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Synthesis of Novel Imines and Their Biological Study

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ABSTRACT:

Some novel imines have been synthesized and tested as antibacterial agents. The results of the in vitro tests showed that most of the synthesized compounds were antimicrobial and antifungal inactive against E.coli. and fungus.

KEYWORDS: Synthesis, Imines, Investigation, Antibacterial and antifungal activity.

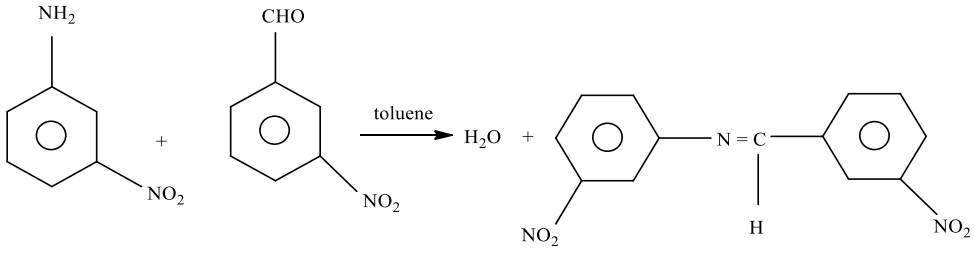
INTRODUCTION:

Schiff bases such as substituted imines are a class of important compounds in medicinal and pharmaceutical field. They show biological activities including antimicrobial and antifungal activities . In view of the above observations, synthesis ofN,bis(3nitrophenyl)methanimine,4-nitro-N-(2-nitrobenzylidene)aniline , 4-(4nitrophenyl)imino) methyl phenol and 2-nitro-N-(4-nitrobenzylidene) aniline have been developed starting from various substituted benzaldehyde and anilines with the aim of investigating their antimicrobial and antifungal activity.

EXPERIMENTAL SECTION:

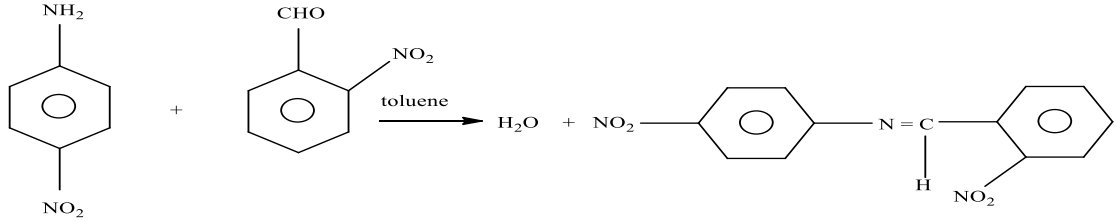
Compound A: Synthesis of N,bis(3-nitrophenyl)methanimine

3–nitroaniline in 20 mL toluene was added to a solution Metanitrobenzaldehyde. The mixture was heated under reflux for 2 hour in the presence of 4A molecular sieves. The mixture was filtered and then solvent was evaporated. The crude products were purified by crystallization from ethanol to give compounds.



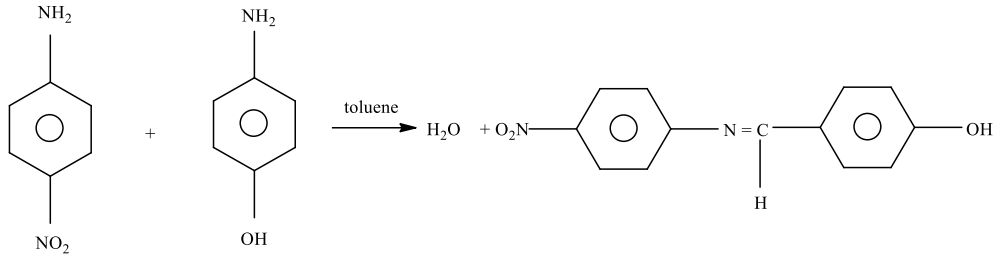
Compound B : Synthesis of 4-nitro-N-(2-nitrobenzylidene)aniline

Paranitroanilinein20ml toluene was added to a solution Orthobenzaldehyde. The mixture was heated under reflux for 2 hour in the presence of 4A molecular sieves. The mixture was filtered and then solvent was evaporated. The crude products were purified by crystallization from ethanol to give compounds.



