MICROWAVE-ASSISTED ECO-FRIENDLY SYNTHESIS AND ANTIMICROBIAL EVALUATION OF HETEROAROMATICALKENE HYDROXAMIC ACID.

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ABSTRACT

All over the world due to the highly growing awareness over worldwide environmental pollution and environmental legislation, recent years have witnessed a phenomenal highly growth in the application of microwave irradiation in area of hetero aromatic organic chemistry synthesis and its large applications. Heterocyclic compounds are abundant in nature and are of great significance value to the human life because their structural subunits exist in many natural products in nature as vitamins, hormones, and antibiotics proteins. They have highly attracted considerable attention in the design of biologically active
Molecules and advanced in different area of organic chemistry.

The various application of molecular diversity technique to the area of medicine discovery is a multidisciplinary effort in organic synthesis with all over the world.. Medicinal chemistry concerns with the discovery, development, interpretation and the identification of mechanism of action of biologically active compounds at the molecular level in specific area. Encouraged by the above reports and on the basis of our research programmed for development of eco-friendly synthetic protocol for biologically active compounds as well as in pursuing of our work on new solvent-free crystals here we report the synthesis of Heteroaromaticalkene Hydroxamicacid. In case of one-port of aromatic organic compounds using $AlCl_3$ as a catalyst under microwave irradiation and in solvent-free condition gave Heteroaromaticalkene Hydroxamicacid with improved yield is described amounts.

INTRODUCTION

In the heterocyclic aromatic organic compounds are aromatic cyclic compounds in which one or more of the atoms of the ring are hetero atoms as nitrogen, oxygen, sulphur. The aromatic heterocyclic ring compound comprises the core of the active moiety or in different large area of the medicines. An especially big attention is given to nitrogen and sulphur containing heterocyclic aromatic compounds, as they possess a large application and broad spectrum of biological activity[1] Heterocyclic compounds have attracted considerable attention in the design of biologically active molecules [2-3] and advanced organic chemistry for the use of large different area of medicines.[4]

Aromatic heterocyclic compounds containing nitrogen in its structure which is an important class of hetero aromatic systems. The common suitable method available for the synthesis of title compound is not satisfactory method because it taken long reaction times, use of expensive with high amount of energy and hazardous solvents and yield are only obtained in moderate amount. Due to the growing awareness about environmental pollution and environmental legislation, current years have witnessed a phenomenal increase in the application of microwave irradiation techniques in aromatic heterocyclic organic synthesis [5-7]. On the basic of its operational simplicity, generality and efficiency and highly effective method is expected to have wider applicability in an aromatic heterocyclic organic compound synthesis.

The synthesis of nitrogen containing heterocyclic aromatic compound has enhance highly interest in all over over the past decade because of their utility in various applications, as propellants, explosives, pyrotechnics and especially chemotherapy and the different area of medicines. In recent years, the chemistry of heterocyclic aromatic compounds and their fused heterocyclic derivatives has received considerable and suitable attention owing to their synthetic of different types of organic compounds and effective biological importance in different area of medicine and industries[8]

The hydroxamic acids nucleus has been synthesized as an antiviral agent for inhibiting the metastasis of malignant tumor cell in human beings. The fusion of two or more aromatic hetero heterocyclic nuclei often enhance biological profile activity may fold than its parent nuclei. The Nitrogen bridged hetero cycle developed from organic compounds possesses anti-inflammatory antifungal[9-11] herbicidal, antimicrobial [12-14] antiparasitic, cytostatic brassinosteroid biosynthesis inhibitory activities[15-16] activities**.**

The malonic and benzaldehyde nucleus is one of the most important aromatic hetero cycle organic compounds which is a feature of natural products with different types of medicinal agents. The derivatization of aromatic ring is based on the phenomenon of bioisosterism in which replacement occurs by oxygen nucleus and nitrogen analogue. These modifications are carried out by using different functionalities, aliphatic chains, aromatic rings and heterocyclic ring systems in different types of organic compounds.[17-20]

Materials and Methods

Experimental Section

The properties of heterocyclic aromatic compounds as melting points were measured by open glass capillary tube method. All the chemicals and solvent were of reagent grade. Solvents were dried 4Å molecular sieves and degassed with dry chemicals before use. Synthesis and manipulation were carried out with the help of Laboratory Microwave Oven (Model BP 310/50) operating at 2450 MHz and power output of 600 W was used for all the experiments work on different types of the organic compounds. The completion of reactions was measured with the help of TLC, IR spectra were recorded on a Shimadzu FTIR-420 spectrophotometer. 1H NMR and 13C NMR spectra were recorded at 400°C on a Bruker AVANCE DPX (400 MHz) FT spectrometer in $CDCl_3$ using TMS as an internal reference. Mass spectra were recorded on JEOL SX-303 mass spectrophotometer at 70ev. Elemental analyses of the compounds were carried out using a Coleman automatic C, H, N and S with other hetero atoms analyzer. Although the synthetic procedure of the compounds is reported in the laboratory we developed a new method for the synthesis of different type of heterocyclic aromatic compounds.

