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Amino Phenolic AZO Compounds Synthesis and Bilogical Analysis

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Abstract

The diazotization reaction pathway has been used for the synthesis of several azo compounds. This synthesis consists of amino phenol. The resultant products are characterized by FTIR / ^{1}H NMR spectroscopy method. These products show excellent antimicrobial behavior.

Keywords: Azo compounds, Amino phenol, Antimicrobial activity, Diazotization.

Introduction

Azo compounds have always been a point of interest in the science community[1]. Azo compounds are excellent organic dyes and find an application in different electronic fields.These compounds, due to their azo linking properties are used in laser beams and electronic filters[2].

Azo compounds have a wide range of application in different areas such as dyeing, fabric, fiber, printing industries[3-4]. Azo compounds are used from foods, cosmetic to highly advanced printers, toners and copiers.

Azo compounds are used as pH analysts and reagents[5]. The azo compounds find place in pharmaceutical usage due to their anti-bacterial reactions[6]. These Biological properties of the azo compounds help treat different diseases resulting from bacteria, cancer and diabetes to name a few.

The moiety found in these compounds show that these are the best pesticides and anti-bacterial agents. This moiety is the reason behind the anti-bacterial activity and the pesticidal behavior.

Materials and Methods

We have used m-amino phenol in this work and derived 8 new azo compounds using different amines. We have used highest purity chemicals from Sigma – Aldrich for this research work. We have used different methods such as mass spectroscopy, ^{1}H NMR and IR for the characteristics analysis. We have calculated an uncorrected melting point in this process.

The FTIR instrument was used for the IR spectrum determination. ^{1}HNMR spectra was determined on the highly advanced NMR spectrometer at the SAIF facility, Chandigarh. We have used ethanol for recrystallization in this work. Thin layer chromatography was used to determine the purity of the derived compounds.

Antimicrobial Activity: We have used four different microbes to determine the antibacterial activities and the process used was disc diffusion and for thischloroform was used as the solvent. The zone of inhibition was noted by using an antibiotic zone caliper.

AZO Compounds Synthesis Method: The aromatic amines were added to the concentrated HCL and the mixture was diluted with water. The solution was cooled and $NaNO_2$was added to the resultant mixture. Then diazonium was added to the m-amino phenol with constant stirring. Ethanol was used for the recrystallization. The synthesis reaction is shown in the Figure-1.

Safety: i. No skin contact with any of the chemicals. ii. No eye contact with the irritant solution, iii. Process all the reactions under cold conditions to avoid explosion.

Results and Discussion

The spectrum determined for IR and ^{1}HNMR are consistent with the signals expected. These signals exhibit the correspondence with the azo compound structures.

Conclusion

The new azo compounds series IIA-IIH synthesis determined their anti-microbial behavior. The azo dyes synthesized in here are good candidates for further study in terms of the investigation of their biological activities. This might create a new vista of opportunity in new drug discovery and medicinal research.

