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An imidazole based colorimetric sensor for fluoride anion

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ABSTRACT

Nine 2,3,5-triphenylimidazole derivatives having nitro and/or OH groups at their phenyl groups as receptors have been designed and synthesized for the colorimetric detection of F- ion, among which receptor (1) having a nitro group at the para position of the 2-phenyl group with respect to the imidazole moiety shows colorimetric responses (yellow to red) in acetonitrile-water (9:1, v:v) mixture towards F- anion selectively among other anions studied. Here nitro group acts as a signaling unit and OH and NH of imidazole moieties act as binding sites respectively.

Supporting information

UV-vis spectra of receptors 2, 3 and 4 after addition of tetrabutylammonium fluoride

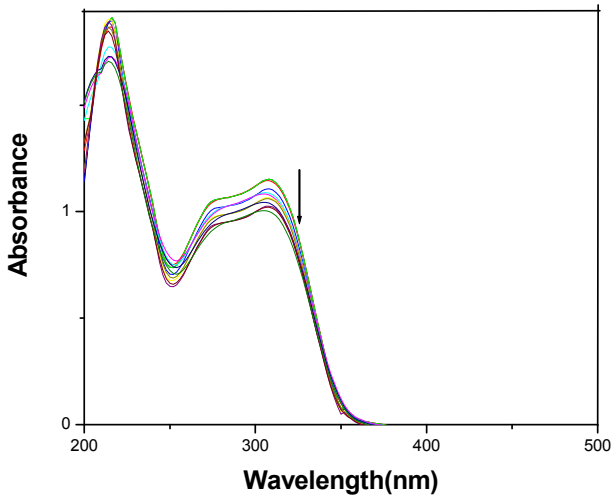

Figure S1: UV-vis titration spectra of receptor **2** with tetrabutylammonium fluoride.

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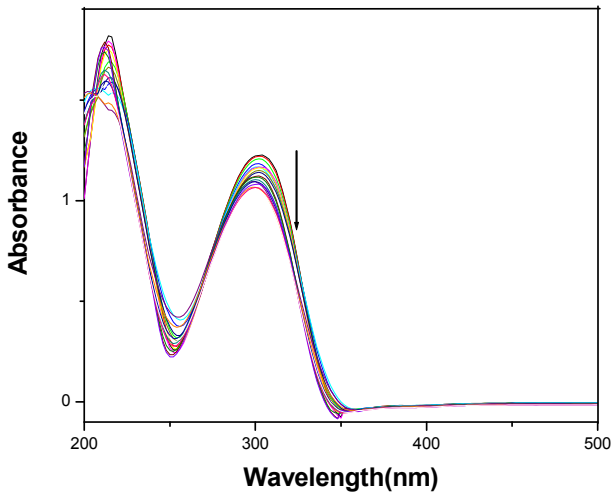


Figure S2: UV-vis titration spectra of receptor **3** with tetrabutylammonium fluoride.

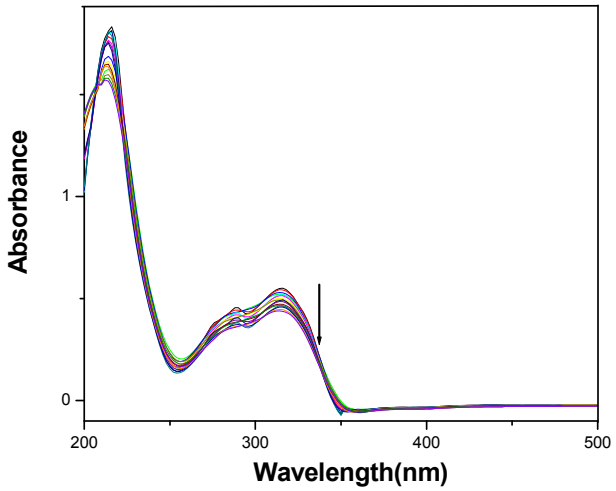


Figure S3: UV-vis titration spectra of receptor **4** with tetrabutylammonium fluoride.

