Synthetic (*E*)-3-phenyl-5-(phenylamino)-2-styryl-1,3,4-thiadiazol-3-ium chloride derivatives as promising chemotherapy agents on cell lines infected with HTLV-1

Danilo Sousa-Pereira [1], Thais Silva de Oliveira [2], Rojane O. Paiva [2], Otávio Augusto Chaves [1,3], José C. Netto-Ferreira [1,4*], Juliana Echevarria-Lima [2*], Aurea Echevarria [1*]

[1] Instituto de Química, Universidade Federal Rural do Rio de Janeiro, Seropédica, Rio de Janeiro, 23.890-000, Brazil; sousadanilo90@gmail.com (D.S.-P.); echevarr@ufrrj.br (A.E.)

[2] Laboratório de Imunologia Básica e Aplicada, Departamento de Imunologia, Instituto de Microbiologia Paulo de Góes, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 21.941-590, Brazil; thais.silvadeoliveira@yahoo.com.br (T.S.O.); rojanedeoliveirapaiva@gmail.com (R.O.P.); juechevarria@micro.ufrj.br (J.E.-L.)

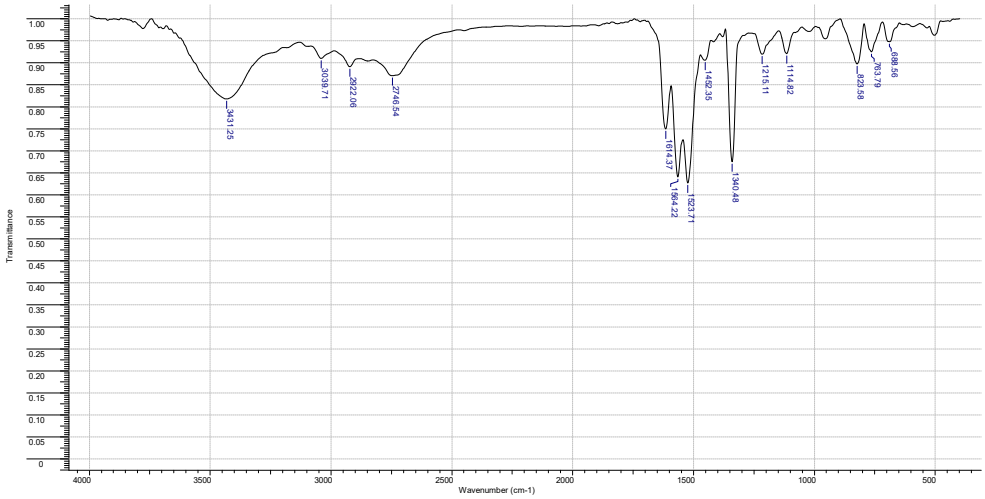
[3] Instituto SENAI de Inovação em Química Verde (ISI QV), Maracanã, Rio de Janeiro, 20.271-030, Brazil; otavioaugustochaves@gmail.com (O.A.C.)

[4] Qualidade e Tecnologia (INMETRO), Divisão de Metrologia Química, Instituto Nacional de Metrologia, Duque de Caxias, Rio de Janeiro, 25.250-020, Brazil; jcnetto.ufrrj@gmail.com (J.C.N-F.)

