TRANSFORMING DISCARDED MEDICINES INTO NEW TRIAZOLIC MOLECULES

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ABSTRACT

Introduction: Inadequate disposal of medicines has become a significant environmental problem, with the contamination of soils and rivers, affecting ecosystems and water quality. A sustainable solution to this challenge is the adoption of the circular economy, which aims to reduce waste by reintegrating products and materials into the production cycle. In the pharmaceutical context, this approach can be applied to the reuse of discarded drug molecules for the synthesis of new compounds, promoting a more sustainable use of resources. This work proposes to use drug residues, provided by the Food and Medicines Research Center (NUPLAM), for the synthesis of triazoles, heterocyclic organic compounds formed by a five-membered ring with three nitrogen and two carbon atoms, existing in the forms isomeric 1,2,3-triazole and 1,2,4-triazole (Dheer; Singh; Shankar, 2017). These medicines contain Active Pharmaceutical Ingredients (APIs) with free amine groups or that can be broken down to create these amines. Among the drugs provided are sertraline, duloxetine hydrochloride (DUAL®, Abretia®), memantine hydrochloride (Mariale ODT®), betahistine hydrochloride (Labirin®), bisoprolol hemifumarate (Concárdio®), lurasidone hydrochloride (Latuda®, Lutab®), atorvastatin calcium (Citalor®), trimetazidine dihydrochloride (Quicard®) and generic clindamycin hydrochloride, whose amines can be used in the manufacture of triazoles. **Objective:** Promote technological innovation through the creation of a library of molecules, offering "building blocks" to recycle complex chemical nuclei that would otherwise be discarded, aiming for the synthesis of new potentially active compounds. Methods: To date, only betahistine dihydrochloride has been isolated by crushing the tablets, followed by centrifugation in absolute ethanol for 10 minutes at 4000 rpm. The supernatant was decanted and concentrated under vacuum, obtaining a yellowish and oily semi-solid. Structure confirmation was performed by FTIR (Fourier transform infrared spectroscopy) and/or mass spectrometry**. Results:** A semi-solid product with a yellowish color and oily appearance was obtained; other tablets and capsules are being processed for isolation. **Conclusion:** It is expected that other APIs can be extracted from discarded medicines to compose a database of substances, offering starting points for the synthesis of new drugs and allowing the breaking of labile bonds to obtain simpler building blocks.