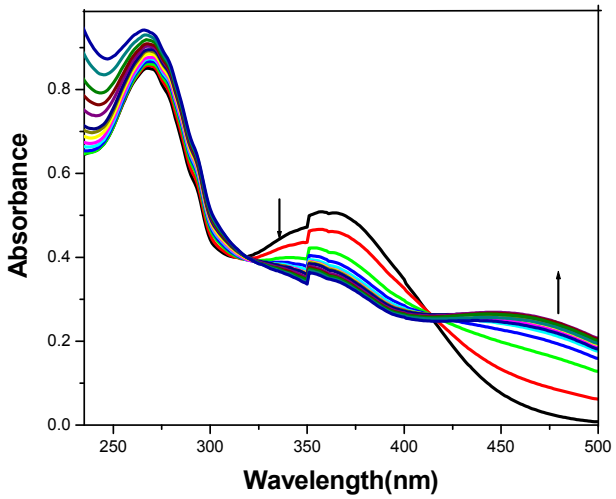
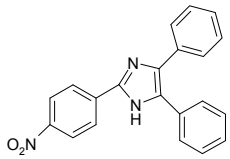
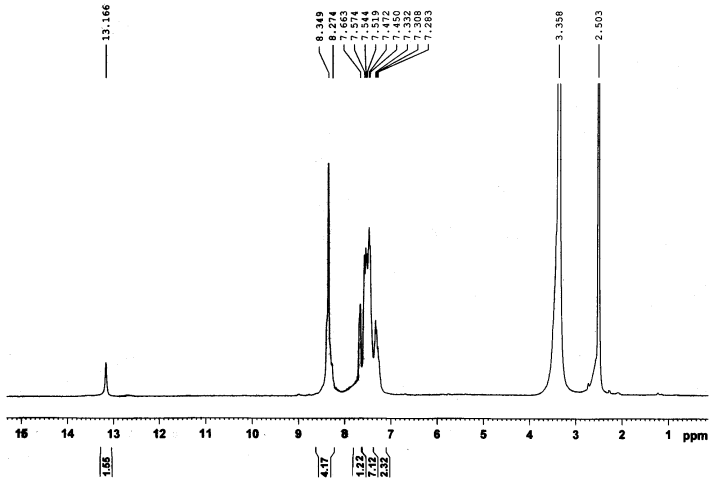


Figure S4: UV-vis titration spectra of receptor **7** with tetrabutylammonium fluoride.

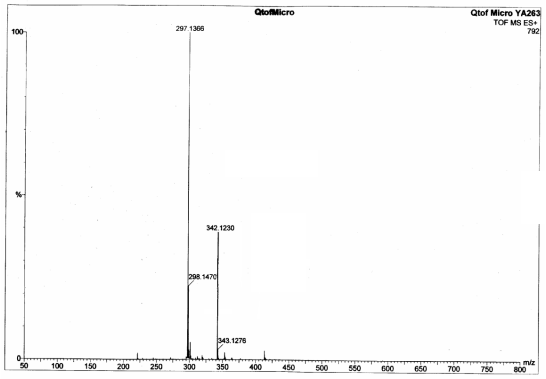
^{1}H, ^{13}C NMR, Mass (HRMS) spectra of receptors (1, 2, 3, 4, 5, 6, 7, 8 and 9)

