

UNIVERSITI TEKNOLOGI MARA

**SYNTHESIS AND CHEMICAL
EXPLORATION OF PYRANO[2,3-
C]PYRAZOLE TYPE COMPOUND**

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

A simple and green approach for the synthesis of fused pyrano[2,3-*c*]pyrazole-3-carboxylate and pyrano[2,3-*c*]pyrazole type compounds were developed. The main objective is to synthesize the Synthesis of novel derivatives of pyrano[2,3-*c*]pyrazole-imine and its derived manganese complexes analogues, in addition of the C-C ring extension of the pyranopyrazole for the new fused pyranopyrimidine and its derivatives. The synthesis of pyrano[2,3-*c*]pyrazole compounds was achieved via a domino one-pot, four-component reaction of diethyl oxaloacetate, hydrazine hydrate, aldehyde and malanonitrile in refluxing acidic ethanolic solution under non-catalytic system. This four-component reaction proceeds via sequential reactions of pyrazole synthesis, Michael addition and Thorpe-Ziegler cyclization reaction. Getting the pyrano[2,3-*c*]pyrazole-3-carboxylate and pyrano[2,3-*c*]pyrazole compounds, a series of chemical explorations on the aminonitrile functionality was done by specifically focusing on the ring extension for different multicyclic compounds through C-C ring extension. Subsequent reaction pyranopyrazole imine with hydrazine and manganese chloride provided the pyranopyrimidine and its Novel complexes respectively. In total in this research more than 70 derivatives which some are novel compounds were generated. Multiple chemical analysis (^1H and ^{13}C NMR, CHNS, FTIR, EDX) were conducted to confirm the structure of all the synthesized compounds.

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