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The findings of the present study have shown that the hydrodynamic (HC) and ultrasound cavitation (US) based hybrid processes can effectively be utilized for the degradation of biorefractory pollutants such as pesticides. However, more detailed investigation of HC based processes is essential, since these processes are found to be more energy efficient and cost effective and are easy to scale up as compared to US based processes. Although it has been demonstrated in the present work that the operating cost of HC can be reduced appreciably by optimizing the operating parameters and using it in combination with other AOPs, even the reduced cost is not sufficiently low for using this process in the industrial application. Hence, there is a lot of scope for the further improvement in the process of hydrodynamic cavitation in order to make it more cost effective and energy efficient. The present work constitutes the degradation study of only two pesticide compounds, imidacloprid and methomyl. Hence, the work can be extended further for the degradation of few more recalcitrant and complex pesticide compounds. In addition to this, detailed understanding of the theoretical aspects of cavitation phenomena is very essential for improving the design methodology. As indicated in the literature, the energy efficiency of HC is a function of various geometrical parameters such as throat size and shape, convergent and divergent angle of the venturi and length of pressure recover zone (divergent section). The future work can be carried out on the optimization of geometric parameters of the cavitator using the computer codes such as CFD for the possible higher cavitation yield and higher energy efficiency of hydrodynamic cavitation reactor. These computer codes can be utilized for the prediction of the effect of geometrical and operating parameters of the hydrodynamic cavitation setup on the energy efficiency of HC. Hence, the need of extensive experimentation can be reduced by using these codes. The controlling reaction mechanism for all cavitation based processes is the generation and subsequent attack of the hydroxyl radicals. Hence, further work on the formulation of a model that can provide the relationship between the rate of generation of hydroxyl radical and the intensity of cavity collapse would be very helpful. In addition to this, the design and fabrication of different types of cavitating devices differing in the flow field, turbulence characteristics and geometry are also required for the efficient large-scale operation in wastewater treatment plants.