MICROWAVE ASSISTED SYNTHESIS OF HETEROAROMATICALKENE HYDROXAMICACID

A mixture of containing malonic acid and appropriate benzaldeyde was dissolved in pyridine and was refluxed 2 hours. After cooling to room temperature the reaction mixture was poured into 2 N hydrochloric acid. The catalytic amount of $AlCl_3$ was mixed thoroughly in a beaker and irradiate in microwave at 500 w for specified period. The reaction-mixture of the compounds was cooled and poured on crushed ice. The separated solid compounds was filtered and then treated with dil. KOH and washed with water and then to obtain dry crystallized from of Heteroaromaticalkene Hydroxamicacid.

Antimicrobial screening

The antibacterial activity of the synthesized heterocyclic compounds was tested against both Gram-negative and Gram-positive bacteria. The test solutions were prepared in benzene and other suitable organic compounds. It seems that enhanced biological activity for the compound is due to its electron donating group and the poly-conjugated nature of the compound. On the basis of conjugation compounds provide large surface areas which enhance greater extent lipophilic and absorbing nature. The complexes are more active due to the greater dissolving ability in fats, oils, lipids and non-polar solvent such as hexane, toluene etc with more absorbing nature of the complexes which controls the growth or killed the bacteria.

Results and Discussion

The effective conventional method available for the heterocyclic aromatic compound is not satisfactory because it requires long reaction times and utilize large amount of energy, use of expensive and hazardous solvents and yield are only intermediate amounts.

The reactions were also carried out using a thermostated oil-bath at the same temperature as for the MW activated method but it occurs very longer period of time. It was found that MW method has improved the yields in suitable amount daring the process. This observation can be rationalized on the basis of the formation of dipolar activated complex due to different electro negativity and gives uncharged adduct in these reactions and greater stabilization of the more dipolar activated complex by dipole-dipole interaction which provide extra stability of complexes with electric field of the microwaves as compared to the less polar adduct which may reduce the activation energy resulting in the rate enhancement of stability of complexes.

The *ortho-*, *meta-* or *Para-position* of the electron donating sites in the aromatic system plays a significant role in the bioactivities area. In addition to this, the presence of heteroatom such as oxygen, sulphur, and nitrogen also play a vital role in the observed antibacterial activity therefore it is use to reduce the growth of micro organism or killed. .It is also suggested that the sulphur-containing compounds might inhibit enzyme synthesis, since enzymes need specific groups for their activity and are especially susceptible to deactivation by the compounds. The presence of sulphur and nitrogen atoms in the structure of the active compounds facilitates their diffusion through the lipid layer of the microorganism membranes to the site of action, eventually killing them or reduce them by linking with essential groups of certain cell enzymes. The lipid layer of complexes enhance their adsorbing ability which the character is more responsible to the antibacterial activity.

Conclusion

The major challenges in worldwide area of medicinal chemistry to development of simple, suitable highly chief effective and eco- friendly method use for the synthesis of chemical reaction in the area of heterocyclic organic compound with enhance their effective properties in the field of antimicrobial activity.

Bur at the present time large number of suitable methods have been used in all over the world for the preparation of compounds while, all of this method has arise several number of drawbacks as for use of organic solvents which arises different types of pollution, drastic conditions reactions, and reactions occurs in very slow motion and highly expensive uses and consume high amount of energy there for it is highly expensive. The related problems reduce by the use of simple, practically effective feasible and eco-friendly suitable techniques for the preparation of complexes. The growth of green chemistry in different area of all over the world is highly applicable because it has many advantages as consuming very small reaction time, more fast with eco-friendly, pollution free or less pollution and use of produce energy easily in different area. Therefore these techniques are more effective and more popular at present in all over the world.

On the basis of importance of the compounds as a chemotherapeutic agent, and development of a facile mode, efficient and environmentally benign method to synthesize this heterocyclic compound would be more effective and greater value. This observation on the basis of research prompted us to develop different types of an environment friendly approach for synthesis of large number of hetrocyclic aromatic compounds which possesses various antimicrobial activities.

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