Abstract Submitted
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Simulation of 'cavern formation in the mixing of viscoplastic fluids[1] KARAN MIRPURI, LYES KAHOUADJI, Imperial College London, JALEL CHERGUI, DAMIR JURIC, LIMSI, CNRS, SEUNGWON SHIN, Hongik University, Korea, PATRICK PICCIONE, Syngenta, OMAR K. MATAR, Imperial College London — This work focuses on elucidating the effects of impeller size and speed on 'cavern formation in Herschel-Bulkley fluids using CFD simulations. 'Caverns are defined as the well-mixed regions within the fluid usually encasing the impeller where shear stress imparted by the impeller overcomes the material yield stress. The caverns are often surrounded by zones of stagnant fluid isolated from bulk flow, wherein mass transfer is mainly restricted to diffusion, making them adverse to mixing quality. Numerous models have been developed to predict cavern size including the spherical (Solomon *et al.*, 1981), cylindrical (Elson *et al.*, 1986) and toroidal (Amanullah *et al.*, 1998) models. Due to its prevalence as a means of comparison in modern experiments, the Elson *et al.* experiment is replicated for a number of rotational speeds (4, 8 and 12 Hz) and three geometrically-similar Rushton turbines using the code *Blue* which facilitates the 'measurement of cavern size and depth among other parameters.

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