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A novel green synthesis of honey-mediated $CoCr_2O_4$ nanoparticles and their expeditious heterogeneous catalytic role for the synthesis of 5-aryl-[1,2,4] triazolidine-3-thiones

Suresh Ghotekar[1,2] · Dnyaneshwar Sanap[3] · Kun-Yi Andrew Lin[4,5] · Hitler Louis[6] · Dattaprasad Pore[7] · Rajeshwari Oza[1]

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Abstract

In this context, first-time cobalt chromite nanoparticles ($CoCr_2O_4$ NPs) were synthesized using honey as a natural precursor through a bio-derived approach. The benefits of this protocol are an easy workup using inexpensive precursors. The textural characteristics of the as-synthesized $CoCr_2O_4$ NPs were examined via XRD, FTIR, UV, FESEM, EDX mapping, and VSM studies. Microscopic pictures revealed a cuboidal topology with a mean size of 31.69 nm for greenly produced $CoCr_2O_4$ NPs. Furthermore, $CoCr_2O_4$ NPs were applied as a heterogeneous catalyst for the facile and one-step formation of 5-aryl-[1,2,4]-triazolidine-3-thiones. The proposed approach offers several admirable benefits, such as straightforwardness, benign

✉ Suresh Ghotekar
ghotekarsuresh7@gmail.com

✉ Rajeshwari Oza
rajeshwariksaraswat@gmail.com

[1] Department of Chemistry, S.N. Arts, D.J.M. Commerce and B.N.S. Science College (Autonomous), Savitribai Phule Pune University, Sangamner, Maharashtra 422 605, India

[2] Centre for Herbal Pharmacology and Environmental Sustainability, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, Tamil Nadu 603 103, India

[3] Department of Chemistry, Organic Chemistry Research Centre, G.M.D. Arts, B.W. Commerce and Science College Sinnar, Savitribai Phule Pune University, Maharashtra 422 103, India

[4] Institute of Analytical and Environmental Sciences, National Tsing Hua University, Hsinchu, Taiwan

[5] Department of Environmental Engineering and Innovation and Development Center of Sustainable Agriculture, National Chung Hsing University, 250 Kuo-Kuang Road, Taichung, Taiwan

[6] Computational and Bio-Simulation Research Group, University of Calabar, Calabar, Nigeria

[7] Department of Chemistry, Shivaji University, Kolhapur, Maharashtra 416 004, India

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