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Data Article

Solid-state characterization of triamcinolone acetonide nanosuspensiones by X-ray spectroscopy, ATR Fourier transforms infrared spectroscopy and differential scanning calorimetry analysis

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ABSTRACT

The data presented in this article describe the physical state of the triamcinolone acetonide (TA) in nanosuspension stabilized with polyvinyl alcohol (PVA) and poloxamer 407 (PL). The data were assessed by X-ray spectroscopy, ATR Fourier transforms infrared spectroscopy measurements (FTIR), and Differential scanning calorimetry (DSC) analysis. PVA, PL and polymeric mixture (PVA and PL) were compared with nanosuspension and the interactions between drug triamcinolone acetonide and polymers were studied. The data are related and are complementary to the research article entitle "Improved release of triamcinolone acetonide from medicated soft contact lenses loaded with drug nanosuspensions" (García-Millán et al., 2017) [1].

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Specifications Table

Subject area	*Pharmaceutical Technology*
More specific subject area	Solid state characterization by X-ray spectroscopy, ATR Fourier transforms infrared spectroscopy, differential scanning calorimetry.
Type of data	*X-ray, ATR Fourier transforms infrared spectroscopy and DSC graphs, text*
How data was acquired	*X-ray Philips diffractometer; Varian FTIR 670 and DSC Q-100 apparatus*
Data format	*Analyzed*
Experimental factors	In order to remove water of nanosuspensions the samples were frozen with liquid N_2 and were freeze-dried (A Telstar LyoQuest Plus)
Data source location	*Santiago de Compostela, Spain*
Data accessibility	*The data are with this article*

Value of the data

- This data will be helpful for the research community that characterizes the solid state of the drug in nanosuspensions used for loading media in soft contact lenses, stabilized with PVA and PL.
- This data allows the scientific community to know the solid state of triamcinolone acetonide, selected triamcinolone acetonide nanosuspension, polymers PVA and PL used as stabilizers and the polymeric mixture using X-ray, FTIR and DSC techniques.

1. Data

Stable triamcinolone acetonide nanosuspensions have been designed and synthesized by nanoprecipitation technique to formulate TA in high concentrations. The nanosuspension was selected in order to use it as loading media and to obtain medicated soft contact lenses. Nanosuspension selected was FM2, a monodisperse nanosuspensions in nanometric range, with a mean particle size of 147 nm and a TA load of 0.8 mg/ml, using mixtures of PVA (10%) and PL (10%) as stabilizers prepared by the nanoprecipitation technique [1]. Nanometric size of the TA particles can promote an increase of the solubility of the drug in nanosuspensions. The solid-state characterization nanosuspension can help to explain this behavior. Also, physical state of drug and polymers may have an important influence on the drug loading process and *in vitro* release characteristics.

The dataset of this article shows additional information about the solid state of the drug and polymers used to elaborate the nanosuspension. The Figs. 1–3 show the physical state of samples assessed by X-ray spectroscopy, FTIR and DSC analysis.

Fig. 1 shows X-ray diffraction patterns of the drug, polymers and freeze-dry nanosuspension prepared by nanoprecipitation as describes in García-Millán et al. [1]. Intact TA X-ray diffraction data shows sharp peaks in the range $2\theta = 9–21^\circ$ and 24–28°, specifically at $2\theta = 9^\circ$, 14°, 17° and 24°, which is indicative of the typical crystal structure of the drug [2,3]. Data of a sample of pure PVA shows some diffraction bands with a broad peak at $2\theta = 19.5^\circ$ hence is identified as a semicrystalline structure [2,4]. The PL X-ray pattern data shows two characteristic peaks with the highest intensity at diffraction angles at $2\theta = 18.3^\circ$ and 22.8° belong to crystalline Poloxamer block [5,6]. X-ray diffraction data results from nanosuspension show two peaks of less intensity at $2\theta = 18^\circ$ and 22° corresponding to the polymers. Nanosuspension X-ray pattern data do not show the characteristic peaks of the drug, indicating that in this system the TA is in the amorphous state.

Fig. 2 shows the ATR-FTIR infrared spectra. Pure TA spectra data shows a typical infrared absorption bands at 3392 cm^{-1} that can be associated with the stretching vibration of hydrogen bonded hydroxyl, and at 1726 cm^{-1}, corresponding to stretching vibration of the carbonyl group at aliphatic ester bonds. Other infrared absorption bands observed are typical of triamcinolone