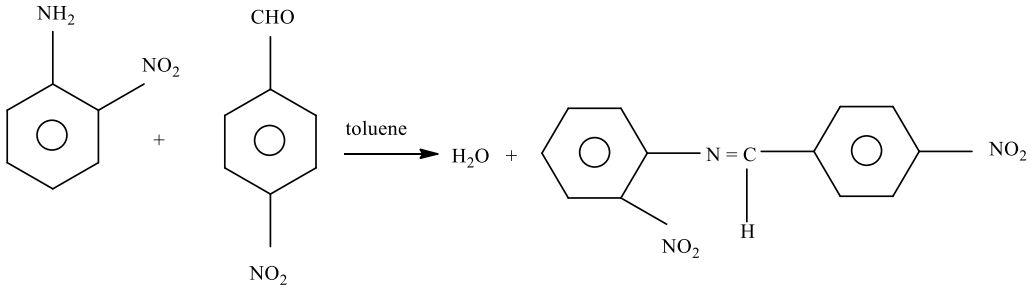
Compound C : Synthesis of 4-(4nitrophenyl)imino) methyl phenol

Paranitroanilinein 20ml toluene was added to solution 4hydroxybenzaldehyde. The mixture was heated under reflux for 2 hour in the presence of 4A molecular sieves. The mixture was filtered and then solvent was evaporated. The crude products were purified by crystallization from ethanol to give compounds.



Compound D: Synthesis of 2-nitro-N-(4-nitrobenzylidene) aniline

Paranitroaniline in 20 mL toluene was added to a solution Orthonitrobenzaldehyde. The mixture was heated under reflux for 2 hour in the presence of 4A molecular sieves. The mixture was filtered and then solvent was evaporated. The crude products were purified by crystallization from ethanol to give compounds.



CHARACTERIZATION :

Various spectral, analytical and biological applications of the above Schiff bases & their complexes were studied. The details are as under: Some physical properties analytical and spectral data of the substituted imines compounds are summarized in Table 1

Table 1. Analytical and spectral data of compounds.

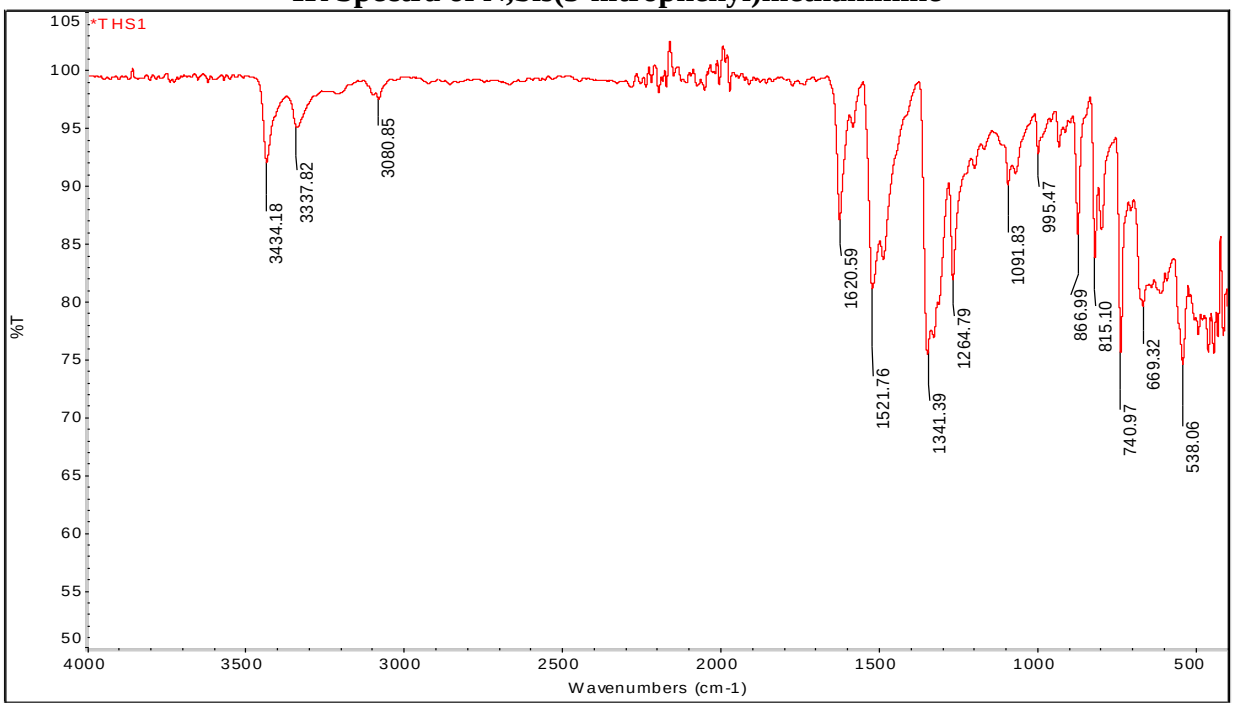
Compound No.	Melting point., °C	Yield	UV λmax MeOH, nm	IR band, cm-1	H^1 NMR
Compound A	153	78 %	600 , 230	1610 ν (N=C)	δ 8.61 (s, 1H), 7.95 (d, J = 5.0 Hz, 2H), 7.53 (s, 3H), 7.42 (t, J = 7.5 Hz, 2H),7.30–7.22 (m, 3H).
Compound B	133	73%	600 , 230	1640 ν (N=C)	δ 8.61 (s, 1H), 7.95 (d, J = 5.0 Hz, 2H), 7.53 (s, 3H), 7.42 (t, J = 7.5 Hz, 2H),7.30–7.22 (m, 3H).
Compound C	155	72%	600, 230	1610 ν (N=C)	δ 8.61 (s, 1H), 7.95 (d, J = 5.0 Hz, 2H), 7.53 (s, 3H), 7.42 (t, J = 7.5 Hz, 2H),7.30–7.22 (m, 3H).