Acknowledgements

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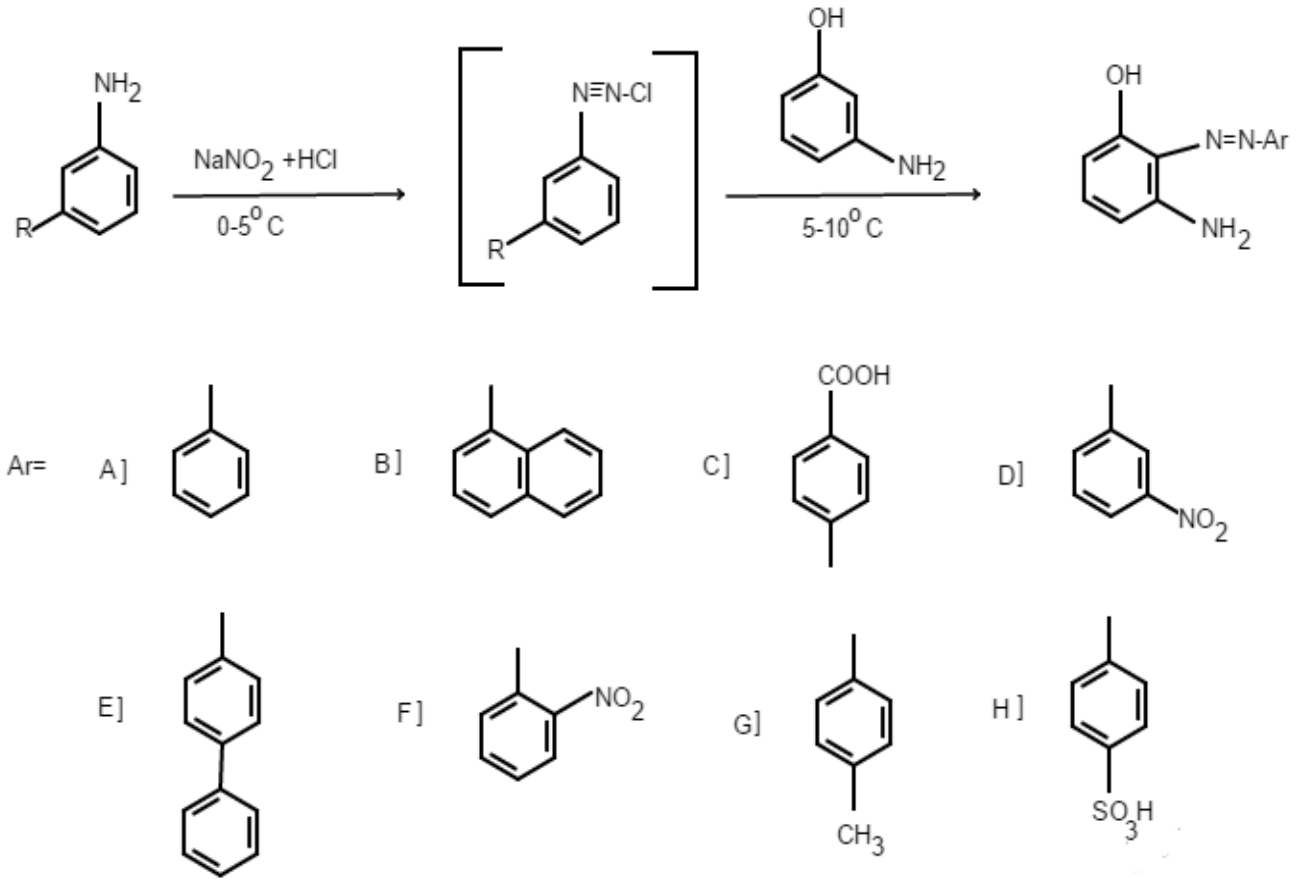

Figure-1
Reaction scheme for synthesis of azo compounds

Table-1
Anti-Microbial activity for the resultant products

Symbol	Zone inhibition diameter (mm)			
	E. Coli	**S.Typhi**	**P. Aeruginosa**	**S. Aureous**
IIA	10.5	_	19	18
IIB	_	_	14	17
IIC	_	15	21	22
IID	_	_	11	13
IIE	21	14	19	18
IIF	20	_	22	20
IIG	17	11	17	19
IIH	15	10	16	20

Table-2
IR spectral data for the resultant compounds

Symbol	IR Result
II A	3321(OH stretching), 3061(N-H stretching of NH_2), 1494(N=N stretching), 1234(C-N), 1556(C=C aromatic), 2895(=C-H aromatic)
II B	2993(OH stretching), 2875(N-H stretching of NH_2), 1531(N=N stretching), 2763(=C-H aromatic), 856(=C-H aromatic), 1454(C=C aromatic)
IIC	3323(OH stretching), 3018(N-H stretching of amine), 1714(C=O stretching of COOH), 1479(N=N stretching), 1253 (C-O stretching), 2611(OH stretching of COOH)
II D	3022(OH stretching), 2885(N-H stretching of amine), 1479(N=N stretching), 1313(NO_2 stretching), 2777(=C-H stretching), 1537(C=C stretching)
II E	3325(OH stretching), 3107(N-H stretching of amine), 1504(N=N), 1537(C=C aromatic), 3008(C-H aromatic)
II F	3481(OH stretching), 3352(N-H stretching of amine), 1500(N=N stretching), 1384(NO2 stretching), 1604(C=C stretching), 3032(=C-H stretching)
II G	3464(OH stretching), 3319(N-H stretching of amine), 1504(N=N stretching), 2875(C-H stretching of CH_3), 3022(=C-H stretching), 1454(C=C stretching), 1714(Ar-CH_3 stretching
II H	1124(S=O stretching), 624(S-O stretching), 1494(C=C stretching), 3007(OH stretching), 3643(N-H stretching of amine), 1494(N=N stretching), 2891(=C-H stretching)

