A MODEL SYSTEM FOR THE PRODUCTION OF AQUEOUS TABLET FILM COATINGS FOR LABORATORY EVALUATION

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Studies into the fundamental permeability and mechanical properties of tablet film coatings frequently employ cast or sprayed free films to provide a large and reproducible area. However, a number of workers have observed differences between the properties of such free films and those of coatings applied to tablets in industrial equipment. (Bayer, 1970; Hawes, 1978; Pickard,1979; Zaro,1973). One explanation for this may lie in the fact that the spraying conditions used in the production of coated tablets are inadequately simulated, in particular, the frequency with which a core is presented to the spray and its dwell time within the spray area.

We have therefore designed a laboratory model system which attempts to mimic more closely the conditions pertaining in a 24" Accelacota fitted with a pneumatic spray nozzle (Spraying Systems Co. 1/4JCO fluid nozzle and 120 air nozzle). Using red and blue marker compacts of identical size, weight and hardness to the rest of the tablet bed, the frequency with which a given tablet is presented to the spray was determined visually using a digital lap timer; large variations were recorded on each occasion (mean 25s., S.D. 35s., range 2-243s.). Dwell times for a tablet within the spray were determined by high speed ciné photography (400 frames $s.^{-1}$), to give a mean of 0.12s., (S.D.0.0035s). Air flow rates, temperatures, spray rate, atomising air pressure and nozzle to bed distance were also recorded.

As will be demonstrated, the model was initially built to expose test surfaces to the spray for 0.12s. every 25s. under the physical conditions measured in the Accelacota. The substrates are attached to a timing belt and an electronically controlled shutter separates them from the spray which is operated continuously. The belt speed and shutter timing mechanisms allow the spray time parameters to be varied and appropriate control of air flow rates, temperature, spray rate, atomising pressure and nozzle to bed distance can also be effected, which allows alternative coating conditions to be simulated.

We believe that this apparatus provides a more realistic coating model and will enable process and formulation variables to be studied in isolation from production equipment. The relatively large areas of film which can be obtained on both tablet core and other substrates ($\sim$ 25mm) allow accurate measurement of the mechanical and surface characteristics of the film to be readily undertaken and enable us to determine the oxygen and water vapour permeability constants simultaneously. The latter values are being obtained by the use of a specially designed cell in conjunction with a mini-mass spectrometer for quantitative gas analysis. The model apparatus could also be of potential value in allowing coating formulations to be evaluated without committing large quantities of active material.

References

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