^{1}H NMR of receptor 1 in DMSO-d6

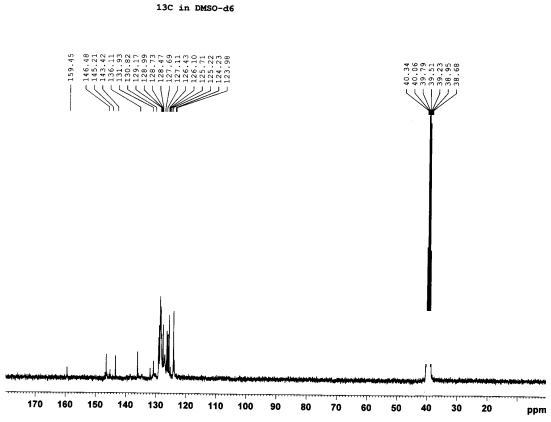




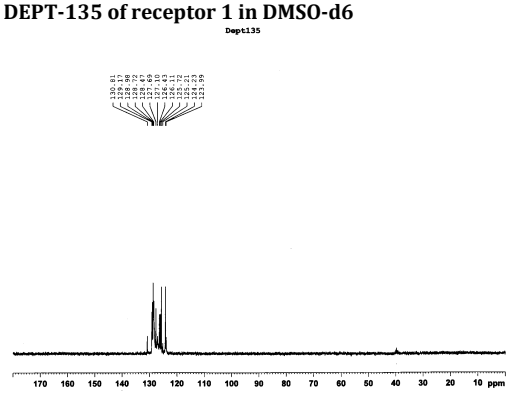
Mass (HRMS) of receptor 1



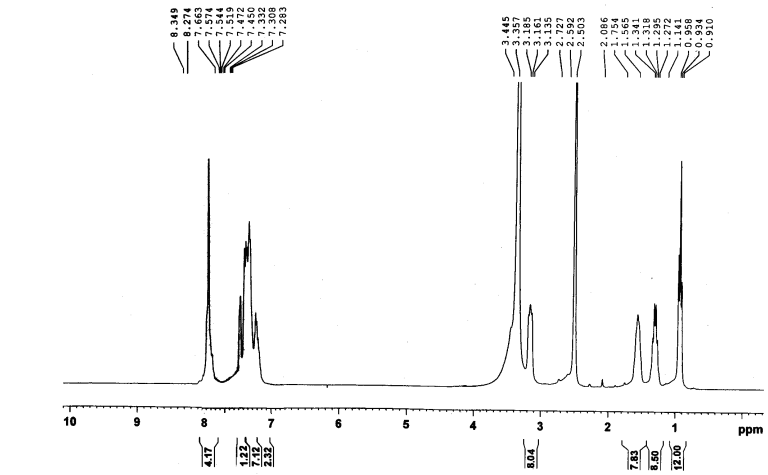
^{13}C NMR of receptor 1 in DMSO-d6

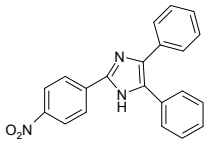


DEPT-135 of receptor 1 in DMSO-d6



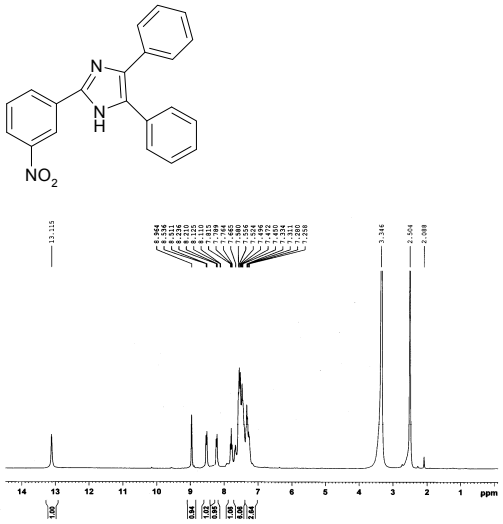
^{1}H NMR of receptor 1 + TBAF in DMSO-d6