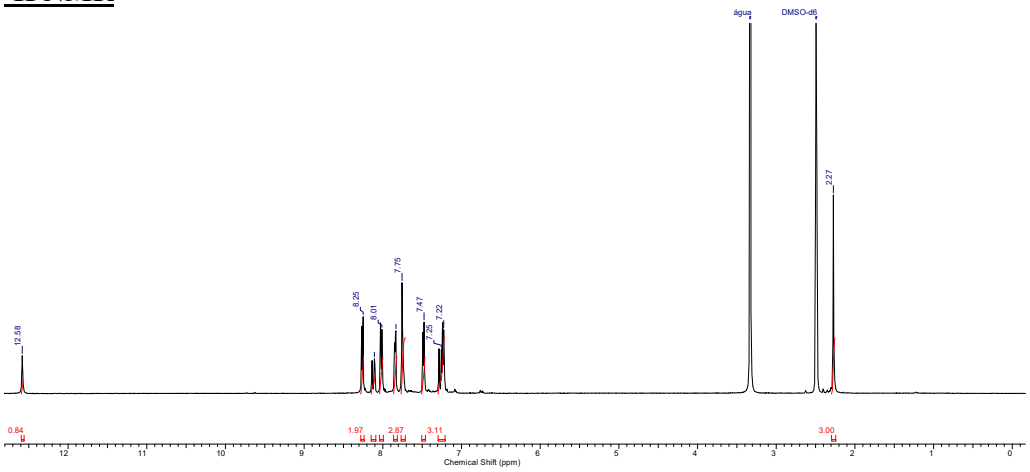
Supplementary Material

Index

FTIR



^{1}H NMR



^{13}C NMR

