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## Investigating the effect of binder type on the material and tableting properties of two novel co-processed excipients

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**Background:** The development of novel excipients for tablet formulation by co-processing forms the basis of this study.

**Objective:** The aim of the research was to investigate the effect of varying the binder type on the material and tableting properties of two novel co-processed excipients namely SGS and SMS.

**Methodology:** Co-processed excipients consisting of either tapioca starch (TS, 90%), gelatin (GEL, 7.5%) and colloidal silicon dioxide (CSD, 2.5%) or tapioca starch (TS, 90%), microcrystalline cellulose (MCC, 7.5%) and colloidal silicon dioxide (CSD, 2.5%) were prepared by a method of co-dispersion followed by drying using a fluidized bed dryer. Analytical characterization of SGS and SMS were carried out using scanning electron microscopy (SEM) and differential scanning calorimetry (DSC). Flow properties of SGS and SMS were assessed by measuring the parameters of angle of repose (AR), Carr's index (CI) and Hausner's ratio (HR). The compaction behaviour of SGS and SMS were evaluated using Heckel and Walker equations. Tablets containing ibuprofen were prepared by direct compression incorporating SGS and SMS as multifunctional excipients.

**Findings:** SEM images revealed a slightly irregular or angular shaped appearance of SGS particles with a folded surface while the SMS particles appeared spherical with rough surfaces. DSC curves for SGS and SMS showed a characteristic glass transition event occurring between 252.15°C – 262.49°C. The flow parameters of AR, CI and HR were consistent with good flowing powders. SMS particles deformed at a higher pressure (564.52 MPa) compared to SGS (419.82 MPa). Tableting properties demonstrated a significant difference at  $p < 0.05$  for tensile strength ( $p = 0.001$ ) and disintegration time ( $p = 0.000$ ) comparing SGS and SMS.

**Conclusion:** This study has shown that the type of binder used influenced the material and tableting properties of the co-processed excipient developed.

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