Synthesis, Characterization, and Antimicrobial Activity of Some New Tetrazole Derivatives from Hydrazones

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ABSTRACT: *In this investigation, a combination of Z_1-Z_5 hydrazone compounds is obtained from the reaction between 4-methylbenzohydrazide and aryl-aldehydes. A subsequent unique synthetic approach to the preparation of di-substituted tetrazoles T_5-T_{10} was achieved through a 1,3- dipolar cycloaddition of sodium azide and prepared hydrazone compounds in ethyl alcohol. Results have been verified by Fourier-Transform InfraRed (FT-IR)spectroscopy, ^1H and ^{13}C-Nuclear Magnetic Resonance (NMR) spectroscopy, and mass spectrometry. The activity of anti-microbial screening has shown that (Z_1-Z_5 and T_{10}) presented antifungal activity. The other tested Z_2 compound was found to exhibit good antibacterial activity, while the other tested compounds revealed low antibacterial activity.*

KEYWORDS: *Syntheses; Hydrazides; Tetrazole; Antimicrobial activity; Hydrazones.*

INTRODUCTION

The tetrazole motif is well-known and widely used in compounds dedicated to various features of science and life [1]. The bioisosterism to carboxyl and amide groups, among other things, has piqued the interest of this five-membered aromatic heterocycle in a growing number of studies over the last few years. The most important area of tetrazole research is in medicine in general, followed by coordination chemistry and materials chemistry [2].

Hydrazones are a special group of compounds in the Schiff's base family that are important for drug design due to their broad spectrum of pharmacological action, as possible ligands for metal complexes, organocatalysis, and also for the synthesis of heterocyclic compounds [3]. One of the most important chemical compounds is sodium azide, which has been used in a variety of applications, including its effect on incubation [4]. Due to its significance, it was used in the preparation of compounds known as tetrazoles [5]. For example, Tetrazoles could be produced by reacting substituted amines with triethyl orthoformate and sodium azide in dimethyl sulfoxide [6]. In addition, the 1,3-dipolar cycloaddition reaction was originally used to synthesize the tetrazole ring by imine as a 1,3-dipolarphile reaction with the azide group as a 1,3-dipolar molecule [7, 8]. The synthesis of tetrazole derivatives is clearly a critical task in modern medicinal chemistry [9]. Tetrazoles are a type of heterocycle that has gained popularity due to its wide range of applications. Pharmacologically, because antimicrobial studies are the most effective way to astound microbial resistance and improve effective therapies [10], some potential products must be synthesized. Tetrazole contains compounds that have been shown to have antibacterial [11] and antifungal properties [12]. *Jackman et al.*