

AN ASSESSMENT OF THE ROYCO 225 PARTICLE COUNTER FOR MEASURING INHALATION AEROSOL PARTICLE SIZE DISTRIBUTIONS

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Particle measurement by light scattering has been used for many years and several studies of inhalation aerosol systems using this method have been published (e.g. Dimmick et al, 1958; Porush et al, 1960). In this study we have examined the size distributions of Beclomethasone dipropionate (BDP) and Salbutamol aerosols using a Royco 225/508 counter. This unit operates in the near forward light scatter region of $7 - 17^\circ$ and has advantages over the right angle scatter unit described by Bell (1967).

We examined the two aerosol systems and compared the data with that published by Hallworth and others (1974, 1976). They found that a microscopical analysis of an oily dispersion of salbutamol gave a mean size of $2.0\mu\text{m}$. Another study in which slides were prepared by sedimenting the particles in a still-air chamber gave mean sizes of $6.5\mu\text{m}$ for salbutamol and $5.7\mu\text{m}$ for BDP. Royco data was obtained by actuating the aerosol into a 150 litre chamber fitted with an air distribution fan. The large chamber ensured that the number of particles did not cause coincidence problems. Sampling was carried out for 1 min starting 10 secs after the aerosol had been actuated. Size distributions were log normal with mean sizes of $3.0\mu\text{m}$ for salbutamol and $2.6\mu\text{m}$ for BDP. These results are rather lower than those of Hallworth (1976) but very near to his 1974 value of $2.0\mu\text{m}$ by dispersion. It can be shown that if the Royco data is truncated at about $1.5\mu\text{m}$ then a distribution very near Hallworth (1976) is obtained.

We conclude that the Royco presents a rapid and efficient method of examining size distributions of inhalation aerosols and which overcomes the truncation problems caused by sedimentation. There is also good correlation with the data obtained by microscopical analysis.

Table 1. Distribution Data for Salbutamol and Beclomethasone Dipropionate

	Mean Size (wt)	S.D.(σ)g	Particles/Dose	% less than $1.5\mu\text{m}$
Salbutamol (1)	2.0	1.6	-	27.0
Salbutamol (2)	6.58	1.9	11.00×10^6	0.8
BDP (2)	5.67	1.6	5.30×10^6	0.3
Salbutamol (3)	3.00	1.7	14.50×10^6	9.5
BDP (3)	2.60	1.6	16.30×10^6	12.5

(1) Hallworth (1974); (2) Hallworth (1976); (3) Davies (1978)

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