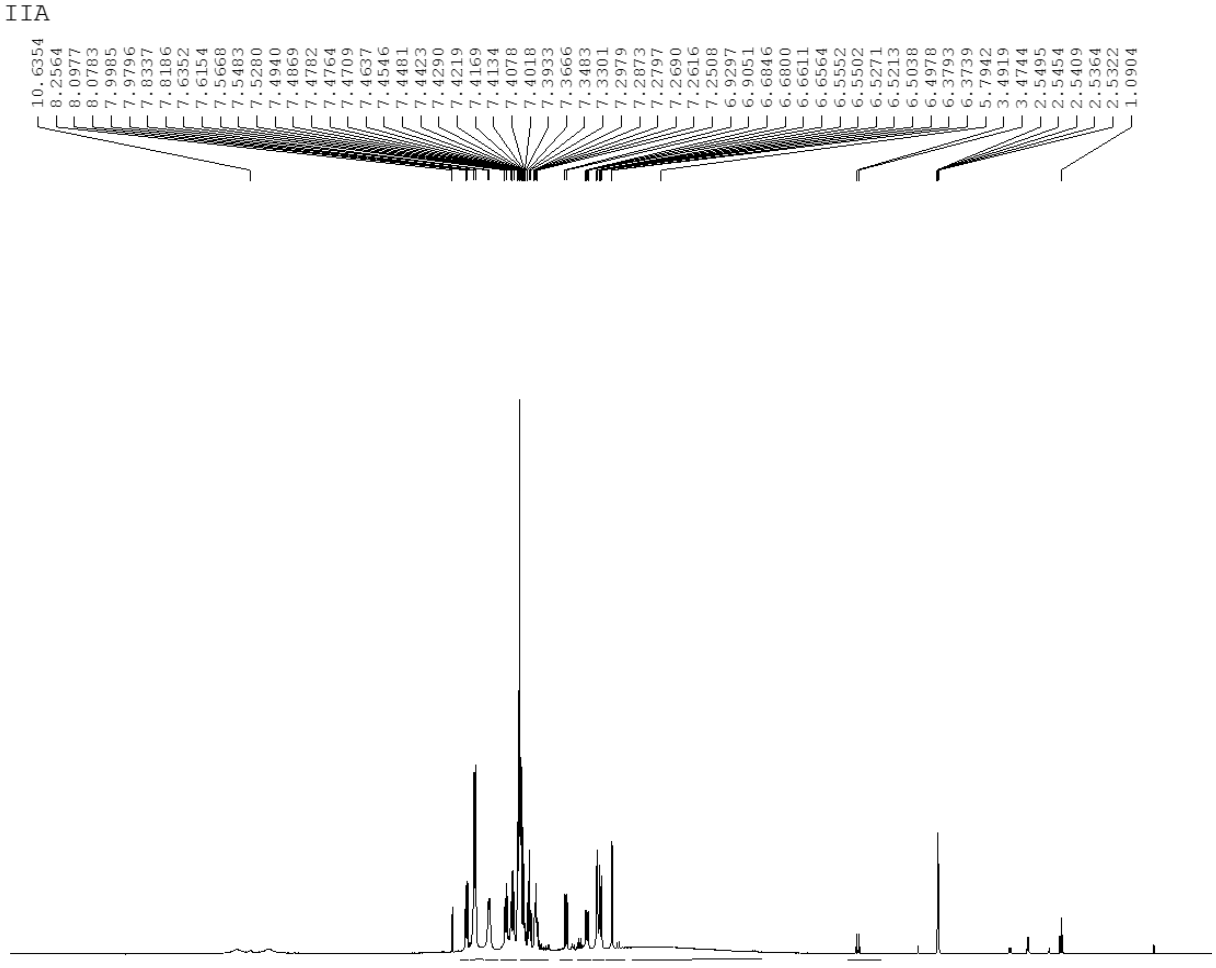

Figure-2
^{1}H NMR Spectra for product IIA

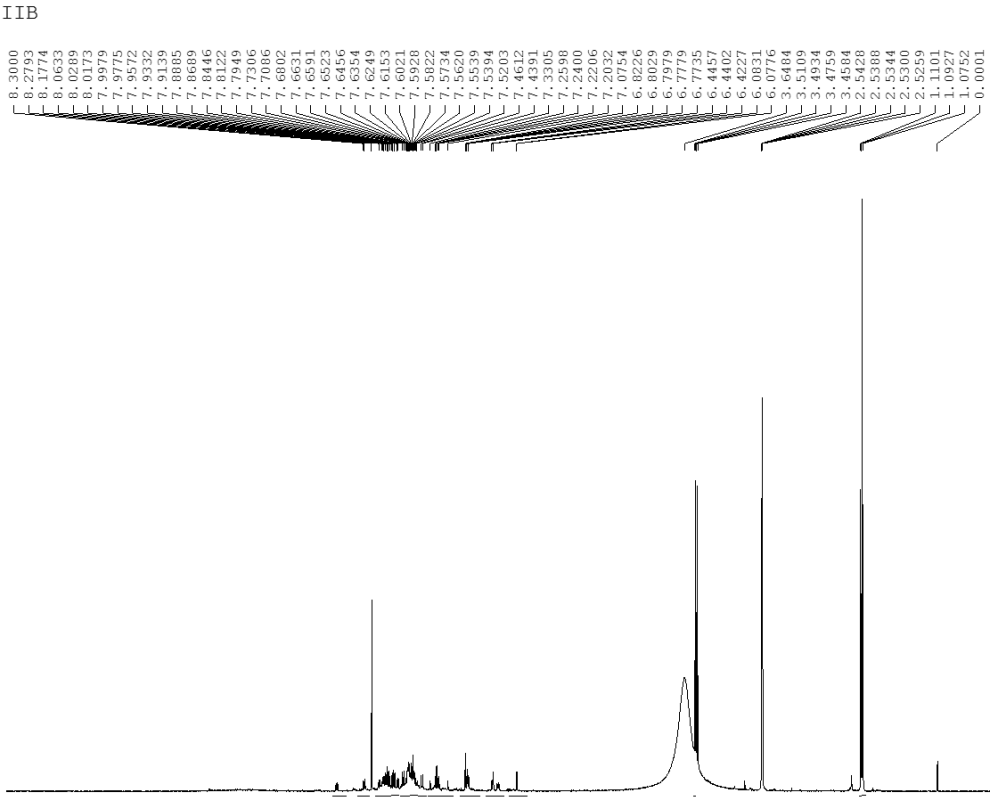