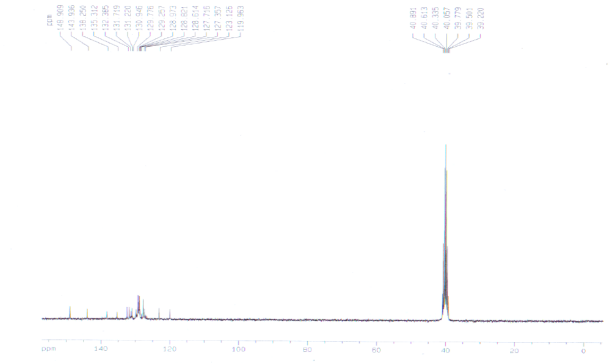


+ TBAF

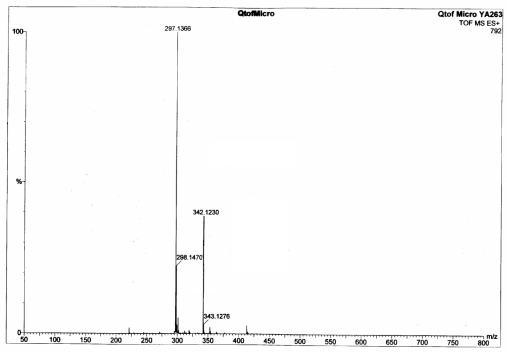
^{1}H NMR of receptor 2



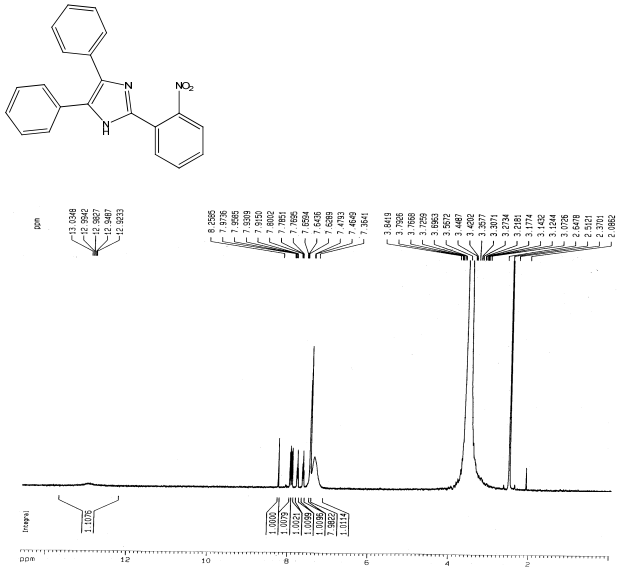
^{13}C NMR of receptor 2 in DMSO-d6



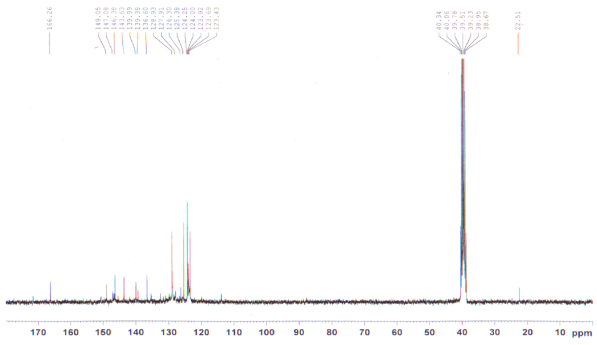
Mass (HRMS) of receptor 2



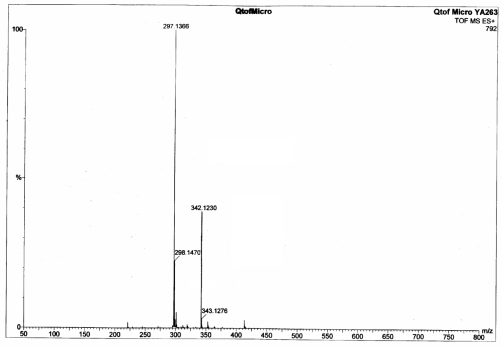
^{1}H NMR of receptor 3



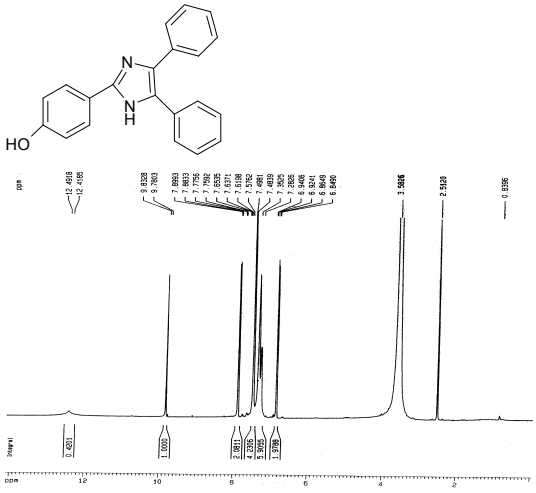
^{13}C NMR of receptor 3 in DMSO-d6



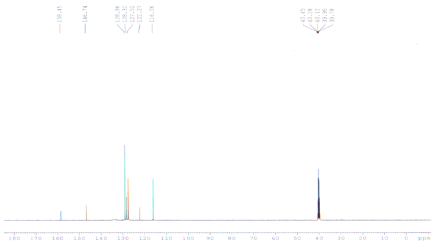
Mass (HRMS) of receptor 3



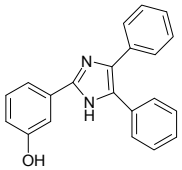
