VIETNAM NATIONAL UNIVERSITY - HCMC
HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY

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THESIS INFOMATION

Thesis title: Synthesis Of Quinazolinone derivatives (Quinazolinones, Pyrido-fused quinazolinones, and 2-arylquinazolin-4(3H)-ones)
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THE MAIN POINTS OF THE THESIS

In this thesis, the biological activity and synthesis methods of quinazolinone derivatives in previous studies will be presented – primarily focusing on the derivatives substituted at the 2,3-quinazolinone position and the corresponding polycyclic derivatives. Additionally, recent developments in utilizing nitroarenes as coupling partners for synthesizing N-containing heterocycles are also underscored.

The thesis focuses on presenting methods for synthesizing quinazolinone derivatives, divided into three main methods: (1) the copper-catalyzed synthesis of fused quinazolinone derivatives from 2-aminoarylmethanols, (2) a metal-free approach to synthesizing fused quinazolin(thi)one derivatives from 2-nitroarylmethanols, and (3) the iron-catalyzed synthesis of 2-arylquinazolinone derivatives. The progress and yields of these reactions were monitored using GC-FID for optimization studies. Isolation of reaction products was achieved either through column chromatography on silica gel or by recrystallization in appropriate solvents, and their identities were subsequently confirmed by GC-MS, HRMS, and NMR.

Copper-Catalyzed Synthesis of Pyrido-Fused Quinazolinones: The first method presented a copper-catalyzed domino C(sp^2)-H amination and annulation strategy to synthesize pyrido-fused quinazolinone derivatives. This process demonstrated the practicality of using molecular oxygen as a green terminal oxidant and showcased the efficiency of copper salts as catalysts for such reaction systems. This approach was noted for its broad substrate scope, relatively mild reaction conditions, and good tolerance of functionalities, making it a significant contribution to pharmaceutical chemistry, material science, and industrial chemistry.

Metal-Free Synthesis of Quinazolinones: The second approach highlighted a simple, metal-free method for the annulation of 2-nitrobenzyl alcohols and tetrahydroisoquinolines to afford fused quinazolinones. This process was distinguished by its tolerance of a wide array of functional groups, starting from nitro compounds as one coupling substrate in an auto-redox pathway. The simplicity and efficiency of the synthetic method, along with its applicability to synthesize quinazolinethiones with elemental sulfur as a terminal oxidant, position it as a valuable addition to the synthetic repertoire for fused quinazolines.

Iron-Catalyzed Synthesis of 2-Arylquinazolin-4(3H)-ones: The third method introduced an iron-catalyzed, elemental selenium-promoted cascade to afford 2-arylquinazolin-4(3H)-ones starting from 2-nitrobenzonitriles and arylacetic acids. The reaction system exhibits reasonable yields of products with notoriously challenging functional groups. This method used $Fe(acac)_3$ as the catalyst and featured likely non-radical reaction pathways. The development of this method underscored the potential of using nitro compounds with iron and selenium in quinazolinone synthesis, providing a complementary approach to existing methodologies.

Supervisor	**PhD Student**
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