Figure-3
^{1}H NMR Spectra for product IIB

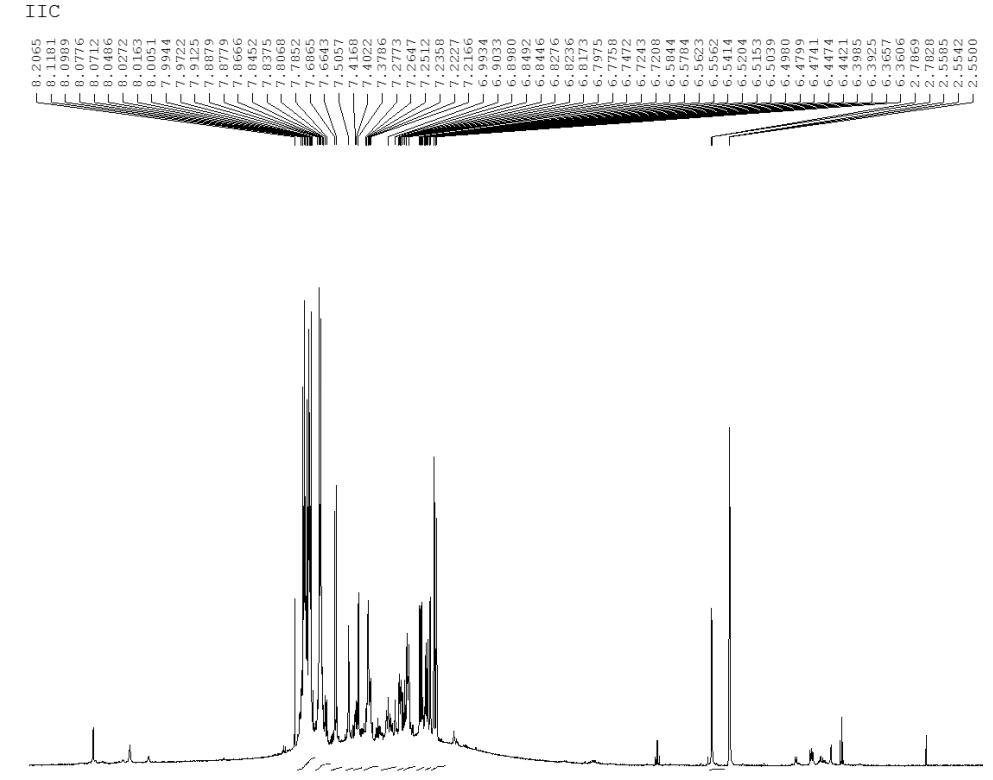

Figure-4
^{1}H NMR Spectra for product IIC

