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Evaluating a novel Rapid Microbe Detection (RMD) technique based on formation of aggregates

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Introduction: Before some medical devices (particularly those labeled as sterile like something that may come in contact with not just external parts of the body) are released for use in the general public, a representative sample is tested for sterility. Traditional microbe detection techniques are either affordable but slow or fast but expensive. In both cases extensive training, substantial amount of materials and equipment coupled with operating in a controlled environment are all needed. Such prerequisites hinder the implementation of traditional techniques to constantly monitor the presence of microbes in test samples. Fast and frequent microbe detection requires a robust technology comprising affordable materials, minimal-to-no equipment, ease-of-use under normal conditions and relatively fast test-to-result timespan.

Purpose: In the goal of expediting the visual detection of microbes, an additive was evaluated for use in Rapid Microbe Detection (RMD). The hope for this RMD technology is to monitor the presence of live microbes in solutions, relatively fast without the need of special equipment or training. Furthermore, in order to determine the universality of this technology, a variety of microbes are tested.

Methodology & Theoretical Orientation: Media was inoculated with various titers of known microbes. These samples were tested using two techniques: A common colony-forming technique and the new RMD technique. In addition to varying titers, certain experiments focused on varying the type of microbes including: Aerobes, anaerobes, slow/fast growers, spore formers, fungi and bacteria. All experiments were visually monitored over time and periodically photographed.

Findings: The novel RMD technology facilitates the formation of aggregates in the presence of live microbes. The size of these aggregates and the speed of their formation are larger and faster, respectively, than the formation of traditional colonies. Detection time of microbes in solutions was reduced by more than half and under certain conditions, the time between experiment setup and final read was less than a 1-day shift.

Conclusion & Significance: The RMD technology that is based on minimal modifications of traditional techniques and could enhance these techniques to detect microbes 2-3 times faster.

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