

Roughness Model for Adhesion Testing of Pharmaceutical Coating Materials

*¹ H. Orafi, ²M. Spring

Abstract

Objective

Roughness is the main parameter in interlocking bonding mechanism. Yet there is no model designed to evaluate the effect of surface roughness on adhesion of coating materials in pharmaceutical sciences.

Materials and Methods

In this study polymethyl methacrylate spherical beads with different sizes were poured into 10 mm mold, then it was pressed by hand screw and finally heated to 141° C. The texture of the resulted surfaces of the discs was quantified and qualified for roughness using Surface Texture Measurement Instrum Model Sarcum110 and SEM, respectively. Solutions of Hydroxypropylmethyl cellulose (HPMC E15) and polyvinylpyrrolidon (PVP K90) were used as binding agents. After conditioning, shear testing technique was carried out for bond strength evaluation using calibrated shear cell bar.

Results

The resulted bond strengths were in the rank order of decreasing particle size and HPMC E15 resulted in higher bond strength.

Conclusion

It could be concluded that this model of roughness, which is easy to prepare, is suitable for studying adhesion of pharmaceutical binders.

Keywords: Adhesion, Adhesive, Binder, Coating materials, Polymethyl methacrylate (PMMA), Roughness.

1- Department of Pharmaceutics, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran
*Corresponding Author: Tel: +98-511- 8823255; Fax: +98-511- 8823251; email: orafaih@mums.ac.ir
2- Department of Pharmacy, University of Manchester, Manchester, UK