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Changing diameters of drops of atomized liquid for pneumatic nebulization

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Atomization of liquid is widely used in industry (including aerosol therapy, spray drying, powder and emulsion production and agro-technical treatment). In the recent years, a high interest in aerosol therapy has been noted. This type of therapy has a series of advantages such as: an easy, convenient and quick drug administration, low invasiveness, ability to choose an individual type and dose of medication. It is worth to note that a higher interest in inhalation techniques may be due to the fact that nowadays, the respiratory diseases are one of the most frequent and fast developing in the world affecting whole population in a wide age range. In aerosol therapy and effective delivery of drugs to specific respiratory tract regions a key role is played by a size of drops. It is due to the fact that the drops with greatest diameters ($>5\ \mu\text{m}$) mostly deposit in the upper respiratory tract while drops with diameters of $\leq 5\ \mu\text{m}$ deposit in the lower respiratory tract. The existing research often concerns the method of improving the efficiency of atomization process by affecting the diameters of drops and drops size distribution curves. As part of the research, an attempt was made to modify the pneumatic nebulizer in order to improve the atomization process as a result of smaller drops. For this purpose, the influence of the temperature of nebulized liquid with a use of additional aeration of liquid residing in a nebulizer cup, exerted on drops size histogram and size of drops were analyzed. The tests conducted showed that the proposed modification of the pneumatic nebulizer contributed to disappearance of drops with relatively large diameters, formation of more drops with smaller sizes and the distribution of drop sizes was more uniform.

Biography

Magdalena Matuszak has completed her Graduation from Poznan University of Technology, Faculty of Chemical Technology, Institute of Chemical Technology and Engineering and has obtained her PhD degree. In 2016 she started to work at Poznan University of Technology, Department of Chemical Engineering and Equipment as assistant. Her research interests include chemical and process engineering, especially multiphase systems, atomization process, and computer analysis of images. She has published more than nine papers in JCR Journals.

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