

# Synthesis of New Azo Compounds Combining with Heterocyclic Groups

Batool S. Haddad<sup>1, a)</sup> and Mariam Abdul-bary<sup>2, b)</sup>

<sup>1</sup> Department of Chemistry, College of Science, University of Basrah, Basrah, Iraq

<sup>2</sup> Department of Food Science, College of Agriculture, University of Basrah, Basrah, Iraq

<sup>a)</sup> Corresponding author: [batoolsalih16@yahoo.com](mailto:batoolsalih16@yahoo.com)

<sup>b)</sup> [maryamabd2018@gmail.com](mailto:maryamabd2018@gmail.com)

**Abstract.** Six compounds of Azo containing heterocyclic groups, as derivatives for  $\alpha$ ,  $\beta$ - unsaturated ketones (the chalcones analogs), were synthesized. The Azo compounds combining the  $\alpha$ ,  $\beta$ - unsaturated ketones were prepared by the reaction the diazonium salt with an aryl carbonyl compound, such as benzaldehyde, 2-chlorobenzaldehyde, and furfural. And then treated with acetone. The products were reacted with benzil to prepare two chalcone groups. The results were reacted with  $\text{NH}_2\text{OH}\cdot\text{HCl}/\text{EtOH}$  and glacial HAC, as a catalyst. Several derivatives of azo compounds that containing heterocyclic group were synthesized. The newly synthesized compounds have been diagnosed by (FTIR,  $^1\text{H}$  NMR,  $^{13}\text{C}$ NMR, and MASS) spectroscopy.

## INTRODUCTION

Azo compounds having the diazenyl group ( $\text{R}-\text{N}=\text{N}-\text{R}'$ ), R and R' are alkyl or aryl. The more stable azo compound contains two aryl groups [1]. Azo compounds were synthesized by the reaction between cation, aryldiazonium compounds, and aromatic compounds [2, 3]. Azo compounds have bright colors, red, yellow, and orange [4, 5]. They are used as an azo dye and as indicators such as methyl orange [6,7]. They have used to treat textiles and some foods due to their insolubility properties in water and many other solvents [8]. Synthesis of azo and heterocyclic compounds such as *isoxazole* derivatives received much of attention due to their important applications [9, 10]. Azo compounds and heterocyclic compounds such as *isoxazole* have ranked first among many types of organic compounds because of different biological and industrial activities [11, 12]. Heterocyclic compounds such as *isoxazole* have a significant place in the field of heterocyclic chemistry [13]. The azo and isoxazole compounds are established extensive applications in the scope of pharmacological activity [14, 15]. The oligomers for these compounds were used in photovoltaic cells due to their high stability [16]. *Isoxazole* compounds have been considered as a free radical's scavenger and as a prevent cancer [17, 18]. They possess the ability to decrease oxidative stress [19]. In this research, according to the above interesting observations, we combining these two interesting classes, azo and heterocyclic compounds. We synthesized azo compounds containing heterocyclic groups, as derivatives of  $\alpha$ ,  $\beta$ - unsaturated ketones.

## MATERIALS AND METHODS

All materials used were supplied by Aldrich, merk, and sigma. All solvents used have been purified. Electro thermalIA 9200 was used to measure the melting point. The NMR spectra were recorded using BRUKER spectrometer 300 MHz. The FTIR spectra were recorded using BRUKER spectrometer. The mass spectra were recorded using Shimadzu. The reaction of the diazonium salt with the aromatic compounds containing the carbonyl group leads to the formation of an azo compound containing the carbonyl group, and then this product is treated with  $\text{CH}_3\text{COCH}_3$  to form  $\alpha$ ,  $\beta$ - unsaturated ketones. Then the heterocyclic group was formed by adding  $\text{NH}_2\text{OH}\cdot\text{HCl}$  in EtOH and adding glacial HAC as catalysis. Nuclear magnetic resonance (in  $\text{CDCl}_3$ , 300 MHz Bruker NMR spectrometer) infrared and mass spectrometry were used to diagnose the compounds.