

Assessment of the influence of air flow through the eFlow[®] on the quality of the aerosol of rhDNase, budesonid, salbutamol and NaCl 0,9%.

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Introduction: The aim of the study was to assess the influence of the constant air flow through the aerosol's chamber on the aerosol's dose and particle size.

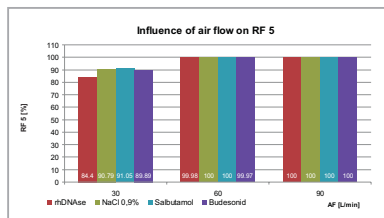
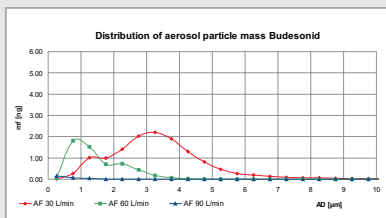
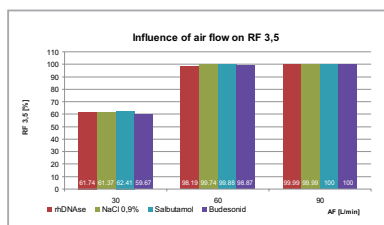
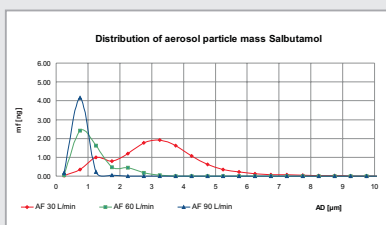
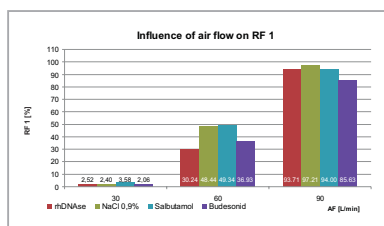
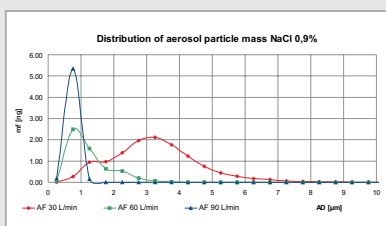
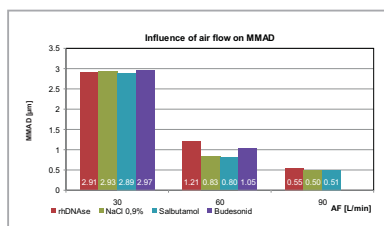
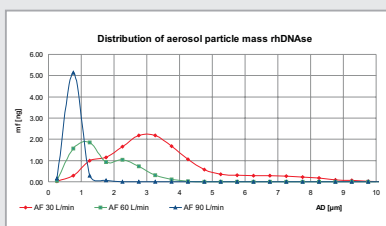
[28,3] +1,7; +31,7; + 61,7
air flow: 30; 60; 90; L/min

BV Godart-Statham NL
flow generator



Method: Aerosol's dose and particle size were measured by laser diffraction method for 1 min using constant air flow through aerosol chamber equal to 30, 60 and 90 l/min respectively. The effect of air flow on the distribution of aerosol particles of rhDNase, budesonid, salbutamol and NaCl 0,9% has been evaluated. The dose value and MMAD have been calculated from 10 measurements.

AUTOCOUNTER
28,3 L/min



Results: Statistically significant and proportional to increase of air flow, decrease in dose and particle size was stated for all drugs. MMAD values dependent on air flow (30, 60, 90 l/min) equaled to: for rhDNase: 2,91; 1,21 and 0,51 μm ; for Salbutamol: 2,89, 0,80, 0,51 μm ; for NaCl 0,9% 2,93, 0,83 and 0,50 μm respectively. For Budesonid MMAD values equaled to 2,97; 1,05 μm for air flow 30 and 60 l/min, whereas for air flow 90l/min the presence of particles was not recorded by particle counter. Our study demonstrates that constant air flow through electronic eFlow[®] nebulizer has a significant influence on the aerosol's particle size and on mass of inhaled drug. Adjustment of the size of aerosol's particles to the flow of inhaled air could be really interesting to obtain an increase of aerosol's deposition in the respiratory tract if the dose would not decrease.

eFlow rapid [®] [Type IIa] - ventilated nebulizer						
T [°C]	26					
RH [%]	50					
Medicine	rhDNase NaCl 0.9% Salbutamol Budesonid SSD					
Test	A	B	C	D	P<0,05	
AF=30 L/min	RF 1.1 m [%]	2,52	2,40	3,58	2,06	RF 1: C/D RF 5: A/B, A/C, A/D
	RF 3.5 m [%]	61,74	61,37	62,41	59,67	
	RF 5 m [%]	84,40	90,79	91,05	89,89	
	MMAD [μm]	2,91	2,93	2,89	2,97	
	MA [ng]	1,62	1,44	1,43	1,45	
AF=60 L/min	RF 1.1 m [%]	30,24	48,44	49,34	36,93	RF 1: A/B, A/C RF 3.5: A/B, A/C MMAD: A/B, A/C, C/D
	RF 3.5 m [%]	98,19	99,74	99,88	98,87	
	RF 5 m [%]	99,98	100,00	100,00	99,97	
	MMAD [μm]	1,21	0,83	0,80	1,05	
	MA [ng]	1,94	2,03	1,98	2,04	
AF=90 L/min	RF 1.1 m [%]	93,71	97,21	94,00	85,63	RF 1: B/C, B/D MA: A/C, A/D, B/C, B/D, C/D
	RF 3.5 m [%]	99,99	99,99	100,00	100,00	
	RF 5 m [%]	100,00	100,00	100,00	100,00	
	MMAD [μm]	0,51	0,50	0,51		
	MA [ng]	1,37	1,36	1,37		

Conclusion: It is recommended to make changes in the design of the nebulizer and to broaden the scope of research in order to use in practice possibilities of adaptation of quality of aerosol to the patients' breathing pattern.