

World Drug Delivery Summit

August 17-19, 2015 Houston, USA

Formulation and evaluation of a 2-component composite excipient microcrystallac as a filler-binder for direct compression

Abiodun Shittu

University of Ilorin, Nigeria

A 2-component composite filler- binder was designed and evaluated for direct compression properties. Tapioca starch (NTS) was modified physically at molecular level by annealing and enzyme hydrolyzed to obtain microcrystalline tapioca starch (MCTS) which was coprocessed with α - lactose monohydrate (LMH) to form Microcrystallac (MSL). NTS was extracted from cassava tuber (*Mannihot esculenta* Crantz) using a standard method. The powder suspensions were prepared in concentration of 40 %w/w in five separate conical flasks. The starch granules were annealed for 1 h and subsequently hydrolyzed with α -amylase at 58o and pH 7 for 1, 2, 3, 4, and 5 h in a water bath. The reaction was terminated and neutralized with 0.1 N HCL and 0.1 N NaOH respectively. The MCTS was washed, recovered by sedimentation and air dried at room temperature for 72 h. Following characterization, the granules that were modified for 3 h, sieved fraction >75-250 m was co-processed with α - lactose monohydrate (α -LMH) at concentrations of 10 to 50 % w/w as a dried mass relative to MCTS. Granule size ranges >75 - 250 m, and >90 - 250 m were characterized and compacted at a range of compression load 2.5 to 12.5 KN. Average flow rate, angle of repose and compressibility index were 3 g/s, 32o, 22 % respectively for MSL (granule size range >90 - 250 m and component ratio, 50:50). The corresponding values for the direct physical mixture of MCTS and lactose are 0.65 g/s, 40o, 53% respectively. MSL shows improved functionality over direct physical mixture of the primary excipients. MSL was compared with Starlaci, Cellactosei and MCC. The onset of plastic deformation P_y (yield value) are: Cellactose (24.2 MNm⁻²) >MCC (25 MNm⁻²) >MSL (68 MNm⁻²) >Starlac (143 MNm⁻²). The degree of plastic deformation occurring during compression (P_k) is in the following order: MSL (16.4 MNm⁻²) >Starlac (17 MNm⁻²) >MCC (18.6 MNm⁻²) >Cellactose (19.1 MNm⁻²). MSL is more superior in functionality than Starlac, Cellactose and MCC. The dilution potential obtained for MSL when compacted with paracetamol (PCM) and ascorbic acid (AA) as active drug (API) were: 45% w/w PCM with MSL, 30% w/w AA with MSL. The hardness of MSL containing 45% w/w PCM, was 80 N. MSL can be employed to formulate harder tablet especially poorly soluble and poorly compressible API.

neobiogate@yahoo.com

Notes: