EFFECT OF SELECTED BIOLOGICALLY ACTIVE CO-SOLUTES ON THE HYDRATION BEHAVIOR OF METFORMIN

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ABSTRACT

Metformin is a first-line therapeutic agent for the management of Type 2 *diabetes mellitus*, owing to its well-balanced efficacy, safety profile, and affordability. As with all pharmacologically active compounds, understanding its behavior in aqueous environments is essential, particularly in the presence of additional components that may influence its properties. Given the wide range of molecules that may coexist with metformin in biological systems, four representative co-solutes were selected to capture different molecular classes. These include glutamine, the most abundant amino acid in the human body; sodium salicylate, representing other pharmacologically active substances; and nicotine and caffeine, chosen as commonly encountered psychoactive compounds.

To investigate their impact on metformin hydration, measurements of density, sound velocity, and viscosity were conducted. The results reveal notable variations in metformin's hydration characteristics depending on the co-solute present. These variations are reflected in parameters such as hydration numbers, taste-related properties, and structure-making or -breaking effects. Overall, the findings emphasize the importance of detailed and targeted analysis of hydration behavior to better understand and predict the physicochemical properties of pharmacologically active compounds like metformin.

Keywords: metformin, water, density, viscosity, sound velocity.

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