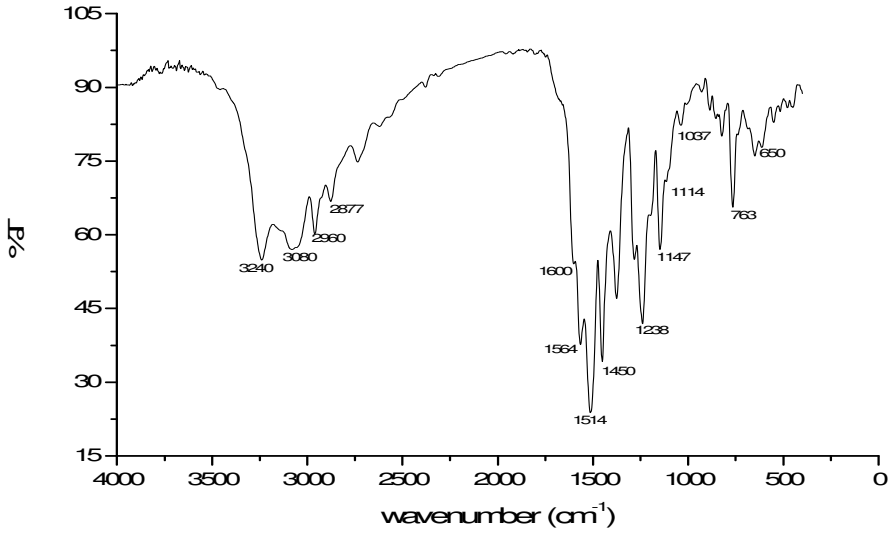
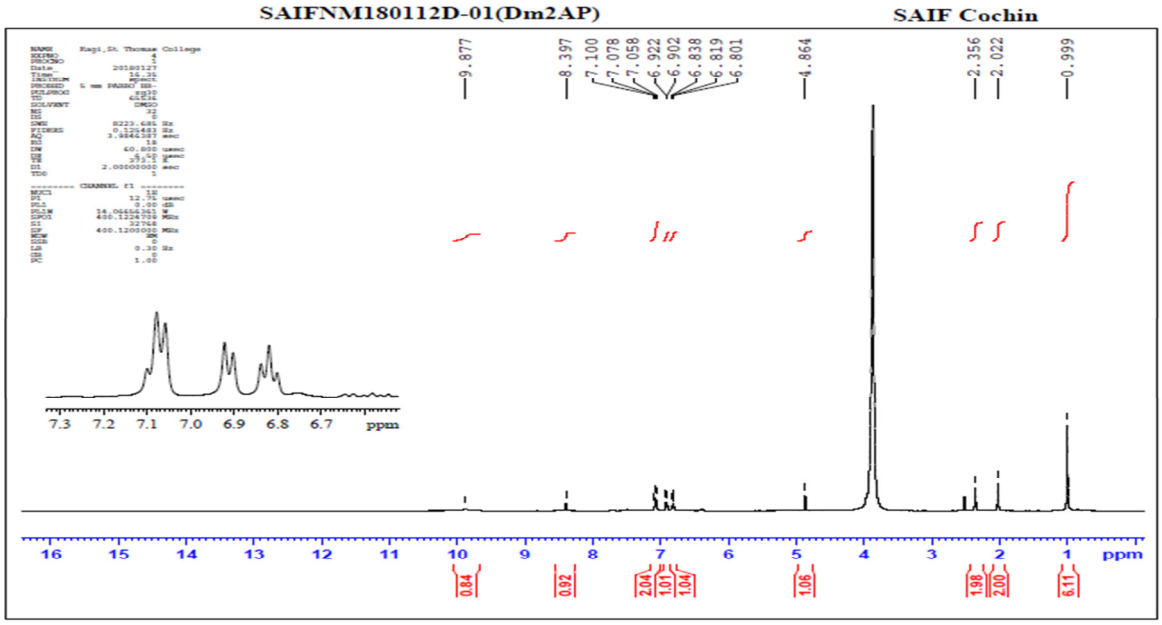
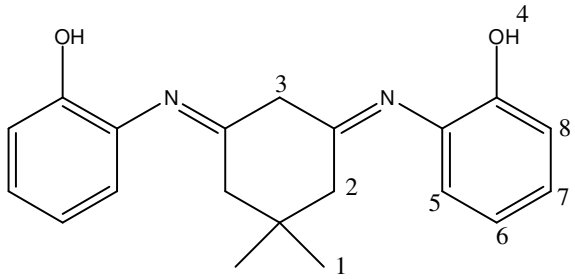
IR spectral studies



