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Investigation of Blends of Cashew and Xanthan Gums as a Potential Carrier for Colonic Delivery of Ibuprofen

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Abstract : The objective of this study was to investigate blends of cashew and xanthan gum as a potential carrier for colonic delivery of ibuprofen. Crude cashew gum was purified and characterized in terms of some physicochemical properties. Ibuprofen matrix tablet formulations (~200 mg ibuprofen) containing varying blends of cashew and xanthan gum were prepared by direct compression. Drug-excipient compatibility and the physical quality of compressed tablets were determined. *In vitro* swelling behavior and drug release of tablets in simulated stomach (pH 1.2; 2 h), small intestine (pH 7.4; 3 h) and colon (pH 6.8; 7 h), without enzymes, were studied. Cashew gum produced lower moisture content, swelling capacity, total ash, calcium, magnesium, sodium, copper and zinc but showed higher levels of manganese, iron and phosphorus, relative to xanthan gum. FTIR studies showed no interaction between ibuprofen and the excipients and the tablets exhibited higher swelling capacity in phosphate buffers (pH 6.8 and 7.4) than in 0.1 M HCl (pH 1.2). Xanthan-containing tablets showed higher swelling behavior in aqueous media than those containing only cashew gum. *In vitro* release studies showed that formulation F3 (cashew and xanthan 1:1) was most promising for colonic drug delivery with minimal (~13 %) ibuprofen release in simulated upper gastrointestinal conditions, and enhanced release in colonic conditions. All the tablet formulations demonstrated super case II transport mechanism and ibuprofen release involved both diffusion and erosion of the hydrated gum matrices. The studies have demonstrated the potential use of blended cashew and xanthan gums as vehicles for colonic delivery of drugs.

Keywords: Cashew gum, xanthan gum, colonic drug delivery, direct compression, matrix tablets, *in vitro* release.

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