

Bio- Chemical Studying of Chemical Compounds

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Abstract

Four chemical compounds were synthesized , identified , azo compounds have a wide applications in bio-activity field which act starting material for many bio-molecules and anti-active compounds that tested against types of bacteria .

Keywords: types , materials .

Introduction

Industrial dyes are found in large quantities are extensively used in textile dyeing, paper printing, color photography, pharmaceutical, food, cosmetics with other industries, among them the textile industry is a major consumer. Industrial effluents involving azo dyes⁽¹⁻⁵⁾ are potential health hazards as they may be converted to toxic and/or carcinogenic products under anaerobic conditions. The most importantly these undergo reductive cleavage, leading to the formation of aromatic amines of which have known mutagenic and/or carcinogenic properties. Therefore the use of certain azo dyes⁽⁶⁻¹³⁾ is prohibited all over the world. General route for the synthesis of azo dyes involves diazotization of primary aromatic amine followed by coupling with one or more nucleophiles, amino or any other groups are used in coupling components⁽¹⁴⁻²²⁾.

Azo derivatives are known to be involved in a many of biological in many reactions such as inhibition of RNA, DNA, protein production, carcinogenesis and nitrogen (N) fixation[8]. Evans blue and Congo Red are being considered as HIV inhibitors. This effect is supposed to be resulted by binding of azo dyes to both reverse transcriptase and protease of this virus⁽²³⁻³⁰⁾ The existence of an azo moiety in different types of compounds has caused them to explain pesticidal actions and antibacterial⁽³¹⁻⁴²⁾ It has been found that the activity of azo compound increases the incorporation of proper heterocyclic moiety.

Drug resistance refers to a situation in which the drugs that usually destroy the bacteria no longer do so. In different organisms, multi-drug resistance mechanisms are established differently. Bacterial resistance⁽⁴³⁻⁵¹⁾ to antibiotics can be divided as natural or acquired resistance. In the former, the bacteria are "Intrinsically" resistant, while the latter refers to bacteria that are susceptible to develop resistance to antibiotics despite the fact that they are usually sensitive. Mutations in chromosomal genes, acquisition of mobile genetic elements like plasmids and transposons, which are carriers of antibiotic resistance genes are frequent causes of acquired resistance. The development of microbial resistance to chemotherapeutic agents usually results from their wide-spread exploitation in the treatment of infectious diseases. The emergence of resistance to the major classes of antibacterial drugs is recognized as a serious health concern. The study⁽⁵²⁻⁶⁰⁾ for new antibacterial agents with different action modes has always remained paramount. Azo compounds, with wide range of biological properties are very promising to this effect. The specific pathway of metabolism generally attributes this activity to azo colorants. *In vivo*, there is an enzyme-catalyzed reduction of the azo bond. The azoreductase activity was found in liver, in digestive tract bacteria of mammals, as well as in the skin of bacteria like *Staphylococcus aureus*. This reaction results in the azo-bond cleavage and the release of the corresponding aromatic amines originating from the azo dye. The products can be more or less toxic than the parent molecules and thus this process can decrease or increase any toxic or carcinogenic effects of the dyes⁽⁶¹⁻⁶⁵⁾.

Experimental &Materials :

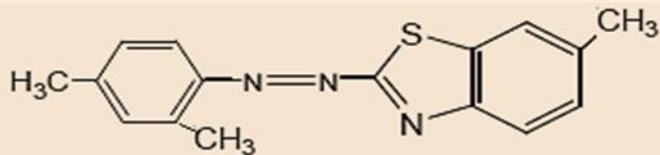
Biological studying carried out in Bio – lab in biological department.,Bio- Chemical Studying carried out in Bio-Lab.

