ORIGINAL RESEARCH

Evaluation of the sustained release potential of a co-processed excipient in Ibuprofen tablet formulation

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ABSTRACT

Background: The oral route happens to be the most preferred route among the various routes of drug delivery. However, the conventional dosage form has few limitations which could be resolved by modifying the existing dosage form. Sustained and controlled drug delivery systems help to maintain constant plasma drug concentration and retarding the release rate of drug thereby extending the duration of action.
Objectives: To develop by co-processing technique a two-component excipient and evaluate its sustained release potential in ibuprofen tablet formulation.
Method: Maize starch (MS) was co-processed with polyvinylpyrrolidone (PVP), acacia powder (ACA) and hydroxypropyl methylcellulose (HPMC) respectively at a ratio of 60:40 using the co-fusion method. The granules so formed were analyzed for flow properties and compatibility tests based on; angle of repose, flow rate, bulk and tapped densities (BD/TD), Hausner ratio (HR) and Carr's Index (CI), Differential Scanning Calorimetry (DSC) and Fourier Transform Infra-red (FTIR) spectroscopy. The tablets were evaluated after compression by direct compression.
Results: The co-processed excipient (CE) had excellent flow properties as compared to the physical mix (PM). The DSC thermograms and FTIR spectra of CE when compared with their individual excipients and that of the drug, showed a similarity in their endothermic peaks respectively but for some slight difference showing compatibility and no new compound was found because of co-processing. The tablets had acceptable values for weight variation and disintegration time. Tablets of Batch XII B were of good quality regarding weight, hardness, disintegration time and friability by meeting the British Pharmacopoeia specifications.
Conclusion: This study concluded that the two-component excipients developed improved the functionality of the single components. Conversely, the co-processed excipients did not exhibit good sustained release property but would be better employed as conventional tablets or prepared as a sustained release matrix formulation.

Keywords: Co-processed technique, Co-processed excipient, Sustained release, Ibuprofen, Flow properties, Drug delivery