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SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL STUDIES OF 7-ETHYL-2, 4-BIS(4-METHOXY-PHENYL)-3-AZA-BICYCLO[3.3.1]NONAN-9-ONE

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ABSTRACT

The newly synthesized 7-ethyl-2,4-bis(4-methoxy-phenyl)-3-aza-bicyclo[3.3.1]nonan-9-one. The compound has been derived by the condensation of 4-ethylcyclohexanone and 4-methoxybenzaldehyde using ammonium formate. The structure of the synthesized compound was elucidated by spectral studies such as IR, ^{1}H, ^{13}C NMR and elemental analysis. The newly synthesized compound was screened for its antimicrobial activity against staphylococcus aureus, escherichiacoli, pseudomonas aerugionosa, aspergillusnigar and mucor.

Keywords: 4-ethylcyclohexanone, 4-methoxybenzaldehyde, Spectral studies, Antimicrobial activity.

INTRODUCTION

Heterocyclic compounds represent an important class of biologically active molecules. A deep study of literature review showed that the study of reaction like Claisen-Schimt, Mannich[1] and aldol condensation. Owing to their pharmacological activity of such as antibacterial[2], antifungal[3], anti-inflammatory[4], antimalaria, cytotoxity and anticancer[5] activities. In the present study we have reported for its antibacterial, antifungal activities. It has been planned in this work to synthesis a novel type of compounds using cyclic ketones, aldehydes, and amines.

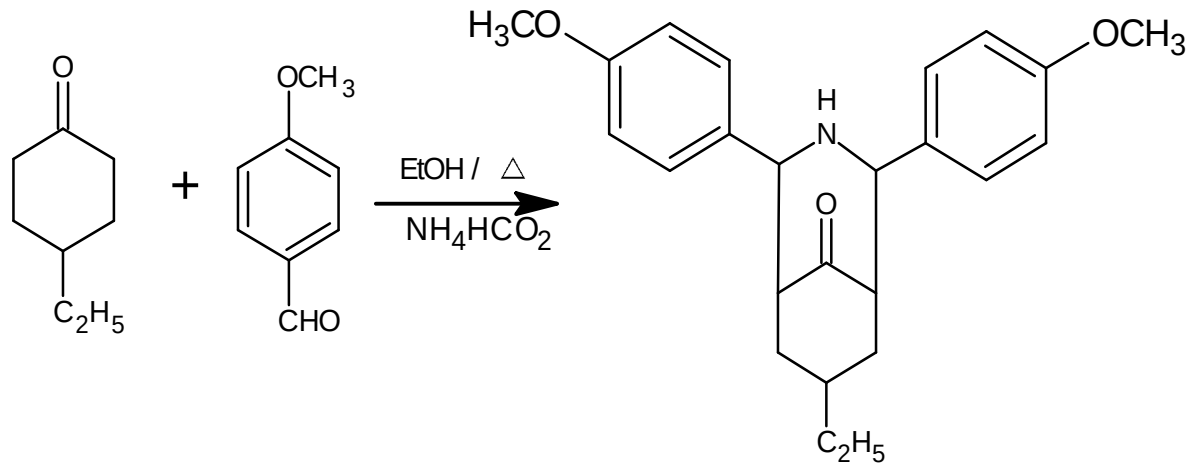
EXPERIMENTAL

Melting points were determined with open capillary and are uncorrected. Proton NMR spectra were taken in DMSO and recorded at 400 MHz in Burker and ^{13}C NMR spectra were taken in DMSO and recorded in 300 MHz in Burker. Chemical shifts were measured in ppm with respect to TMS.FTIR spectra recorded on instrument Simadzu 2100 S and Perkin Elmer BX.