EXPERIMENTAL PROCEDURES

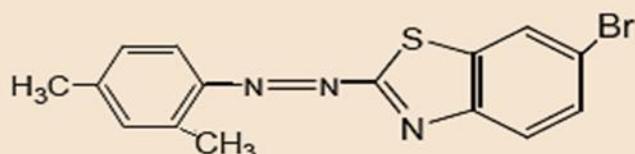
The in vitro biological testing effects of the identified compounds were tested against selected types of bacteria which include (*Klebsiellaspp.*, *E. coli* and *B. subtilis*) through using the Well Diffusion Method⁽³¹⁾ using agar nutrient as the medium. Stock solutions (10^{-3} M) were prepared by dissolving the compounds in DMSO solution. In a typical procedure, a well was made on the agar medium inoculated with microorganisms. The well was filled with the test solution using a micropipette and the plat was incubated at ((35°C)) for((72)) hrs. During this period, the test solution diffused and the growth of the inoculated microorganisms was affected

Synthesized Compounds In Schemes:

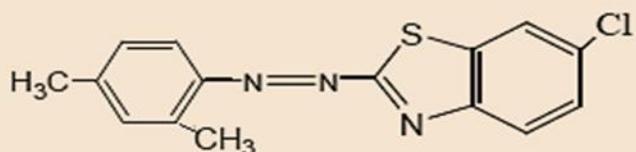
In our schemes , we prepared iminecompounds , but now we will study the biological activity for them in this work :



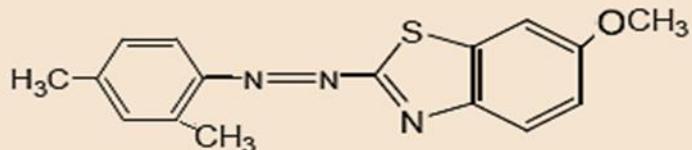
Compound { 1 }



Compound { 2 }



Compound { 3 }



Compound { 4 }

Scheme (1): Synthesized Compounds

RESULTS AND DISCUSSION

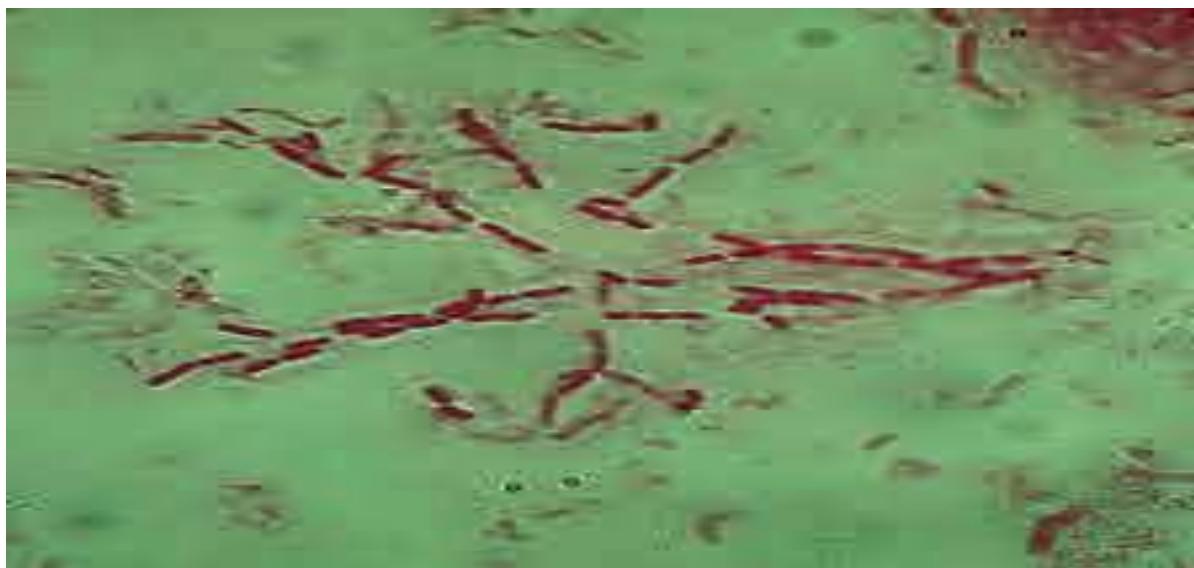
The synthesized compounds screened for Biological Activity against three types of bacteria .