Characteristic stretching frequencies of various bonds in DmChDp were obtained from the IR spectrum. The azomethine moiety (C=N) was identified by the peak at 1600cm^{-1}. A band at 3080cm^{-1} was due to the aromatic C-H bond stretching vibration. ν_{C-O} was observed at 1238 cm^{-1}. $\nu_{C=C}$ stretching vibration of the aromatic ring was observed at 1564 and 1514 cm^{-1}. A band at 3240 cm^{-1} indicates the stretching vibration of OH group. The C-H bond involving sp3 hybridized carbon gave characteristic bands at 2960 and 2877 cm^{-1}. A peak at 1450 cm^{-1} corresponds to C-H bending vibration. In plane deformation was observed at 1147, 1114 and 1037 cm^{-1}. Out of plane deformation was observed at 763 and 650 cm^{-1}.

^{1}H NMR spectral studies

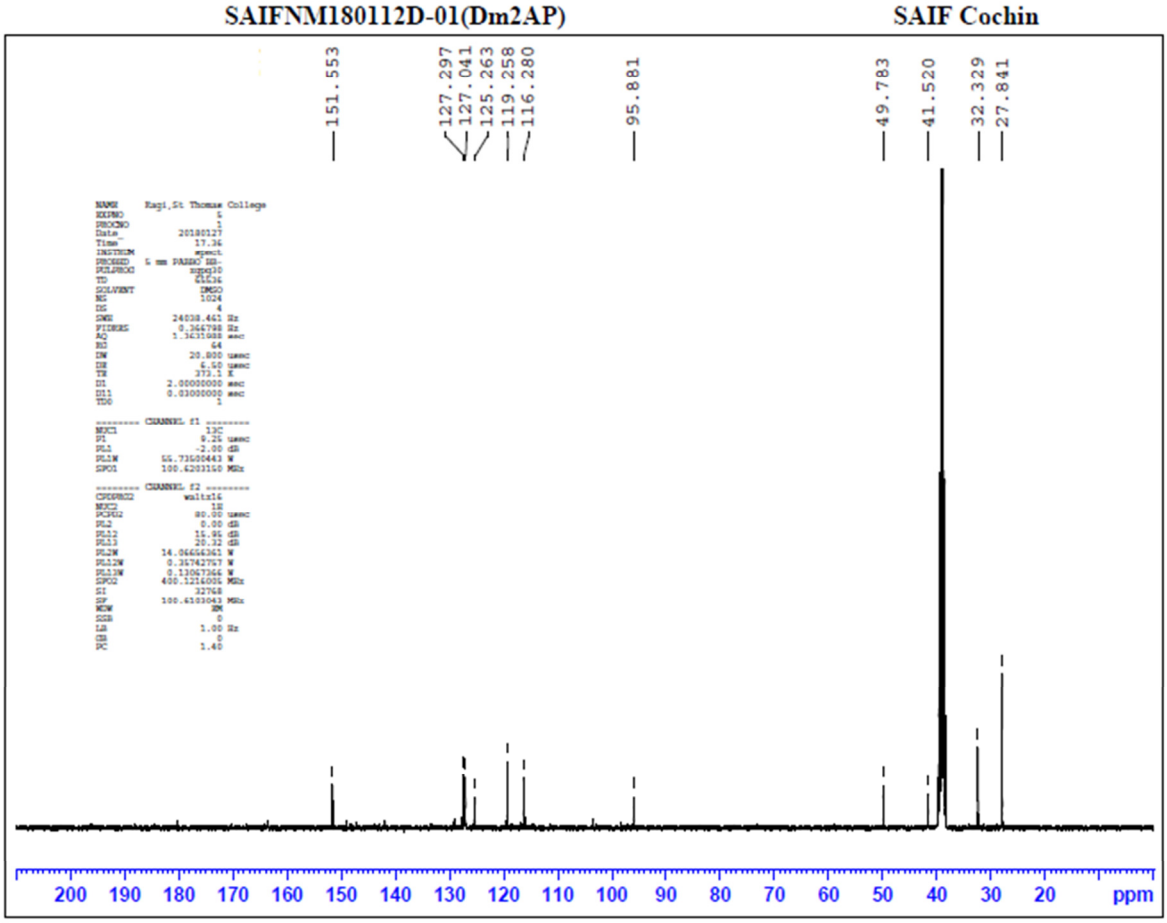


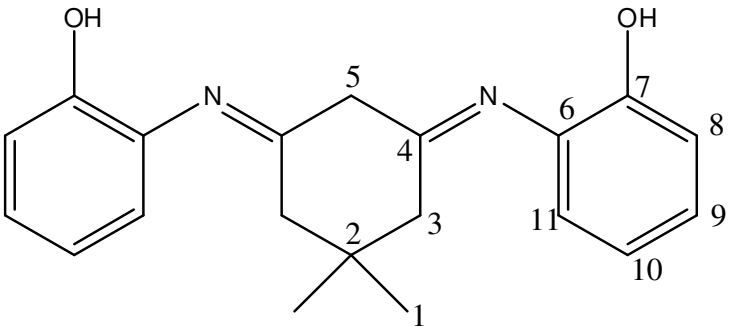


Labelled number	δvalue
1	0.999
2	2.022
3	2.356
4	9.877
5-8	6.819-7.078
δ_{NH} (tautomeric form)	8.397
$\delta_{CH(olefinic)}$ (tautomeric form)	4.864

Eight non-equivalent hydrogen atoms which were in different electronic environments gave characteristic peaks in the NMR spectrum. A peak obtained at 0.999δ can be assigned to CH_3 group present in the cyclohexane ring. The CH_2 group adjacent to the carbon containing CH_3 group showed a peak at 2.022 δ. The peak at 2.356 δ is assigned to the proton present in the carbon between two azomethine moiety. A broad peak at 9.877 