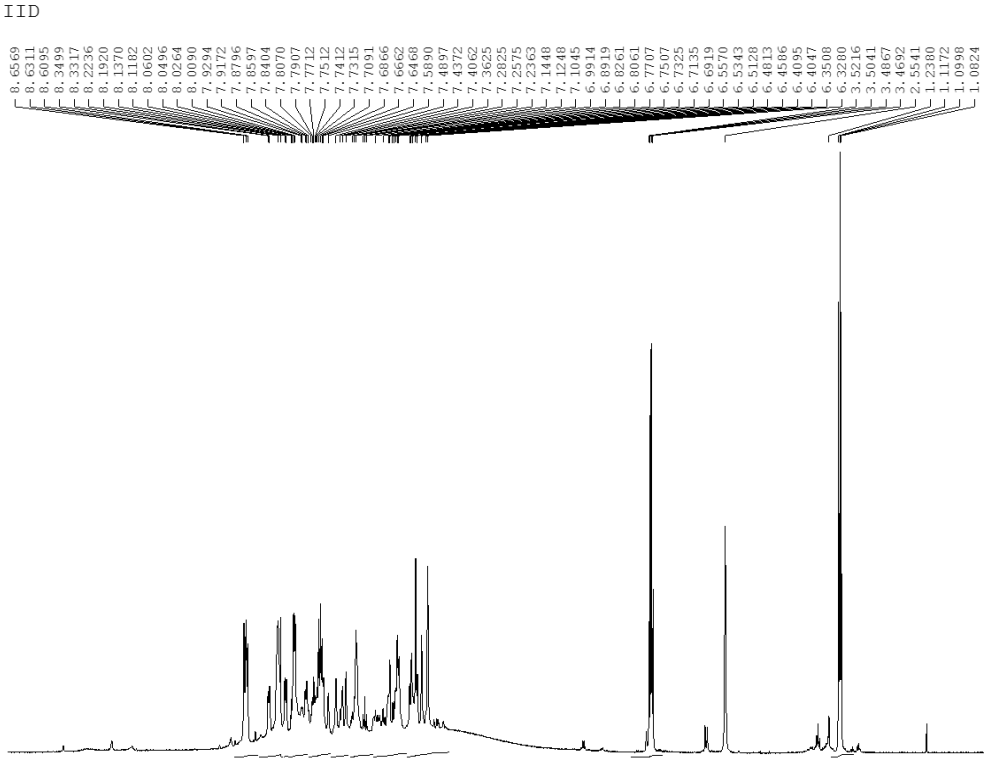

Figure-5
^{1}H NMR Spectra for product IID

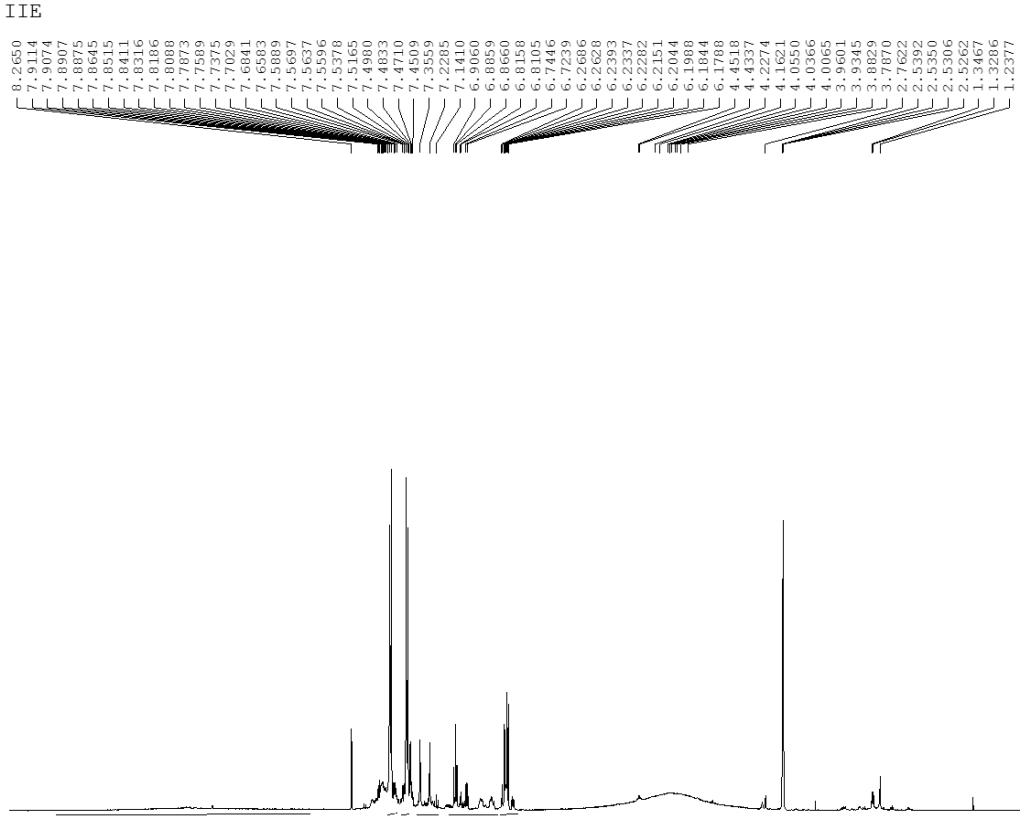

