ENHANCED DELIVERY THROUGH MODIFIED XANTHAN GUM IN SOLID DISPERSIONS

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ABSTRACT

Poor solubility of numerous pharmaceutical agents in aqueous medium, especially those that belong to Class II and Class IV of the BCS, is a major impediment to oral bioavailability. Natural polymers are under widespread development as carriers in solid dispersion systems due to their biodegradability, biocompatibility, low toxicity, and economic considerations, but the natural high viscosity and hygroscopicity of native polymers may undermine the performance of pharmaceuticals. In the current work, xanthan gum has been thermally modified at 120°C during 2 h to form modified xanthan gum (MXG), which was further tested to determine its potential as a carrier in applications of solid dispersion. Thermal treatment significantly lowered viscosity from 1,300 cps to 650 cps and swelling index from 1,650 to 983.33 per cent, and at the same time increased the water retention capacity from 21 mL to 44 mL, as well as flow properties. FTIR spectroscopy was used to ensure that the characteristic functional groups have remained intact, and no chemical bond formation occurs, and thus the transformation was purely physical in nature. The results of the differential scanning calorimetry showed a general endothermic signal at 118.60 °C, which is indicative of the absence of degradation and dehydration, and the X-ray diffraction pattern displayed a higher amorphous nature. All these results present MXG as a stable and economical dissolved carrier with high possibilities to increase the dissolution of poorly water-soluble drugs.