AN EXECUTIVE SUMMARY OF THE FINAL REPORT OF THE WORK DONE ON THE TOPIC- **"MICROWAVE ASSISTED SYNTHESIS OF HETEROCYCLIC COMPOUNDS CONTAINING NITROGEN AND SULPHUR ATOMS- A GREEN APPROACH"**, AS A MINOR RESEARCH PROJECT

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EXECUTIVE SUMMARY OF THE MINOR RESEARCH PROJECT

The microwave region covers the frequency range from 3 to 300GHz which corresponds to 0.1 to 30cm in wavelength of the electromagnetic spectrum which are similar to telecommunications and radar. The microwaves used for industrial and household purpose operates at a frequency of about 2.45GHz. Polar molecules are Microwave active whereas the non polar molecule shows no activity towards microwave radiations. The polar molecules selectively absorb the microwave radiations from the electromagnetic spectrum, since the polar molecules have a permanent dipole they align themselves and when these molecules are subjected to an electric field their orientation changes . This phenomenon produces heating.

Environmental benign chemical synthesis is called as Green Chemistry which focuses on the process which reduces the use of hazardous chemicals and by-products. After the passage of Pollution Prevention Act of 1990 which dealt with the prevention of the formation of pollutants, the chemists were inspired to device greener conditions which could be achieved by replacing hazardous organic solvents with water of reducing the use of hazardous solvents; reactions being conducted in solid-phase without using solvents; use of phase transfer catalyst rather than using Stoichiometric reagents. As time passed; the increases in the number of people lead to environmental pollution.

Heterocyclic compounds are found in living cells and serve as the raw material for the manufacture of drugs. The hetero atoms include Nitrogen, Oxygen, Sulphur, Tellurium, Silicon, and Selenium. These compounds are found in the form of alkaloids, flavanoids, dyes, proteins, enzymes etc

The novel substituted thiazole derivatives were synthesized by the reaction of substituted phenyl-aldehyde thiosemicarbazone with Phenacyl chloride/ Phenacyl bromide. The substituted phenyl-aldehyde thiosemicarbazone was synthesized by treating the respective Aldehyde with Thiosemicarbazide in the presence of acetic acid acting as a catalyst and ethanol as the solvent. The melting point and absorption maxima of the product was found and the IR spectra provided the structural data.

2-[4-methoxybenzylidinehydrazin]4-phenyl-1,3 thiazole

Aromatic C-H $_{str}$ 2965cm^{-1} (13), Aromatic C=C$_{str}$ 1514cm^{-1} (21), N-H$_{str}$ 3733cm^{-1} (7), and C-S$_{str}$ 1026cm^{-1} (31) C=N$_{str}$ 1921cm^{-1} (19) and C-O$_{str}$ 1170cm^{-1} (27)

The absence of peak at 3255cm^{-1} for NH$_{2\ str}$ and 1290cm^{-1} for C=S$_{str}$ when compared to the spectra for the raw materials, provided the data that the compound has undergone cyclisation to give Thiazole

2-[benzylidinehydrazin] 4-phenyl-1, 3thiazole:

Aromatic C-H$_{str}$ 2914cm^{-1} (14), Aromatic C=C$_{str}$ 1577cm^{-1} (21), N-H$_{str}$ 3733cm^{-1} (7), and C-S $_{str}$ 1026 cm^{-1} (30) C=N $_{str}$ 1889 cm^{-1} (18)

The absence of peak at 3393cm^{-1} for NH$_{2\ str}$ and 1241cm^{-1} for C=S$_{str}$ when compared to the spectra for the raw materials, provided the data that the compound has undergone cyclisationto give Thiazole

2-[4-clorobenzylidinehydrazino]4-phenyl-1,3 thiazole

Aromatic C-H$_{str}$ 2923cm^{-1} (18), Aromatic C=C$_{str}$ 1490cm^{-1} (24), N-H$_{str}$ 3733cm^{-1} (9), and C-S $_{str}$ 1026cm^{-1} (31) C=N $_{str}$ 1908cm^{-1} (21)

The absence of peak at 3440cm^{-1} for NH$_{2\ str}$ and 1235cm^{-1} for C=S$_{str}$ when compared to the spectra for the raw materials, provided the data that the compound has undergone cyclisation to give Thiazole.

Microwave assisted synthesis of heterocyclic is a reduced chemical microwave approach which opens up numerous possibilities for conducting rapid organic synthesis and functional group transformations more efficiently. Microwave-accelerated general approach shortened the reaction time which reduces the use of expensive and hazardous chemical reactants.