OFFICIAL ABSTRACT and CERTIFICATION

Optimizing Hyperswarming Bacterial Plate Assay Serving As a Diagnosis Method For Inflammatory Bowel Diseases

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Approximately seventy-four percent of Americans are living with digestive symptoms such as diarrhea, gas, bloating, and abdominal pain. A distinct property of intestinal inflammation is characterized by bacterial swarming – the rapid movement of bacteria across a nutritious environment through flagellar propulsion. Early research indicates that bacterial swarming could act as a protective host response to intestinal inflammation. In order to further study the protective properties of bacterial swarming on intestinal inflammation, an effective replicable assay for swarming accommodating complex material was created. Using diseased and unafflicted human fecal samples, an optimized plate assay was created to ensure diseased samples to swarm while simultaneously suppressing the growth of the unafflicted sample. Four imperative variables were discovered and tested for reproducibility: The method by which the frozen samples were thawed, the concentration of agar used in the LB-agar plate, the volume of the sample inoculated, and the volume of the petri dish. While the method of thaw and the volume of the plate showed no significant effect on the ability to swarm, the volume of the inoculant and the agar percentage both showed distinct correlations. The optimized plate consisted of a 0.5% LB – agar plate with a 25 mL volume and 7.5 microliter (ìl) sample inoculants. Using this assay, clinics can diagnose intestinal issues while avoiding complex, invasive and expensive procedures like colonoscopies.

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