Figure-6
^{1}H NMR Spectra for product IIE

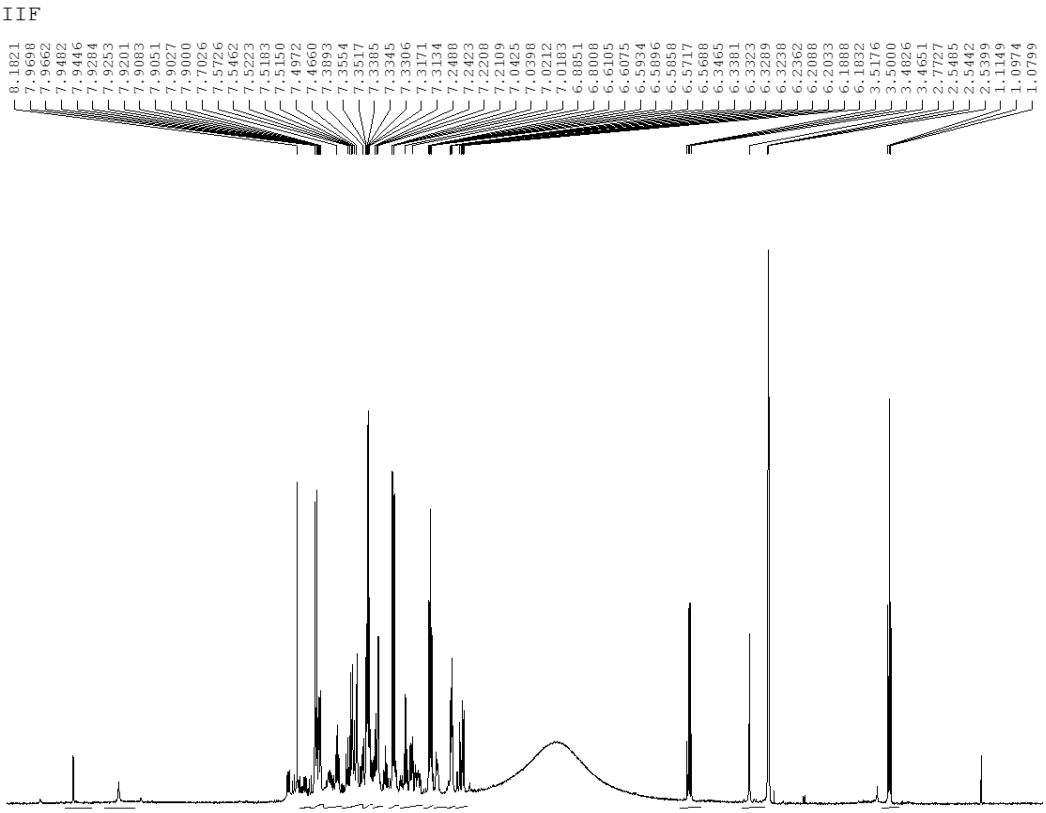

Figure-7