Compound D	133	76%	600, 230	1620v (N=C)	δ 8.61 (s, 1H), 7.95 (d, J = 5.0 Hz, 2H), 7.53 (s, 3H), 7.42 (t, J = 7.5 Hz, 2H),7.30–7.22 (m, 3H).

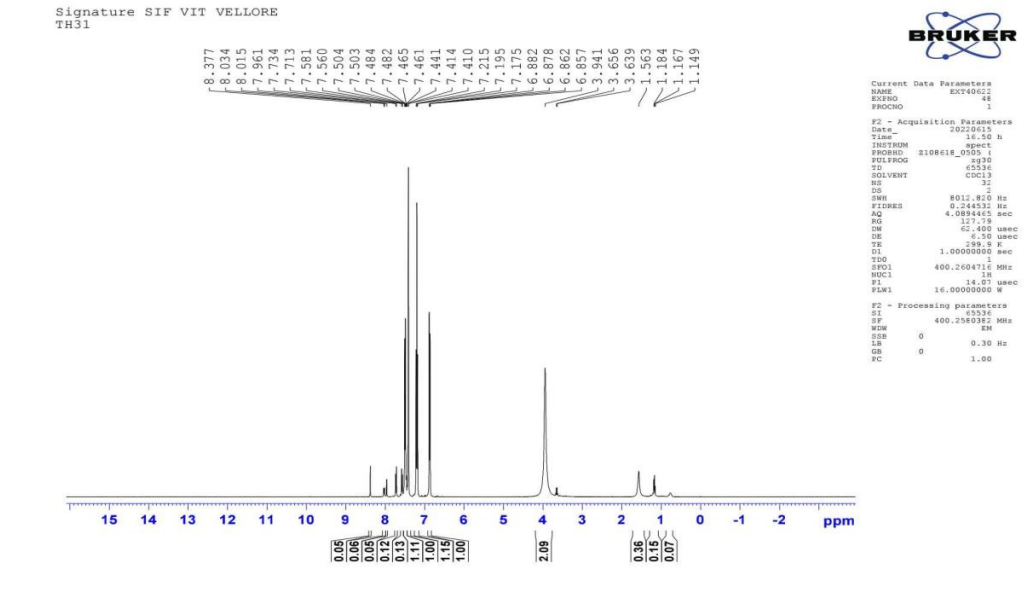
The infrared spectral data of the imines are in agreement with the expected range. A band at 1600-1660 cm-1 is due to C=N vibration. The UV absorption show bands for all compounds at about λmax 600 and 230 nm corresponding to n-π* with conjugated system compounds.