^{1}H NMR of receptor 4

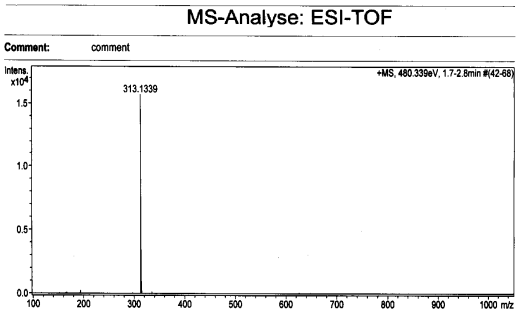


^{13}C NMR of receptor 4 in DMSO-d6

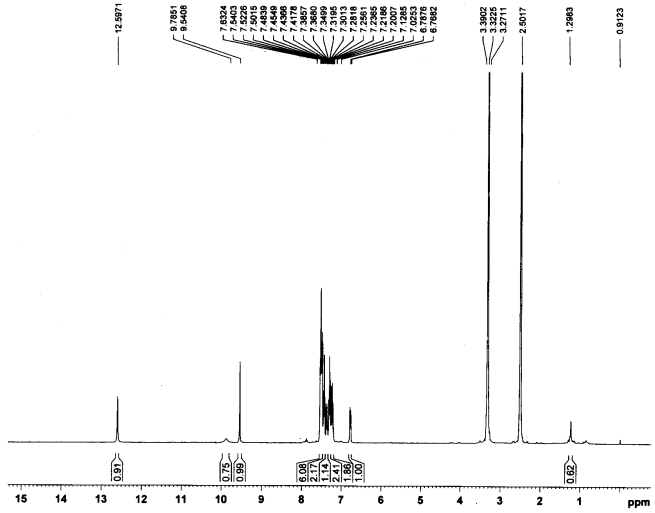


Mass (HRMS) of receptor 5

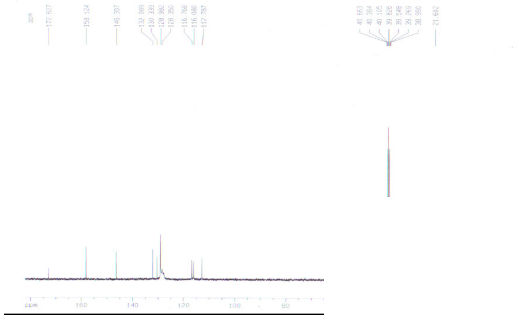




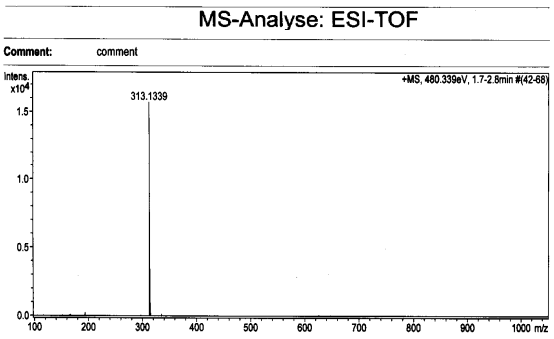
^{1}H NMR of receptor 5



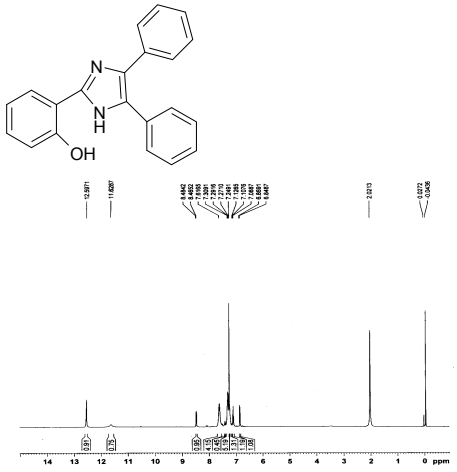
^{13}C NMR of receptor 5 in DMSO-d6



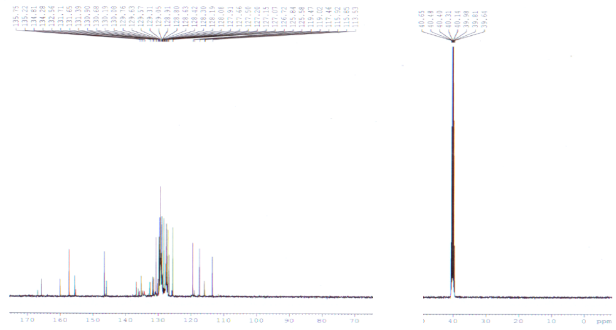
Mass (HRMS) of receptor 5



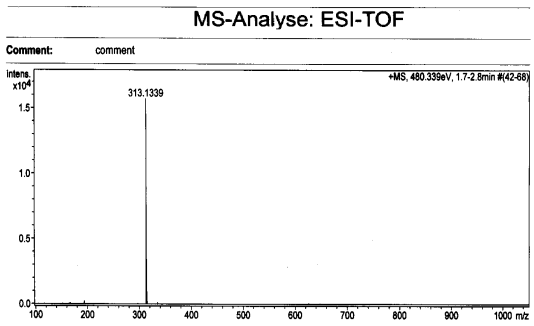
^{1}H NMR of receptor 6



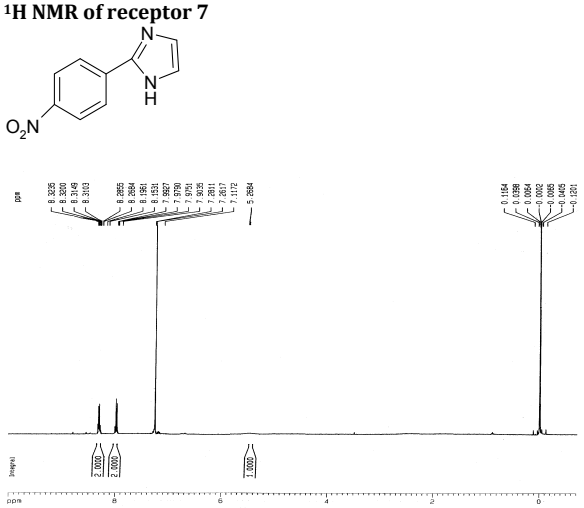