δ corresponds to OH proton. The aromatic protons gave characteristic peaks at 6.819-7.078 δ. The appearance of a weak signal at 8.397 δ due to the NH proton and peak at 4.864 δ due to olefinic CH confirmed the existence of tautomerism.

^{13}C NMR spectral studies

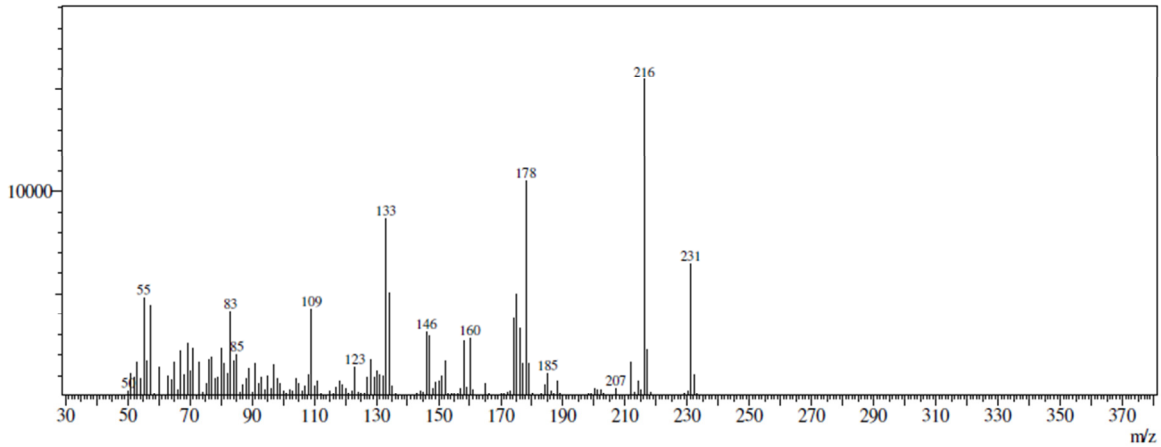




Labelled number	δvalue
1	27.841
2	41.520
3	32.329
4	95.881
5	49.783
6-11	116.280-151.553

The presence of eleven chemically different carbon atoms was confirmed by this spectrum. The azomethine carbon was identified at 95.88ppm. The aromatic carbons of the benzene ring exhibited six signals in the range 116.28-151.55ppm. Methylene carbon atoms labelled 3 and 5 exhibited their peaks at 32.329ppm and 49.783 respectively. Methyl carbon atom exhibited a signal at 27.841ppm.

Mass spectral studies



m/z value	Fragment
231	$[C_{14}H_{19}N_2O]^+$
216	$[C_{14}H_{18}N_2O]^+$ BASE PEAK
178	$[C_{11}H_{16}NO]^+$
160	$[C_9H_8N_2O]^+$
146	$[C_9H_{10}N_2]^+$
133	$[C_8H_7NO]^+$
109	$[C_6H_9N_2]^+$

Molecular ion peak at m/z 322 was absent. Base peak was observed at m/z 216, which is formed by the loss of amino phenolic moiety from the molecule. Loss of one phenolic moiety resulted with a peak at m/z 231 which corresponds to $[C_{14}H_{19}N_2O]^+$. Peaks at m/z 178, 160, 146, 133 and 109 were due to the fragments $[C_{11}H_{16}NO]^+$, $[C_9H_8N_2O]^+$, $[C_9H_{10}N_2]^+$, $[C_8H_7NO]^+$ and $[C_6H_9N_2]^+$ respectively.