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Recent advances in tandem mass spectrometry, rational application workflows for research and development of pharmaceuticals and understanding future needs**Dev Kant Shandilya**

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Mass Spectrometry (MS) is an analytical technique/tool can identify and quantify verity of organic, inorganic and biological compounds. In pharmaceutical research and development mass spectrometry plays a key role from initial to late development phases for all type of drug molecules; small organic molecules, peptides, monoclonal antibodies (mAbs), Antibody Drug Conjugates (ADC) and Biosimilar (BS). Use of advanced mass spectrometry instruments is continuously increasing in analytical research laboratories, especially tandem mass spectrometry with high resolution mass analyzers, ion mobility and advancement in fragmentation techniques. These recent advances features along with rational workflows allow researchers for in-depth research with minimum experiments. Use of rationally designed workflows further helps to increase the productivity and quality of the research data. So the present study focused on the recent advances, rational analysis workflows and for utilization of technological advancement to fulfill research needs for various research arenas. Recent advances covered during study are; Ion Mobility (IM) feature used to drive the Collision Cross Section (CCS) of molecules under pre-set gas and temperature conditions, low and high energy dissociations, some other rational lab workflows with case studies using wide verity of drug molecules. For better understanding of workflows and latest technological advancement some of basic interpretation rules and other rational interpretation tools also discussed during the study. Discussed recent advances, rational workflow and case studies will surely guide researcher for better utilization of existing technology and to predict technology enhancement needed for future.

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