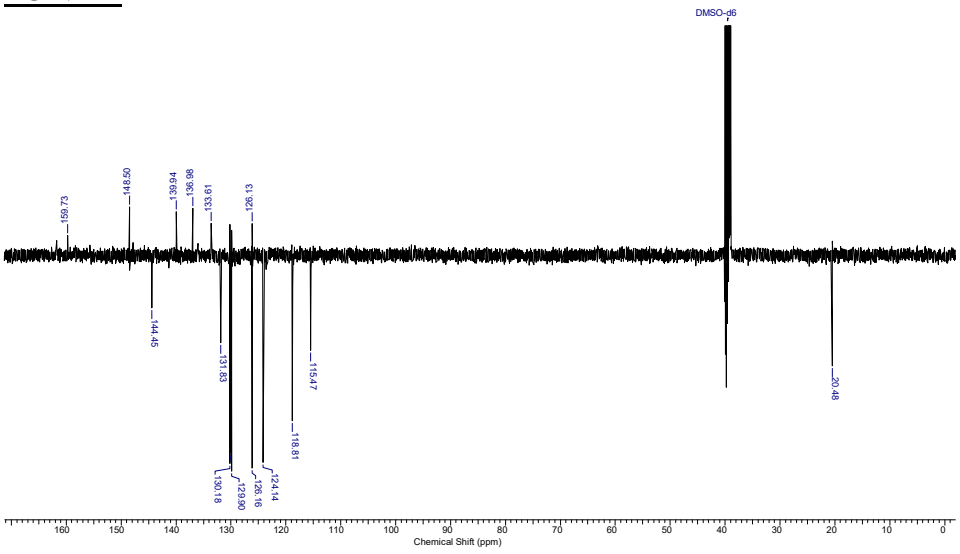
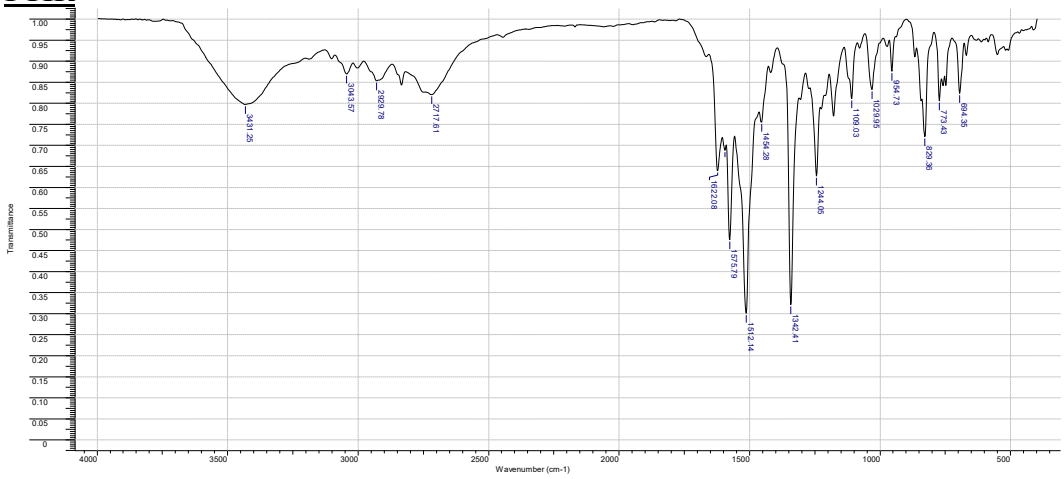
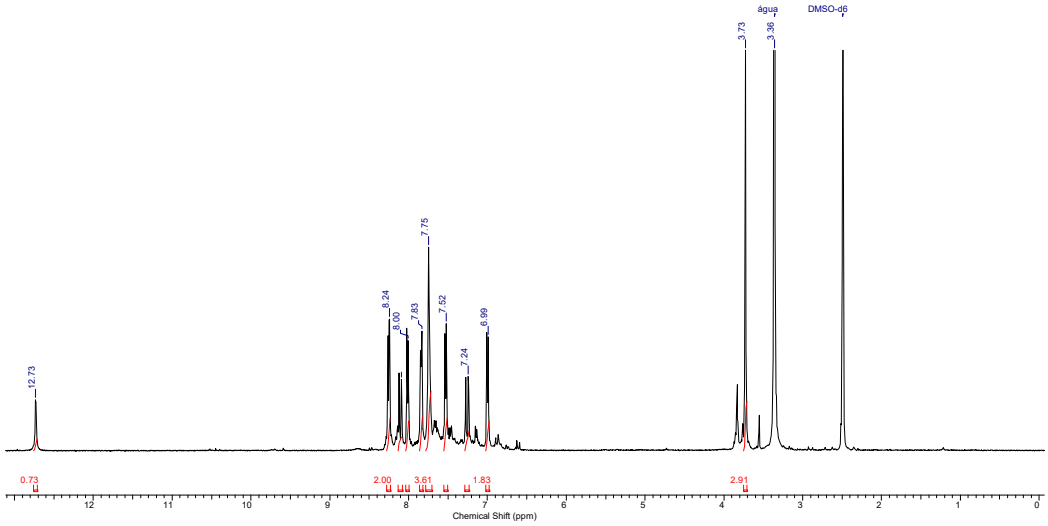