^{1}H NMR Spectra for product IIF

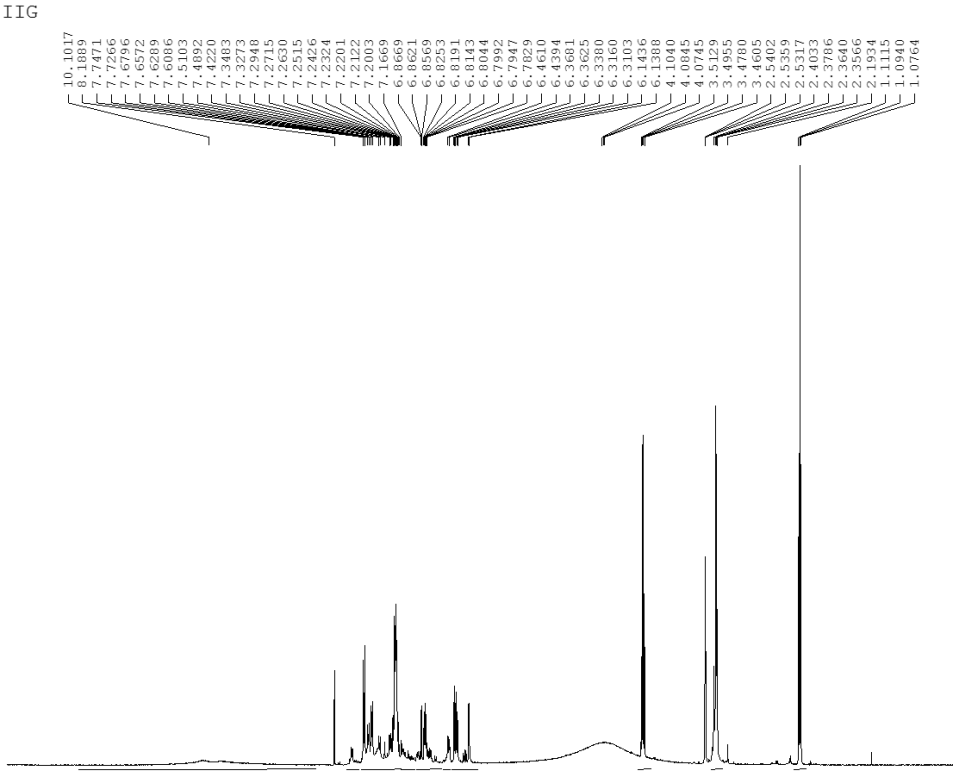

Figure-8
^{1}H NMR Spectra for product IIG

