Heterocyclic Letters
Vol. 14| No.4|737-741|Aug-Oct|2024
ISSN : (print) 2231–3087 / (online) 2230-9632
CODEN: HLEEAI
http://heteroletters.org

SYNTHESIS OF NOVEL POLYCYCLIC SCHIFF BASE AND ITS MICROBIAL EVALUTION

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Abstract:
We are interested in synthesis and developing the chemistry of novel polycyclic schiff base. For this 6-chrysenecarboxaldehyde was treated with the different aromatic aldehyde to yields the respective polycyclic schiffbase.The structures of the synthesized compounds were confirmed by physico-chemical test and spectral techniques, representative samples were screened for their antimicrobial activity against gram positive and gram negative bacteria.

Keywords: 6-Chrysenecarboxaldehyde, Aniline derivatives, Schiff base.

Introduction:

Schiff base linker (C=N) is a structural motif in various compounds exhibiting biological activity, treated as intermediates in organic synthesis. The great advantage of schiff bases is simplicity in synthesis because they can be prepared in one step condensation reaction between substrates with carbonyls (aldehyde and ketones) and amines.[i-vi] Moreover, they can be considered as environmentally friendly compounds because water is the only byproduct, any expensive catalyst is not necessary and complicated purification is not required.[vii-ix] This article is devoted to schiff bases, that ispolyaromatic hydrocarbon 6-chrysenecarboxaldehyde which are highly fluorescent organic compounds.[x-xii]

Methodology

Melting points of all synthesized compounds were determined in open capillary tubes on an electro thermal apparatus and are uncorrected. The progress of reaction was monitored by thin layer chromatography on silica gel coated aluminum plates (Merck) as adsorbent and UV light as visualizing agent. ^{1}H NMR spectra were recorded on Varian 500 MHz NMR spectrophotometer using $CDCl_3$/DMSO-d_6 as solvent and TMS as an internal standard (chemical shifts in δppm).C, H, N was recorded on Carlo Erba 1108 (CHN) with Elemental Analyzer.

General procedure for synthesisof polycyclic schiff base:
All the compounds were prepared using the same procedure. Different aniline derivtives (1.2mole equivalent) were dissolved in solvents like alcohols and aprotic solvents and added 6-chrysenecarboxaldehyde (1.0 mole equivalent) in presence of acid catalyst such as acetic acid, trifluoroacetic acid, p-toluene sulfonic acid. The reaction mixture was stirred and heated upto 90°C for 5hrs to 24hrs.The progress of the reaction was monitored on TLC. The product was filtered and washed with solvent respectively and dried (Scheme 1)

1-(Chrysen-6-yl)-N-phenylmethanimine (1):
m.p.=445-448°C, yield=81%
Anal.Calcd for $C_{25}H_{17}N$: C, 90.59; H, 5.20; N, 4.21. Found C, 90.60; H, 5.17; N, 4.23.
IR (cm-1): 1623 (CH=N stretching).
^{1}H NMR (DMSO-d6, δ/ ppm): 8.68 (s, 1H, CH=N), 9.57 (S, 1H, AR-H), 7.47 – 8.84 (m,15H,Ar-H).
^{13}CNMR(DMSO-d6,δ/ppm): 160 (-CH=N), 121.4,122.5,123.3,124,125.8,126.6,127.5,128.1,129.8, 130.5,131.9,152.2 (Ar-C-N).
LCMS;m/z:331

1-(Chrysen-6-yl)-N-(4-methoxyphenyl)methanimine (2):
m.p.=315-320°C, yield=72%
Anal.Calcd for $C_{26}H_{19}NO$: C, 86.36; H, 5.32; N, 3.89; O, 4.43. Found C, 86.40; H, 5.30; N, 3.87; O, 4.43.
IR (cm-1): 1628 (CH=N stretching). 1130 (C-O-C stretching)
^{1}H NMR (DMSO-d6, δ/ ppm): 8.68 (s, 1H, CH=N), 9.57 (S, 1H, AR-H), 6.96– 8.84 (m,15H,Ar-H), 3.81 (s, 3H,O-CH3).
^{13}CNMR(DMSO-d6,δ/ppm):160 (-CH=N), 159 (Ar-C-O), 121.4,122.5,123.3,124,125.8,126.6,127.5,128.1,129.8,130.5,131.9,144 (Ar-C-N),55.8 (O-CH3).
LCMS;m/z:361