^{13}C NMR of receptor 6 in DMSO-d6



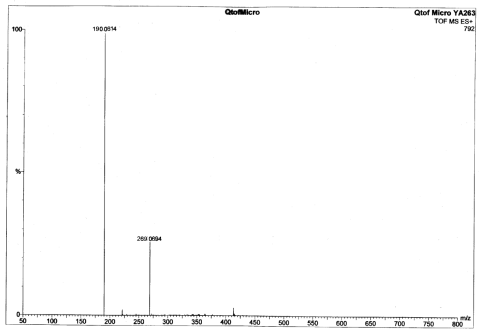
Mass (HRMS) of receptor 6



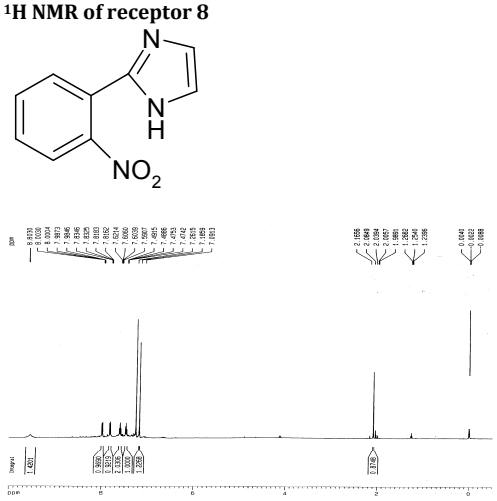
^{1}H NMR of receptor 7



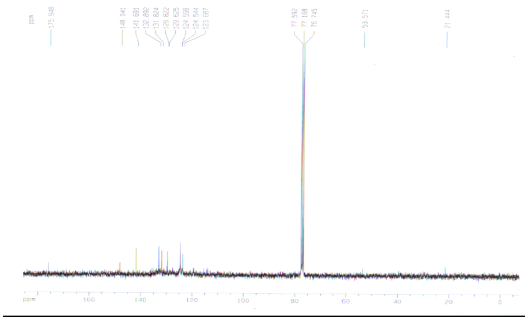
Mass (HRMS) of receptor 7



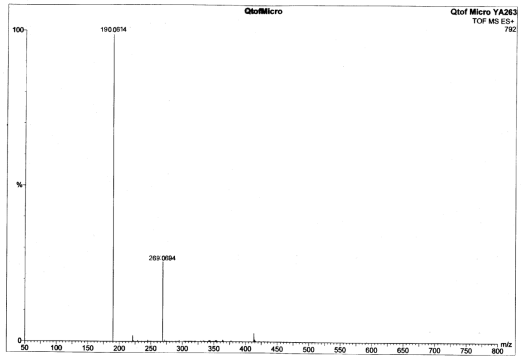
^{1}H NMR of receptor 8



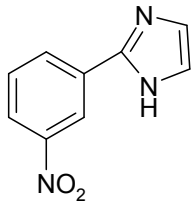
^{13}C NMR of receptor 8 in $CDCl_3$

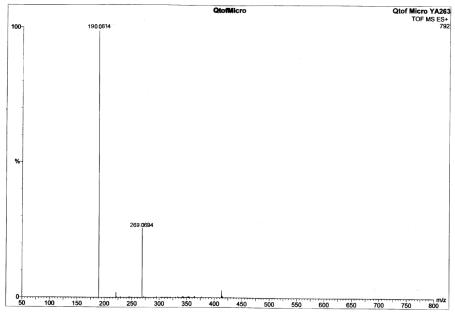


Mass (HRMS) of receptor 8



Mass (HRMS) of receptor 9





^{13}C NMR of receptor 9 in $CDCl_3$