SPECTRAL DATA :

IR Spectra of N,bis(3-nitrophenyl)methanimine



^{1}H-NMR of N,bis(3-nitrophenyl)methanimine



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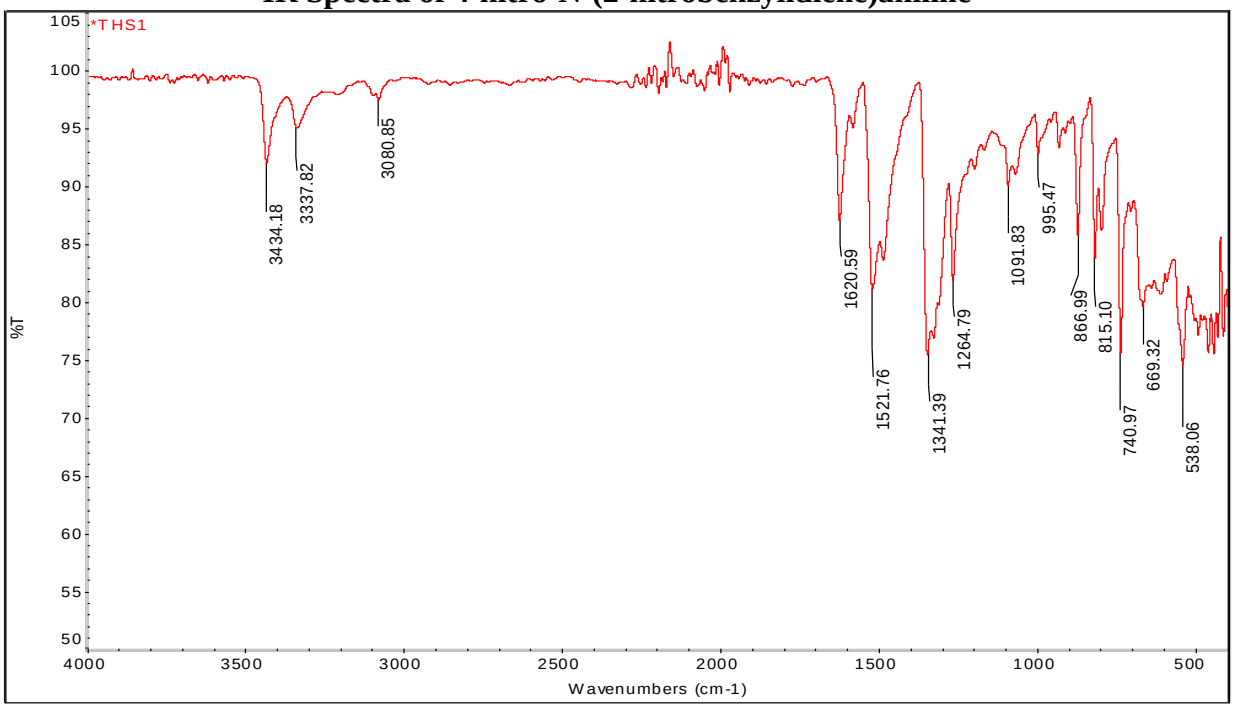
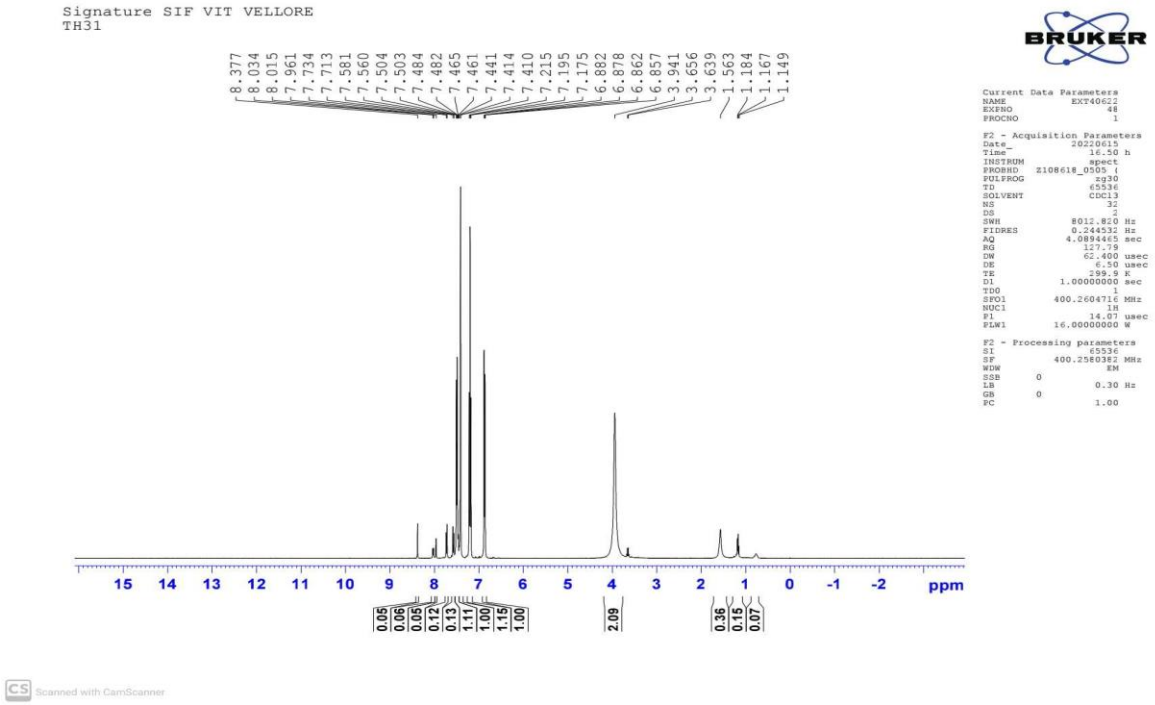
IR Spectra of 4-nitro-N-(2-nitrobenzylidiene)aniline