N-(4-Chlorophenyl)-1-(chrysen-6-yl)methanimine (3):
m.p.=338-346°C, yield=79%
Anal.Calcd for $C_{25}H_{16}NCl$: C, 82.07; H, 4.40; N, 3.83; Cl, 9.70L. Found C, 82.07; H, 4.41; N, 3.83; Cl, 9.69.
IR (cm-1): 1615 (CH=N stretching), 740 (C-Cl strong)
^{1}H NMR (DMSO-d6, δ/ ppm): 8.68 (s, 1H, CH=N), 9.57 (S, 1H, AR-H), 7.47 – 8.84 (m, 14H,Ar-H).
^{13}CNMR(DMSO-d6,δ/ppm):160 (-CH=N), 121.4,122.5,123.3,124,125.8,126.6,127.5,128.1,129.8, 130.5,132.9 (Ar-C-Cl),146.3 (Ar-C-N).
LCMS;m/z:365

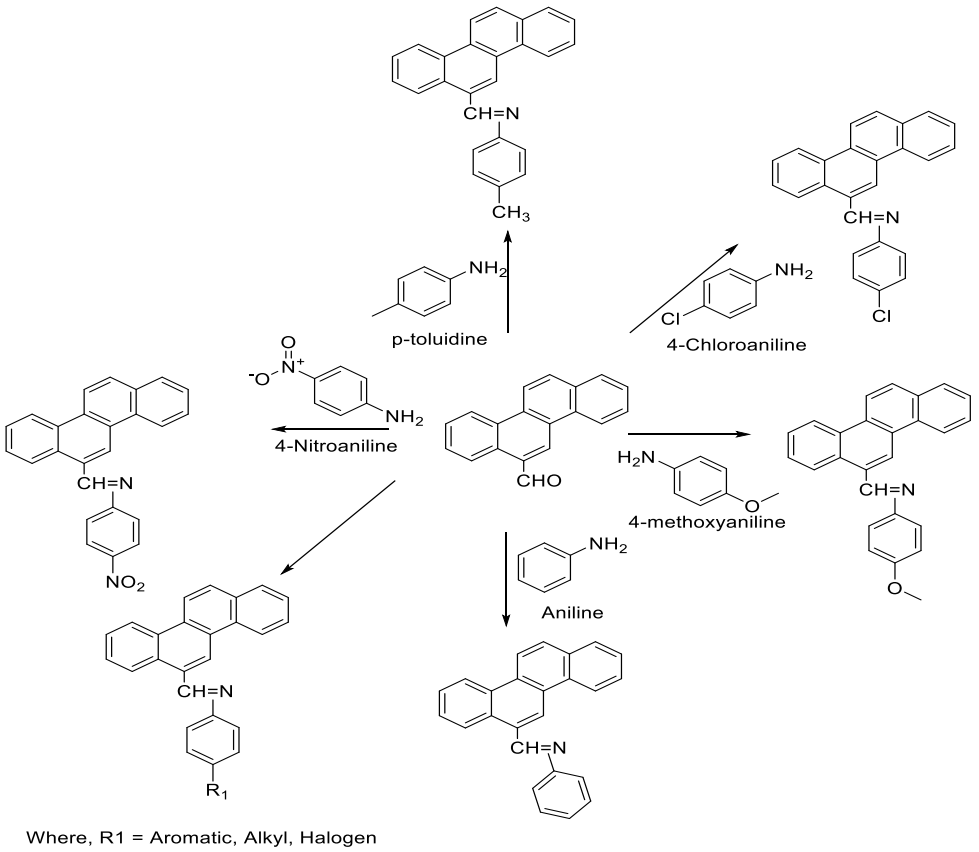
1-(Chrysen-6-yl)-N-(4-nitrophenyl)methanimine (4):
m.p.=296-303°C, yield=87%
Anal.Calcd for $C_{25}H_{16}N_2O_2$: C, 79.75; H, 4.28; N, 7.42; O, 8.55. FoundC, 79.75; H, 4.28; N, 7.44; O, 8.53.
IR (cm-1): 1672 (CH=N stretching), 1360, 1545 (NO_2 stretching)
^{1}H NMR (DMSO-d6, δ/ ppm): 8.68 (s, 1H, CH=N), 9.57 (S, 1H, AR-H), 7.47 – 8.84 (m, 14H,Ar-H).
^{13}CNMR(DMSO-d6,δ/ppm):160 (-CH=N), 121.4,122.5,123.3,124,125.8,126.6,127.5,128.1,129.8, 130.5,131.9,154.2 (Ar-C-N), 146.4 (Ar-