Figure S1. FTIR, ^{1}H NMR and ^{13}C NMR (DEPT-Q) spectra of (*E*)-3-phenyl-5-(4′-methylphenylamino)-2-styryl-1,3,4-thiadiazol-3-ium chloride (**5a**).

FTIR



^{1}H NMR



^{13}C NMR

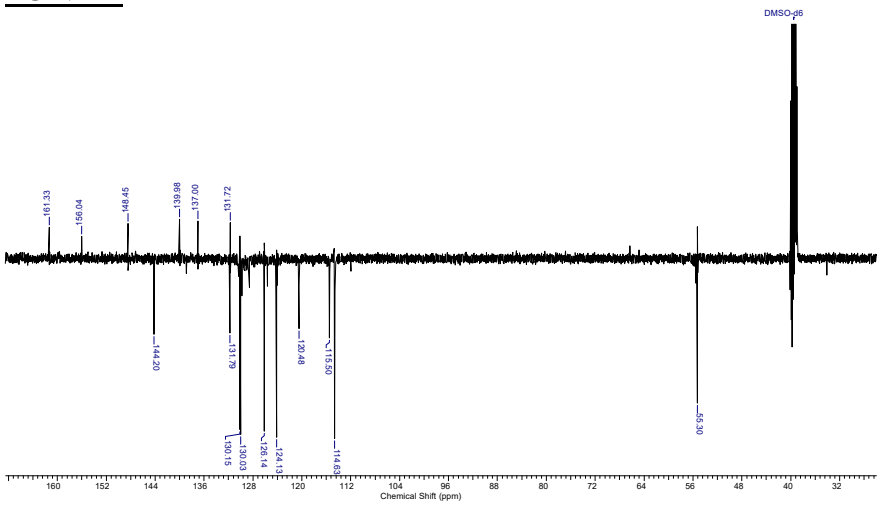
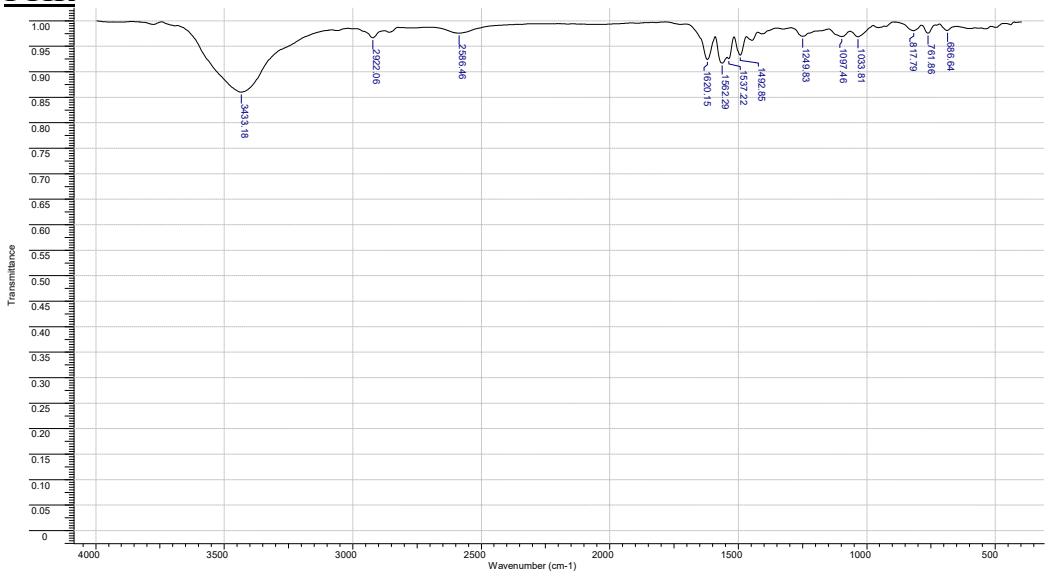
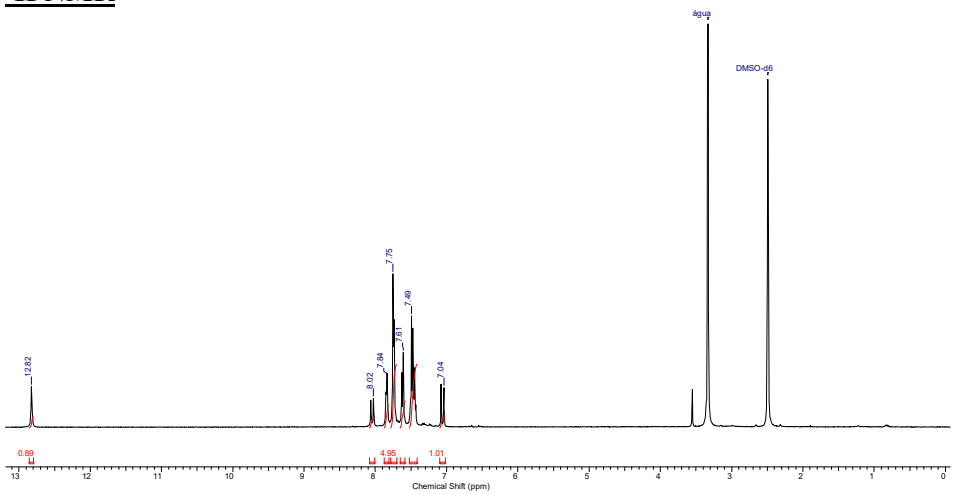


Figure S2. FTIR, ^{1}H NMR and ^{13}C NMR (DEPT-Q) spectra of (*E*)-3-phenyl-5-(4′-methoxyphenylamino)-2-styryl-1,3,4-thiadiazol-3-ium chloride **(5b)**.

