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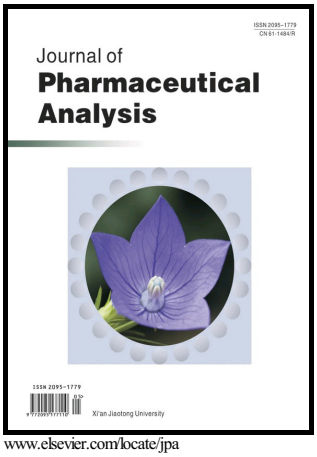

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Physicochemical characterization, the Hirshfeld surface, and biological evaluation of two meloxicam compounding pharmacy samples

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ABSTRACT

Meloxicam is an anti-inflammatory drug susceptible to variations and crystalline transitions. In compounding pharmacies, the complete crystallographic evaluation of the raw material is not a routine procedure. We performed a complete crystallographic characterization of aleatory raw meloxicam samples from compounding pharmacies. X-ray diffraction indicated the presence of two crystalline forms in one sample. DSC experiments suggested that crystallization, or a crystal transition, occurred differently between samples. The FTIR and ^{1}H NMR spectra showed characteristic assignments. ^{13}C solid-state NMR spectroscopy indicated the presence of more than one phase in a sample from pharmacy B. The Hirshfeld surface analysis, with electrostatic potential projection, allowed complete assignment of the UV spectra in ethanol solution. The polymorph I of meloxicam was more active than polymorph III in an experimental model of acute inflammation in mice. Our results highlighted the need for complete crystallographic characterization and the separation of freely used raw materials in compounding pharmacies, as a routine procedure, to ensure the desired dose/effect.

Keywords: meloxicam, polymorphism, Hirshfeld surface, anti-inflammatory activity