C-NO2).
LCMS;m/z:376

1-(Chrysen-6-yl)-N-(p-tolyl)methanimine (5):
m.p.=385-390°C, yield=80%
Anal.Calcd for $C_{26}H_{19}N$: C, 90.43H, 5.54; N, 4.03. Found C, 90.42; H, 5.54; N, 4.04.
IR (cm-1): 1642 (CH=N stretching)
^{1}H NMR (DMSO-d6, δ/ ppm): 8.68 (s, 1H, CH=N), 9.57 (S, 1H, AR-H), 7.47 – 8.84 (m, 14H,Ar-H), 2.34 (s, 3H, CH_3).
^{13}CNMR(DMSO-d6,δ/ppm):160 (-CH=N), 121.4,122.5,123.3,124,125.8,126.6,127.5,128.1,129.8, 130.5,131.9,149.1 (Ar-C-N), 136.9 (Ar-C-CH_3), 21.3 (-CH_3).
LCMS;m/z:345

Antimicrobialactivities
All the newly synthesized compounds were evaluated for their antimicrobial activity against gram-negative bacteria, *E coli* and *P aeruginosa* and gram-positive bacteria, *S aureus*, and *C diphtheria*usingdiscdiffusionmethod[XVIII-XIX].Thezoneofinhibitionwasmeasuredinmm and the activity was compared with standard drug. The data is given in **TABLE I**.

General Scheme 1



Results and Discussion:
In the present study, a series of 6-chrysene carboxaldehyde and different aniline schiff base were designed and synthesized, it involves one step, the compound 1 to 5 were synthesized in high yields. The representative compounds were evaluated for antimicrobial activity, which showed promising activity. The structure of all the synthesized compounds were

characterized on the basis of the chemical and spectral techniques such as IR, ^{1}H NMR, ^{13}C NMR and elemental analysis techniques.

Acknowledgement:
Authors are thankful to Marwadi University, Rajkot, Gujarat and Lewens Labs Pvt. Ltd. Authors are also thankful to the Director, Institute of Science Mumbai for spectral data.

Table-I. **Antimicrobial activities of some newly synthesized compounds.**

Compds	Inhibition Zone(mm)			
	Gram-negative		Gram-positive	
	E.coli	*P.Putide*	*B.Subtilis*	*S.lactis*
1	10	11	16	15
2	8	8	14	14
3	15	12	15	17
4	7	5	12	11
5	8	7	12	12
DMSO	0	0	0	0
Ampicilin®	22	20	19	22

E.coli.=Escherichiacoli;P.Putide=PseudomonasPutide;B.Subtilis=Bacillus Subtilis; S. lactis = Sterptococcus lactis.

The sensitivity of microorganisms to the tested compounds is identified in the following manner*;
Highly Sensitive = Inhibition zone:15-20 mm
Moderately Sensitive=Inhibitionzone:10-15mm
Slightly Sensitive = Inhibition zone: 5-10 mm
Not Sensitive=Inhibitionzone:0 mm
*Each result represents the average of triplicate readings.

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Received on July, 2024.