FTIR



^{1}H NMR



^{13}C NMR

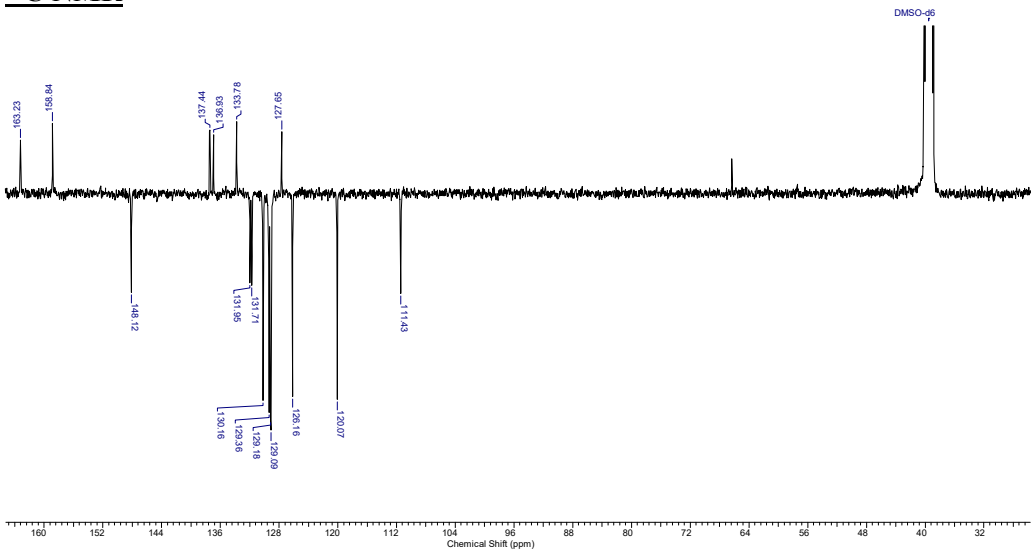
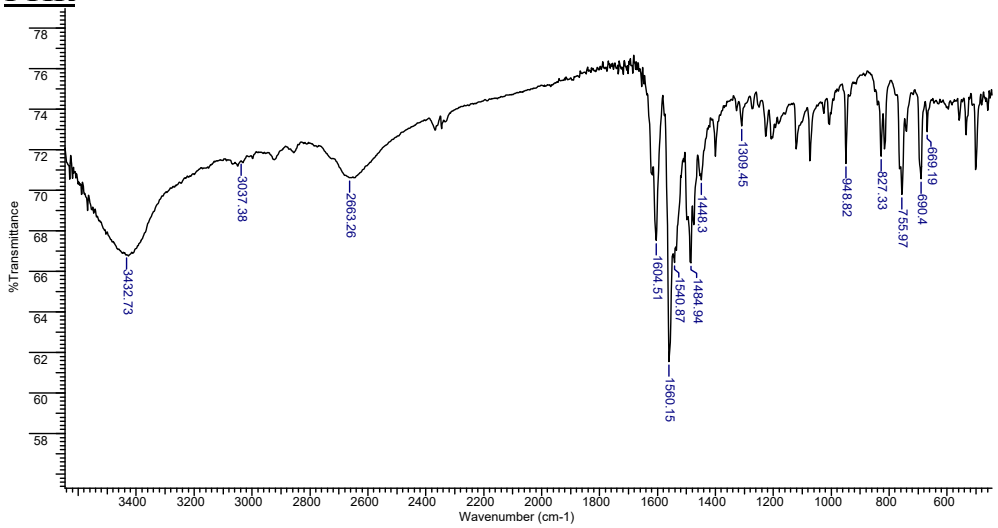
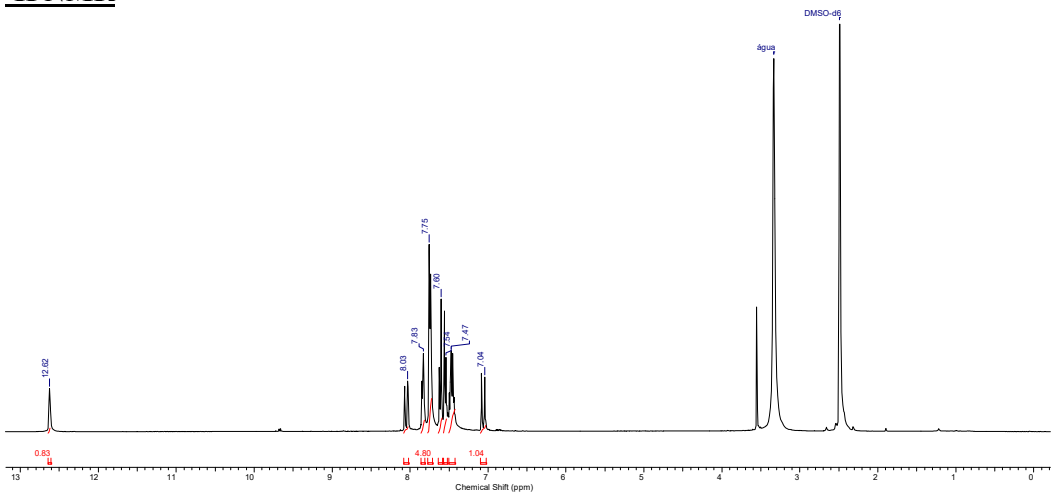


Figure S3. FTIR, ^{1}H NMR and ^{13}C NMR (DEPT-Q) spectra of (*E*)-3-phenyl-5-(4′-chlorophenylamino)-2-styryl-1,3,4-thiadiazol-3-ium chloride (**5c**).