^{1}H-NMR of 4-nitro-N-(2-nitrobenzylidiene)aniline



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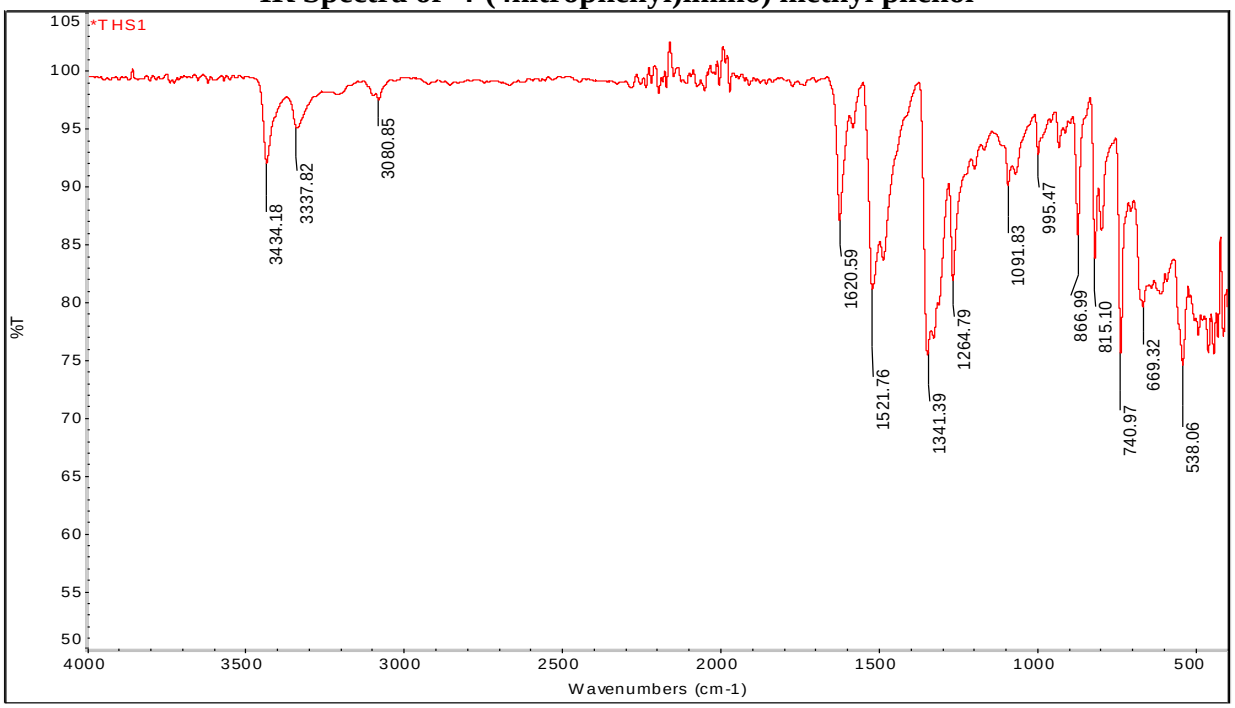
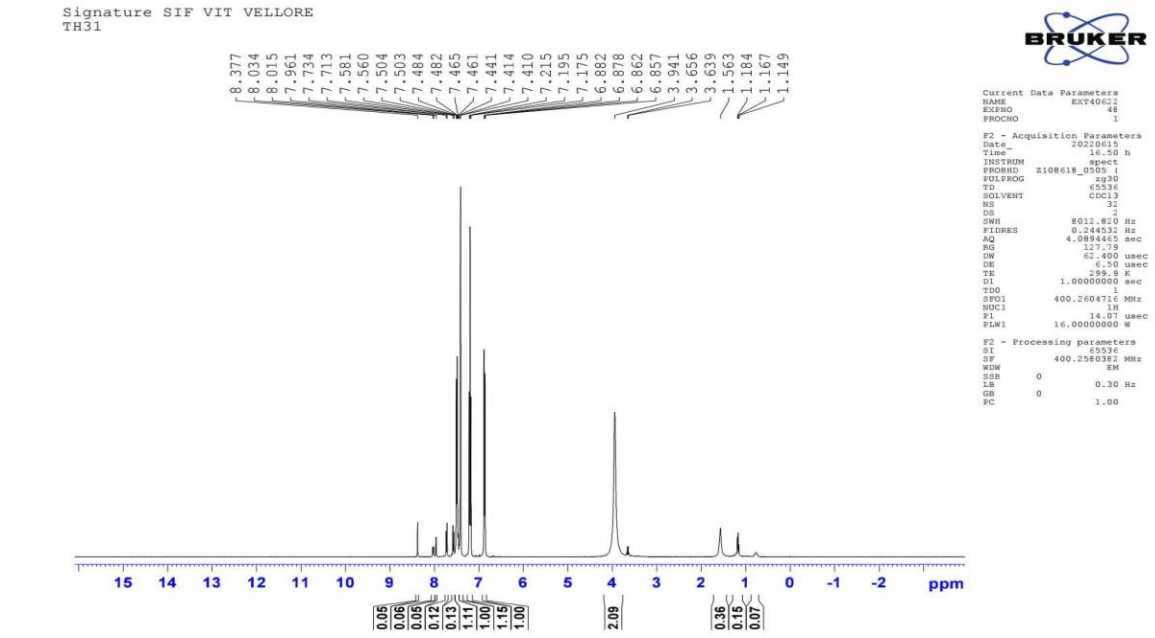
IR Spectra of 4-(4nitrophenyl)imino) methyl phenol



