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**Simulating Tablet Dissolution in Complex Hydrodynamic Environment with Lattice-Boltzmann Method** ARPON RAKSIT, Harvard University, NING SUN, VADIM POZIN, DILIP GERSAPPE, Department of Materials Science and Engineering, Stony Brook University — Using the Lattice-Boltzmann method, we developed a 3D mesoscopic model to study the drug-dissolution process in a complex hydrodynamic environment involving spatially varying velocity and shear forces. The results showed turbulent flow in region above tablet, which was also obtained by visualization experiments. The dissolution profiles obtained by incorporating detailed kinetics showed good agreement with case studies from literature. The influence of the paddle speed and the size of the system were studied, and a multicomponent approach was also incorporated. Our results show how that the hydrodynamic environment would affect the dissolution process by changing the local concentration of components near the tablet and by the particle erosion under high fluid velocity. The code was also successfully parallelized so that the simulation of comparatively large system is now possible.

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