FTIR



^{1}H NMR



^{13}C NMR

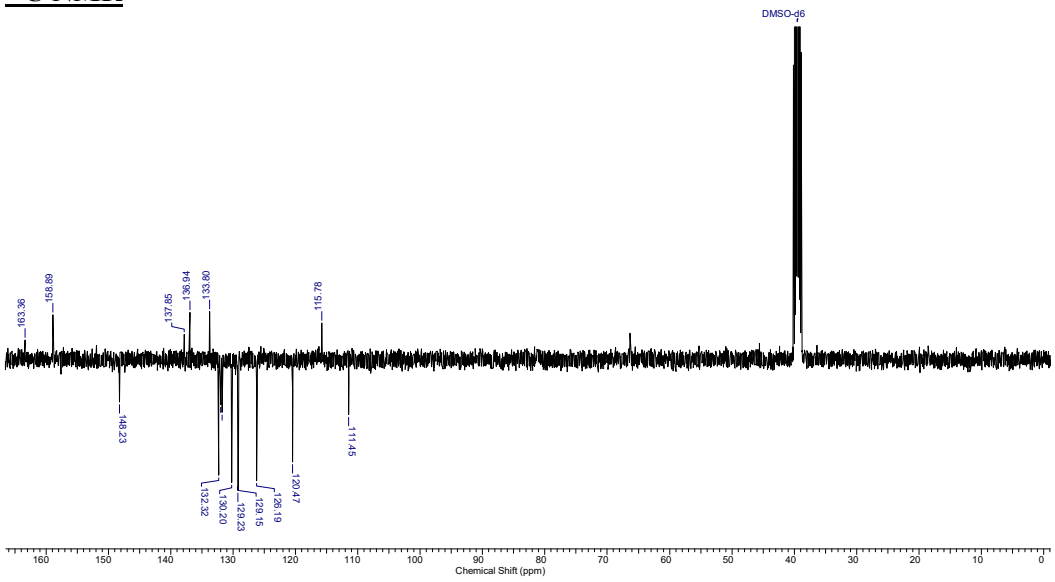


Figure S4. FTIR, ^{1}H NMR and ^{13}C NMR (DEPT-Q) spectra of (*E*)-3-phenyl-5-(4′-bromophenylamino)-2-styryl-1,3,4-thiadiazol-3-ium chloride (**5d**).

