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Effect of solvent compositions on habits and *in vitro* aerodynamic results of spray-dried pulmonary formulations

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In the case of carrier-free dry powder inhalation systems (DPIs), the formulations can be prepared by various technological methods to bring the particles of the samples in the internationally recommended range of 1-5 microns. In addition to traditional particle size reduction technologies (such as milling), appeared sample preparation procedures (spray-drying, spray-freeze-drying, and supercritical-fluid technology) to ensure the aerodynamically favorable particle morphology. Among the latter production methods, spray drying is already widespread, as it compares its advantages and disadvantages and proves to be a very promising production solution. The choice of the solvents used in spray drying and their proportions are in many cases based solely on the solubility of the drug and applied excipients, but it may also be noteworthy that each solvent composition may affect the habit of DPI powders and thus *in vitro* aerodynamic results. Observations in this regard have been reported in a few studies in the international literature [1, 2]. The present work aims to investigate the different concentrations of a given organic solvent, how it affects the physical properties, and the *in vitro* aerodynamic results of the prepared DPI powders. Based on the results, it can be concluded that due to the changes in the micrometric properties of the samples, the *in vitro* aerodynamic results can be tripled. Thus, in the development of spray-dried DPI, the solvents used in the production and their mixtures are of paramount importance.

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