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SYNTHESIS AND APPLICATION OF ISOTOPE-LABELED CARNOSINE IN LCMS/MS

Maspero, M.;^a Gilardoni, E.;^a Regazzoni, L.;^a Aldini, G.;^a Carini, M.;^a De Amici, M.;^a Dallanoce, C.^a

^aDepartment of Pharmaceutical Sciences, University of Milan, via L. Mangiagalli 25, 20133 Milano, Italy
E-mail of the presenting author: marco.maspero@unimi.it

Carnosine is an endogenous dipeptide, composed of β -alanine and L-histidine, and is highly concentrated in skeletal muscle and other excitable tissues. Its physiological roles, based on its biochemical properties, include pH-buffering, metal-ion chelation and antioxidant capacity as well as the ability to protect against the formation of advanced glycation and lipoxidation end-products.¹ For these reasons, besides its nutritional ergogenic application in the sport community,² carnosine supplementation offers a therapeutic potential for the treatment of numerous diseases in which ischemic or oxidative stress is involved.¹ Quantitation of carnosine in biological matrices appears to be crucial for these applications, and LC-MS procedures with isotope-labeled internal standards are the state-of-the-art approach for this analytical need.³ The use of these standards allows to account for variations during the complex sample preparation process, different matrix effects between patient samples, and variations in instrument performance.

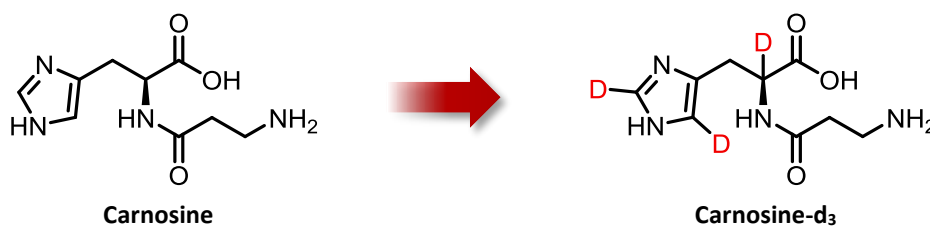


Figure 1

In this work, we present a fast and highly efficient synthetic route to obtain a deuterated carnosine analogue (Figure 1) starting from the trideuterated L-histidine (α -d₁, imidazole-2,5-d₂). Moreover, the use of Carnosine-d₃ in the validation of a multiple reaction monitoring (MRM) LC-MS/MS method for the analytical quantitation of carnosine in a biological matrix will be reported.

References

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