^{1}H-NMR of 4-(4nitrophenyl)imino) methyl phenol



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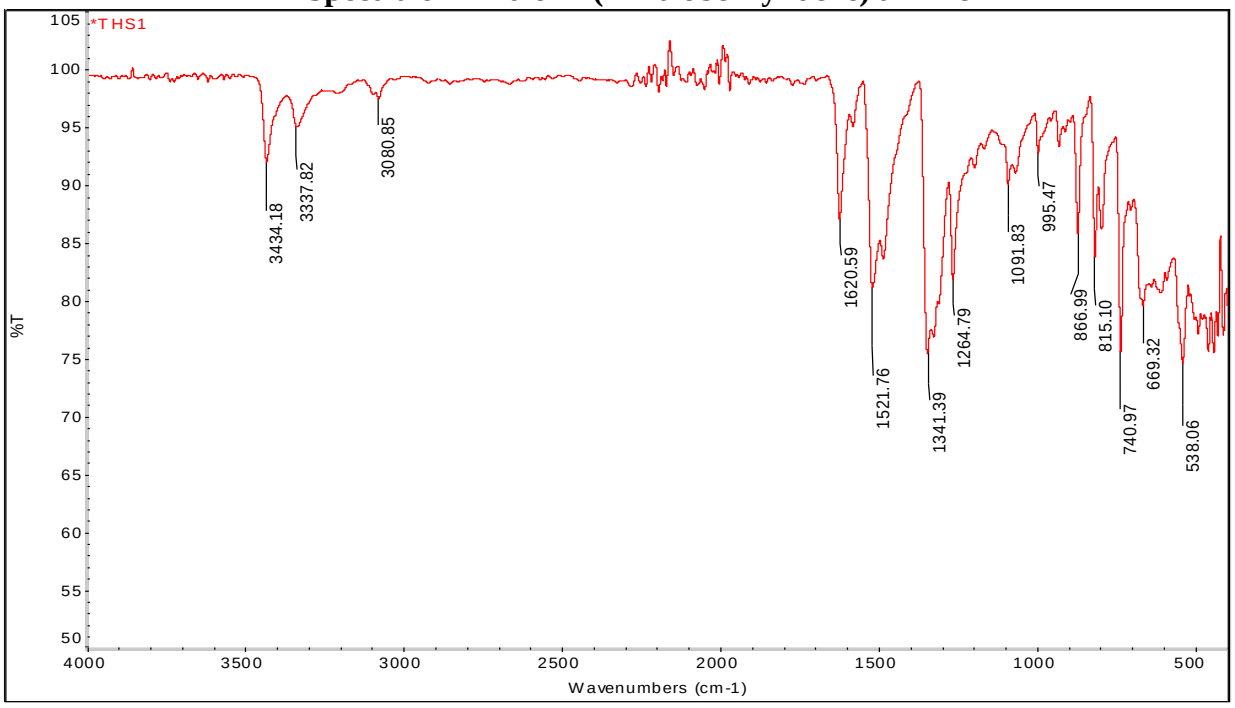
IR Spectra of 2-nitro-N-(4-nitrobenzylidene) aniline



