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Development of a new continuous process for mixing of complex non-Newtonian fluids[1] SIMONA MIGLIOZZI[2], LUCA MAZZEI[3], University College London, BOB SOCHON[4], GlaxoSmithKline Consumer Healthcare, PANAGIOTA ANGELI[5], University College London, THAMES MULTIPHASE TEAM, CORAL PROJECT COLLABORATION — Design of new continuous mixing operations poses many challenges, especially when dealing with highly viscous non-Newtonian fluids. Knowledge of complex rheological behaviour of the working mixture is crucial for development of an efficient process. In this work, we investigate the mixing performance of two different static mixers and the effects of the mixture rheology on the manufacturing of novel non-aqueous-based oral care products using experimental and computational fluid dynamic methods. The two liquid phases employed, i.e. a carbomer suspension in polyethylene glycol and glycerol, start to form a gel when they mix. We studied the structure evolution of the liquid mixture using time-resolved rheometry and we obtained viscosity rheograms at different phase ratios from pressure drop measurements in a customized mini-channel. The numerical results and rheological model were validated with experimental measurements carried out in a specifically designed setup.

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