MATERIALS AND METHODS

4-ethylcyclohexanone (0.01mol), Ammonium formate (0.01mol), 4-methoxybenzaldehyde (0.02mol) in a RB flask containing ethanol (10ml). The mixture is refluxed at 60-70 °C in a water bath with occasional shaking until the colour changes into red orange. The solution is cooled, and then ether (50ml) is added. The filtered solution is transfer into conical flask. The yellow colour precipitate formed is filtered and dried. Then the product is recrystallised with ethanol and crystal form of product obtained is dried. The melting point is 160°C.

(4-ethylcyclohexanone and Ammonium formate supplied by E.merck were used as such. 4-methoxybenzaldehyde were supplied by BDH. Ethanol was distilled twise to get maximum alcohol content. Silicagel.G supplied by BDH was used to prepare TLC plates)



Scheme I

RESULT AND DISCUSSION

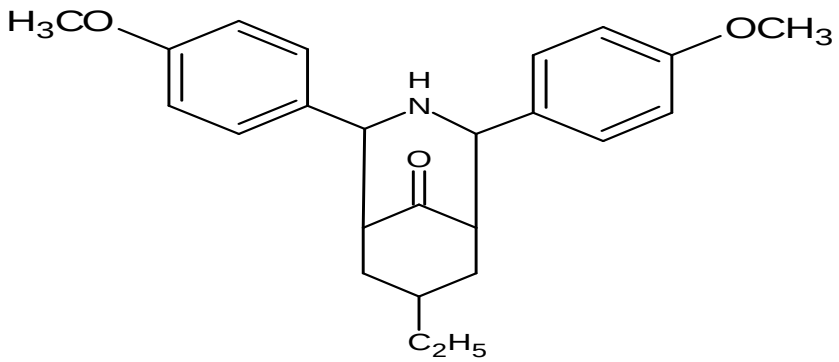
SPECTRAL DATA

IR (KBr): 3059 cm^{-1}(NH), 2997 cm^{-1}(aromatic C-H), 2924 cm^{-1}(aliphatic C-H), 1664 cm^{-1}(C=O), 1145 cm^{-1}(C-O-C); ^1H NMR(400 MHz, DMSO): δ 7.53-7.50 and 7.04-7.01 (8H, aromatic proton), δ 3.80 (3H OCH_3 proton), δ 2.50 (1H NH proton);

^{13}C NMR (DMSO): Chemical shift value 159 ppm(C=O), 135 ppm(Ipso carbon), 133 ppm(carbons of phenyl ring), 114 ppm(substituted O-CH_3 carbon), 55 ppm(O-CH_3), 34 ppm(C_7).

Based on the above spectral data the compound is identified as

7-ethyl-2,4-bis(4-methoxy-phenyl)-3-aza-bicyclo[3.3.1]nonan-9-oneand the given structure



ANTIMICROBIAL ACTIVITY

The compound was dissolved in DMSO. The filter paper disks were soaked with different solution of the compound dried and then placed in petri dish previously seeded with test organism*E-coli, S-aureus, P. aerugionosa, A-nigar* and *mucor*. The plates were incubated for 24h at 37 °C and incubation zone arround each disc was measured the biological activities of the synthesized compound was studied against the *E-coli, S-aureus, P. aerugionosa, A-nigar* and *mucor* using agar plates technique at concentration of 1mg/ml in DMSO. The compound show inhibition zone diameter ranges between 10-15 mm as shown in table. The compound show greater antimicrobial activity towards *E-coli* and antifungal activity towards *A.nigar* while all other showed moderate activity against all the bacterial and fungal cultures.

Table No.1: Results of Antimicrobial Activity

Antimicrobial			Antifungal	
E-coli	**S-aureus**	**P.aeruginosa**	**A.nigar**	**Mucor**
38	35	35	35	32

(Reference standard Ciprofloxin 5µ/g disk for bacteria; Nystain 100 µ/g disk for fungi)

CONCLUSION

In this part the synthesis of new cyclic Mannich base is explained very clearly with the reaction the structure of the synthesized compound is analyzed by spectral data and antimicrobial studies.

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