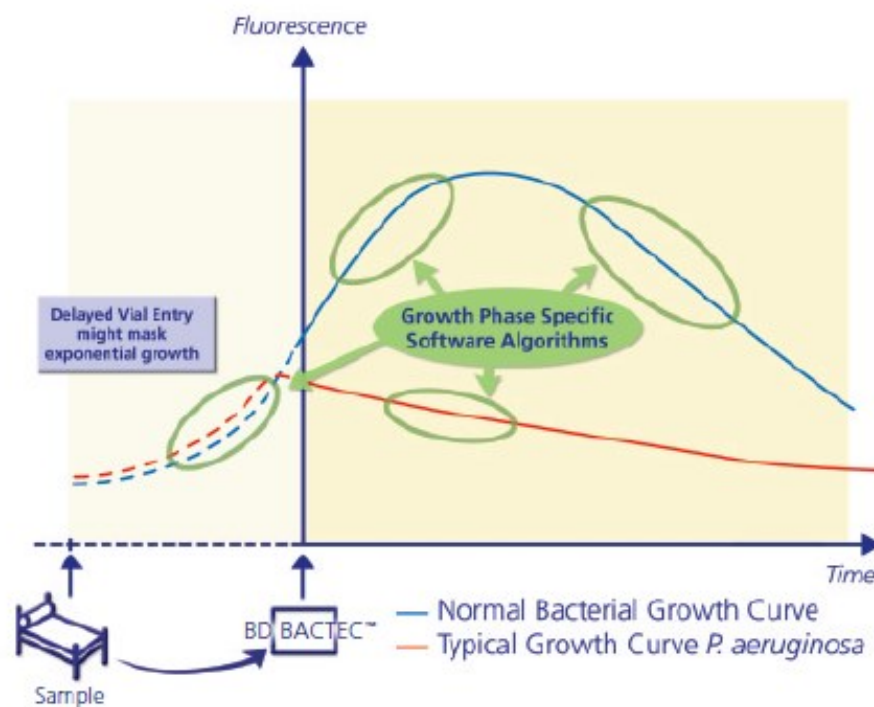


Figure 2 Fluorescent Technology and Sophisticated Algorithms: a Powerful Combination

References:

1. BACTEC™ Fluorescent Series User's Manual
2. BD BACTEC™ 9000 Systems: A World of Difference in Blood Culture



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