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RPT for Tracking Microalgae Cell Movement in Split Photobioreactor Column

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Radioactive Particle Tracking (RPT), is a visualization technique utilizing for multiphase flow systems. This technique has used to track the microalgae's cells movement through all the segments of growth by tracking a single radioactive particle (Co-60) 200 μCi . This particle was coated by 2mm Polypropylene particle to mimic the motion of the liquid inside the reactor. The Gamma-ray intensity distributions are reveal by a 30 NaI detectors placed uniformly in a certain angles and levels, around the reactor. The performance of split photobioreactor requires in-depth knowledge and understanding for photosynthetic growing and for hydrodynamic parameters. Therefore, the advanced non-invasive measurement technique Radioactive Particle Tracking RPT will plug this hiatus. This present study investigates the flow features in the 5.5-inch (0.14m) inner diameter Plexiglas split photobioreactor for air-green algae (*Scenedesmus*) system. Moreover, seeks to examine the impact of algae growth rate on the three-dimensional liquid velocity field and turbulent parameters (Reynolds stresses, turbulent kinetic energy, and turbulent eddy diffusivities) at different superficial gas velocities (1, 2, and 3 cm/sec). The experimental results will provide benchmark data for simulation, design, scale-up, and performance calculation of split photobioreactor. The experimental results and conclusions will present at the conference.

Country/Organization invited to participate

United States of America

Primary author: Mr SABRI, Laith (Chemical Engineering and Biochemical Engineering Department Missouri University of Science and Technology, Rolla, MO 65409-1230. United States of America)

Co-authors: Mr SULTAN, Abbas (Chemical Engineering and Biochemical Engineering Department Missouri University of Science and Technology, Rolla, MO 65409-1230. United States of America); Mr AL-DAHMAN, Muthanna (Chemical Engineering and Biochemical Engineering Department Missouri University of Science and Technology, Rolla, MO 65409-1230. United States of America)

Presenter: Mr SABRI, Laith (Chemical Engineering and Biochemical Engineering Department Missouri University of Science and Technology, Rolla, MO 65409-1230. United States of America)

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