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Enhancing Microfluidic Mixing Efficiency: CFD Analysis of a 3D Y-Shaped Serpentine Device

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Microfluidic devices have attracted significant attention in various scientific and industrial applications due to their precise control over small amounts of fluids. This study employs Computational Fluid Dynamics (CFD) to investigate and evaluate the mixing efficiency within a three-dimensional (3D) Y-shaped serpentine microfluidic device. The device is designed to mix two different fluids, water and ethanol, at different flow rate values. The results demonstrated that low flow rates have greater mixing efficiency at the first units of the mixer than higher flow rate values, and mixing ethanol is slightly easier due to slower residence time. The results of this research provide valuable insights into the mixing efficiency of the microfluidic device and contribute to a comprehensive understanding of the impact of various operational parameters on the mixing process.
Keywords: Microfluidics, micromixer, Computational Fluid Dynamics (CFD), lab on chip, pressure drop.

Type of presence

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