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Nano-magnetite L-proline as an efficient nano-biocatalyst for the synthesis of tetrahydrobenzo[b]pyran derivatives

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L-proline is known as the most favored catalyst in enamine-mediated reactions. This simple amino acid as a bifunctional catalyst is efficiently applied in variety of organic transformations. The simplicity of this small molecule contrasts with the complex structure of the natural enzymes, which are capable of promoting similar transformations. A secondary amine, functionality refers to its enhanced nucleophilicity over the other amino acids, which is the particular feature in nucleophilic catalysts. From the catalytic performance point of view, proline is termed "the simplest enzyme", meanwhile it is a building block or catalytic center of some of natural enzymes. The surprising versatility and specificity of this simple natural amino acid against toxic organometallic catalysts convert it to a promising candidate for artificial enzyme designing. Magnetic functionalization of L-proline gives recoverability and reusability to this efficient organocatalyst. Herein, we report the synthesis and use of magnetite L-proline as an efficient and reusable nano-biocatalyst in the coupling reaction of dimedone, malononitrile and aromatic aldehydes to afford the corresponding benzo-[*b*]-pyran derivatives in aqueous media and in good yields. Pyran derivatives have great biological and pharmacological importance that is organized as a significant class of heterocyclic compounds. Despite the catalytic role of proline in chemical reactions, it has been known for several decades, but its significance in biochemistry and biogenesis has still remained uncovered.

Biography

Ali Ramazani has completed his PhD under the supervision of Professor Issa Yavari in the Department of Chemistry at the Tarbiat Modares University (TMU), Iran. He currently works as a Full Professor in Chemistry at the University of Zanjan, Iran. His studies focused on Organic Synthesis and Nanochemistry. He has published more than 350 papers and is an Editorial Board Member of the international journal *Nanochemistry Research*. He has received several national and international awards, including the 2013 Khwarizmi International Award, Several Top-Cited Author Awards and Best-Paper Awards from leading ISI Journals, Best Researcher Awards and the Best Lecturer Awards at the University of Zanjan.

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