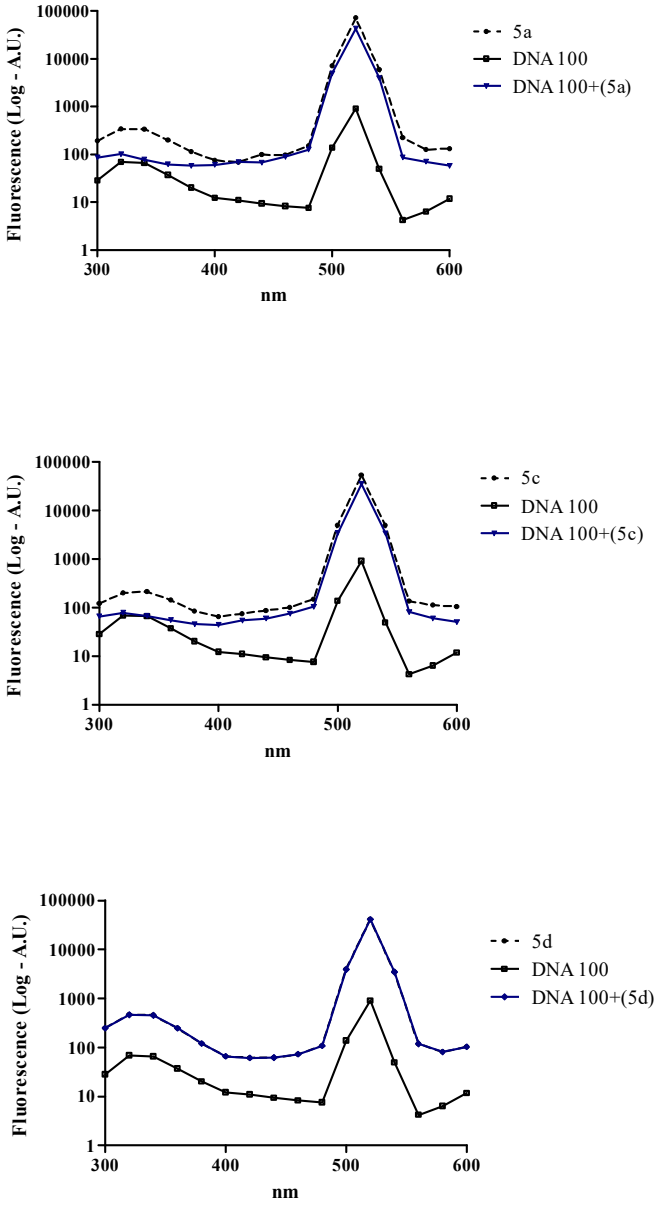


Figure S5. Fluorescence emission spectra of **5a** ,**5c** and **5d** (25 μM) in the presence of 100 ng/mL of DNA. A.U. = Arbitrary Unit.