Biological Tests⁽⁶¹⁻⁷⁰⁾ :

The azo dyes containing heterocyclic rings involved in the biological reactions have continued to attract more attention as potential drugs for therapeutic intervention in various diseases. In the present study, the results of the newly synthesized azo compounds tested for their antibacterial activity against pathogenic strains (*Klebsiella* spp., *E. coli* and *B. subtilis*) . The test of the sensitivity of the bacteria , which included work on three types of bacteria to measure the biological activity of certain compounds which bacteria positive for the dye Cram (bacteria) and

negative gram, Table (1) shows the diameter of inhibition zone for vehicles chemical measured in mm towards the bacteria.

B. subtilis a Gram-positive, aerobic bacterium. It is rod-shaped and catalase-positive. *B. subtilis* is found in soil and the gastrointestinal tract of ruminants and humans.



B. subtilis

Klebsiellaspp a genus of nonmotile, Gram-negative, oxidase-negative, rod-shaped bacteria with a prominent polysaccharide-based capsule. *Klebsiella* species are found everywhere in nature



***Klebsiella* spp**

E. coli is bacteria found in the environment, foods, and intestines of people and animals. *E. coli* are a large and diverse group of bacteria. Although most strains of *E. coli* are harmless, others can make you sick. Some kinds of *E. coli* can cause diarrhea.



E- Coli

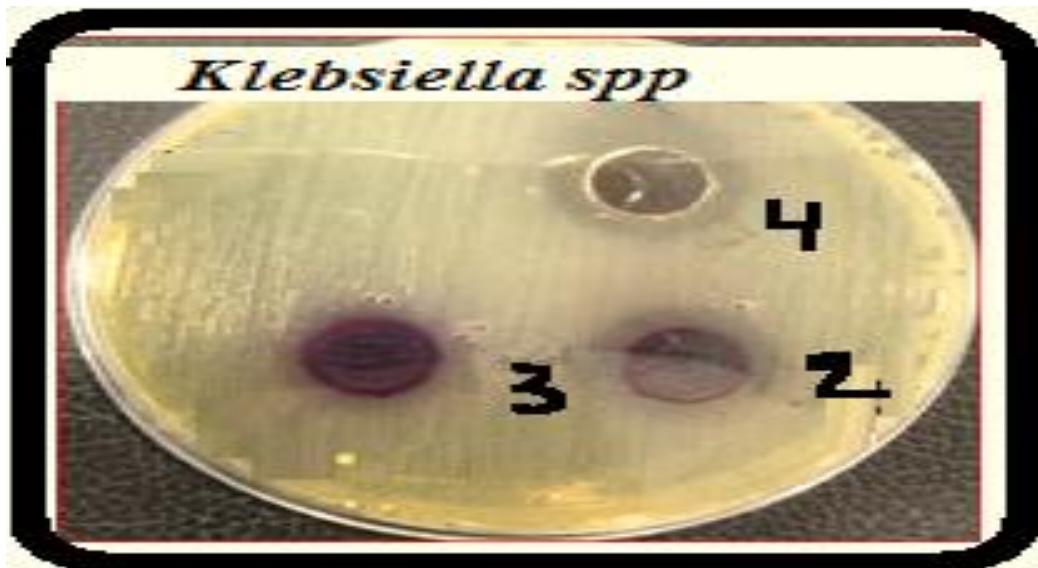
Table.1: Biological Activity (Inhibition Zone in (mm)) of Compounds

in Concentration (1×10^{-3} M).

Comp. No.	<i>B. subtilis</i>	<i>Klebsiellaspp</i>	<i>E - Coli</i>
[1]	4	6	< 4
[2]	10	8	6
[3]	10	10	6

[4]	6	6	4
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The results showed the Biological Activity for compounds (3, 2) the effectiveness of anti-resistant bacteria is much higher than other compounds in the inhibition of bacteria, ((Cl and Br)), which gave vital to the effectiveness of many of the bacteria, and the following photos show the following:



Picture(1).The amount of inhibition of the compounds on

Klebsiella spp



Picture(2).The amount of inhibition of the compounds on

E. coli

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