

# Physical-chemical Characterization of Binary Systems of Albendazole Desmotropes and Glutamic Acid or Aspartic Acid †

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† 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:** Albendazole is a broad-spectrum anthelmintic widely used in treating intestinal and systemic parasitosis, which was included in the essential medicines list of the World Health Organization. However, it has an extremely low aqueous solubility. In addition, two desmotropes of the drug have been reported. To improve the biopharmaceutical properties of Albendazole, new binary systems of albendazole desmotropes and glutamic acid or aspartic acid were developed and investigated. Solid samples were prepared by kneading method and physical mixture to evaluate the interactions. It was characterized by powder X-ray diffraction, Fourier transform infrared spectroscopy, scanning electron microscopy, thermal analysis, and solubility studies. The structural characterization evidenced different interactions between albendazole desmotropes and the amino acids. Interestingly, diffractograms showed that polymorphic transformation during the preparation of the solid did not occur. The saturation solubility studies showed a significant solubilizing effect in water and simulated gastric fluid compared to free desmotropes, which could be attributed to several intermolecular H-bonds. In conclusion, the improving biopharmaceutical properties show the aminoacids as promising candidates for developing oral formulations for the delivery of albendazole.

**Keywords:** Albendazole; desmotropes; aminoacids; aspartic acid; glutamic acid; binary systems; solubility; solid-state characterization.

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## Funding

This research was funded by the National Council of scientific and technical research (CONICET), the Secretariat of science and technology of the National University of Córdoba (SECYT-UNC), and the Fund for scientific and technological research (FONCYT).

## Acknowledgments

The authors would like to especially thank MSc Norma Maggia (UNITEFA) for performing the thermal analysis experiments and Ezequiel Palacios (UNITEFA) for FT-IR measurements.

## **Conflicts of Interest**

The authors declare no conflict of interest.