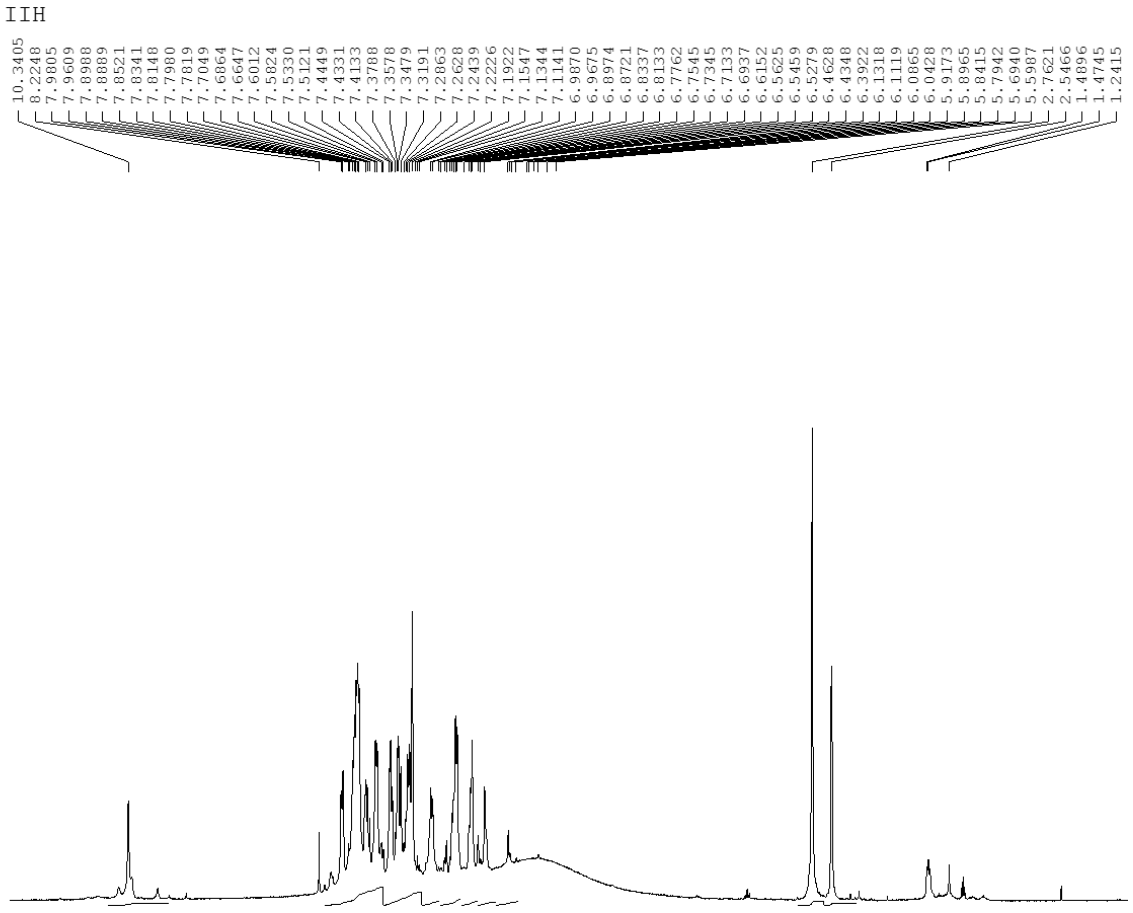

Figure-9
^{1}H NMR Spectra for product IIH

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