

## GREEN AND EFFICIENT SYNTHESIS OF DIHYDROPYRIMIDINONE ANALOGUES VIA HPA-CLAY CATALYZED MULTICOMPONENT BIGINELLI REACTION

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**Abstract.** This study introduces an environmentally sustainable approach for the synthesis of 3,4-dihydropyrimidin-2(1H)-ones (DHPMs), *via* the Biginelli reaction. A heterogeneous catalyst, Heteropolyacid-Clay (HPA-Clay), is developed by immobilizing H<sub>5</sub>PV<sub>2</sub>W<sub>10</sub>O<sub>40</sub> on Montmorillonite KSF clay. The catalyst exhibits enhanced stability and catalytic efficiency, confirmed through X-ray powder diffraction and scanning electron microscopy. Utilizing a one-pot multicomponent strategy under solvent-free conditions, various aldehydes, urea or thiourea, and ethylacetoacetate generate DHPMs with excellent yields and reduced reaction times. Catalysed by 2 mol% HPA-Clay, the process aligns with green chemistry principles, emphasizing cost-efficiency, environmental sustainability, and recyclability. The catalyst demonstrates consistent activity over multiple cycles, highlighting its potential for advancing Biginelli reactions.

**Keywords:** dihydropyrimidinone synthesis, heteropolyacid catalyst, Biginelli reaction optimization, green chemistry approach, efficient multicomponent synthesis.