IJARSCT



International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 10, March 2025



A Study on Green Approach of Biginelli Reaction using Biocatalyst

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Abstract: The growing demand for environmentally friendly chemical processes has led to the exploration of biocatalysts as an alternative to conventional catalysts in organic synthesis. Green chemistry aims to reduce the environmental impact of chemical reactions by using sustainable, non-toxic, and biodegradable catalysts. In this study, we investigate the potential of fruit juices, particularly Kiwi and Karvanda, as natural biocatalysts for promoting organic reactions, specifically the Biginelli reaction. These fruit juices contain organic acids, polyphenols, and enzymes that facilitate chemical transformations under mild reaction conditions, reducing the need for harsh reagents and extreme temperatures. The Biginelli reaction, a widely studied multicomponent reaction, is crucial for synthesizing dihydropyrimidinones (DHPMs), which have applications in pharmaceutical and medicinal chemistry. The use of fruit juice-based catalysts offers several advantages, including low cost, easy availability, non-toxic nature, and environmental sustainability. This study not only demonstrates the efficiency of natural catalysts but also highlights their potential role in promoting eco-friendly synthetic methodologies. Despite their numerous benefits, the large-scale implementation of biocatalysts in organic chemistry faces challenges such as standardization of catalytic activity, stability, and reusability. However, ongoing research and technological advancements are expected to overcome these limitations, making green catalysts a viable alternative in the future. This study contributes to the growing field of sustainable chemistry by encouraging further exploration of natural catalysts in organic synthesis..

Keywords: Biocatalysis, Green Chemistry, Fruit Juice Catalysts, Biginelli Reaction, Sustainable Organic Synthesis, Natural Catalysts, Eco-Friendly Reactions



DOI: 10.48175/IJARSCT-24763

