Proceedings International
Platinum Open Access Journal (ISSN 2668-6384)

Proceedings, Abstract
Volume 4, Issue 2, 2022, 77
https://doi.org/10.33263/Proceedings42.077

Binary Systems of Oxytetracycline Hydrochloride Polymorphs with N-acetylcysteine: Improved Solubility †

Maria S. Bueno [1,*], Nahuel Camacho [1], Santiado D. Palma [1], Marcela R. Longhi [1], Claudia Garnero [1,*]

[1] Departamento de Ciencias Farmacéuticas, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba and Unidad de Investigación y Desarrollo en Tecnología Farmacéutica (UNITEFA) CONICET-UNC, Ciudad Universitaria. X5000HUA Córdoba Argentina
* Correspondence: soledad.bueno@unc.edu.ar (M.S.B.), cgarnero@unc.edu.ar (C.G.);
† Presented at The Sixth International Meeting of Pharmaceutical Sciences (RICiFa), November 10-12, 2021, Córdoba, Argentina

Received: 26.04.2022; Revised: 4.05.2022; Accepted: 6.05.2022; Published: 8.05.2022

Abstract: Oxytetracycline hydrochloride (Oxy), an antibiotic of the tetracycline family, is a polymorphic drug unstable in the solution that evidences erratic absorption in oral administration, which may be due to the presence of polymorphs. In recent years, the combination of active pharmaceutical ingredients with amino acids have been studied in order to improve their unfavorable properties. The study's main objective was to investigate the effect of N-acetylcysteine on the solubility of Oxypolimophs I, II, and III. The binary systems, in a 1:1 ratio, were obtained by kneading, spray drying (SD), and physical mixture. The solids were characterized by several techniques, such as powder X-ray diffraction (PXRD) and Fourier transform-infrared spectroscopy.The saturation solubility was evaluated. Among the most important results, the complete amorphization of the systems obtained by SD was demonstrated by PXRD, while the solids obtained by KN remained in the crystalline state. The binary SD systems significantly incremented the saturation solubility compared to free polymorphs, which could be attributed to the formation of co-amorphous solids. In conclusion, the results revealed a potential way for Oxy formulation with improved solubility.

Keywords: polymorphism; amino acid; spray-drying; solubility.

Funding

This research was funded by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), the Secretaría de Ciencia y Técnica de la Universidad Nacional de Córdoba (SECyT-UNC) and Fondo para la Investigación Científica y Tecnológica (FONCYT).

Acknowledgments

The authors especially thank Alejandro Menzaque (CONICET) for PXRD measurements.

Conflicts of Interest

The authors declare no conflict of interest.The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.