^{1}H-NMR of 2-nitro-N-(4-nitrobenzylidene) aniline

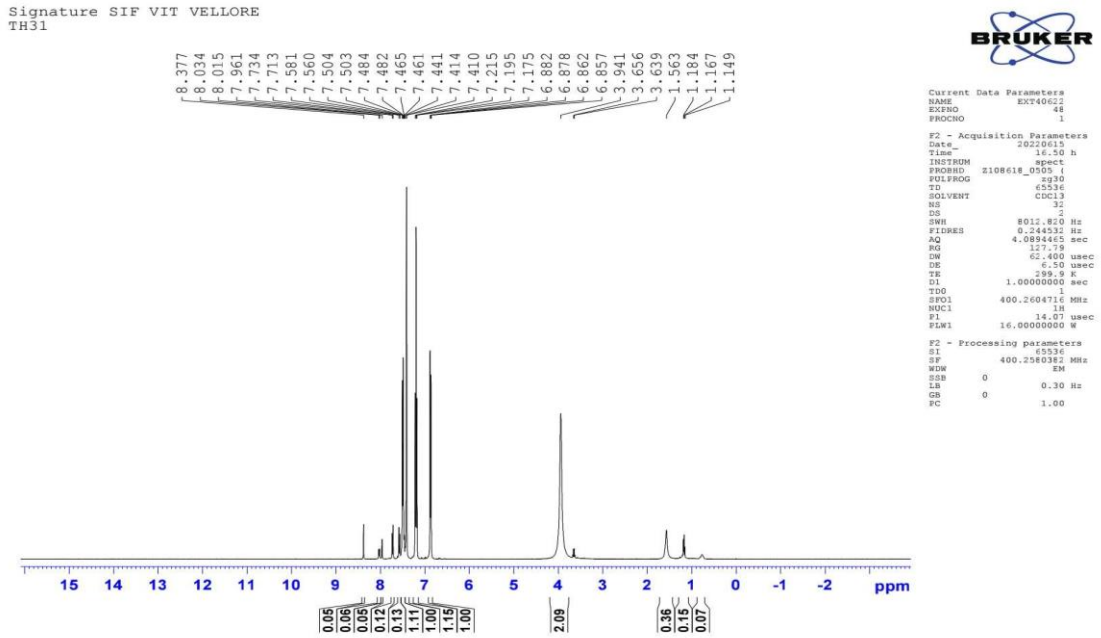


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Table 2. Antimicrobial and Antifungal activity of compounds

ZONE OF INHIBITION IN MM		
TEST COMPOUND	GM+VE BACTERIA	FUNGUS
	Escherichia coli	**Yeast**
Compound A	18 mm	25 mm
Compound B	16 mm	26 mm
Compound C	15 mm	27 mm
Compound D	14 mm	25 mm
REFERENCE ANTIBIOTICS	38 mm (FLUCONAZOLE)	39 mm (FLUCONAZOLE)
CONTROL DISC (CHOLROFORM)	--	--

On the basis of Anti- Microbial testing of the given compounds found to be Anti-Microbial & Antifungal activity.

CONCLUSION :

The condensation of substituted aniline and substituted aldehyde was accomplished using imines was using solvent toluene. Substituted imines show the good efficiency for the condensation reaction with maximum yield in less reaction time. Moreover , the present protocol remains an effective and environmental friendly alternative method for production of imines.

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