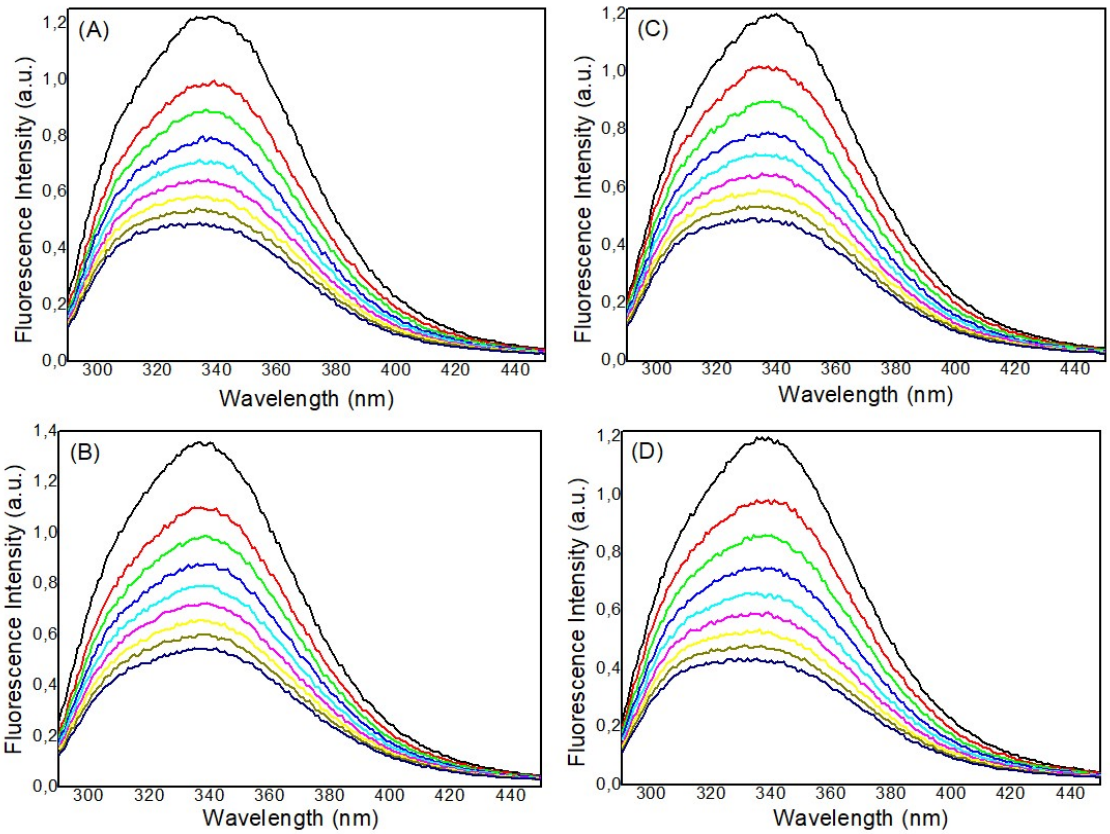


Figure S6. Steady-state fluorescence emission spectra for HSA and its quenching upon successive additions of (A) **5a**, (B) **5b**, (C) **5c**, and (D) **5d** at pH 7.4 and 310K. [HSA] = 1.00 × 10^{-5} M and [mesoionic compounds] = 0.17; 0.33; 0.50; 0.66; 0.83; 0.99; 1.15 and 1.32 × 10^{-5} M.

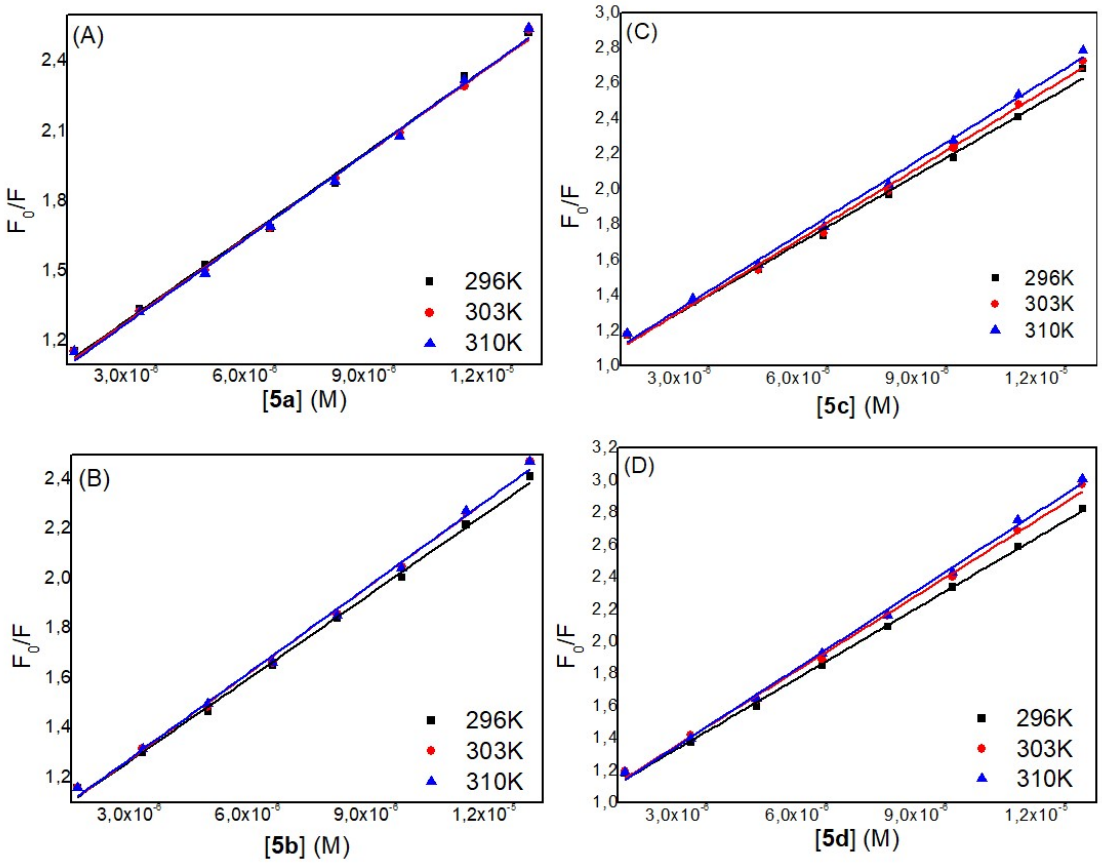


Figure S7. Stern-Volmer plots for the interaction (A) HSA:**5a**, (B) HSA:**5b**, (C) HSA:**5c**, and (D) HSA:**5d** at 296, 303, and 310K. [HSA] = 1.00 × 10^{-5} M and [mesoionic compounds] = 0.17; 0.33; 0.50; 0.66; 0.83; 0.99; 1.15 and 1.32 × 10^{-5} M.

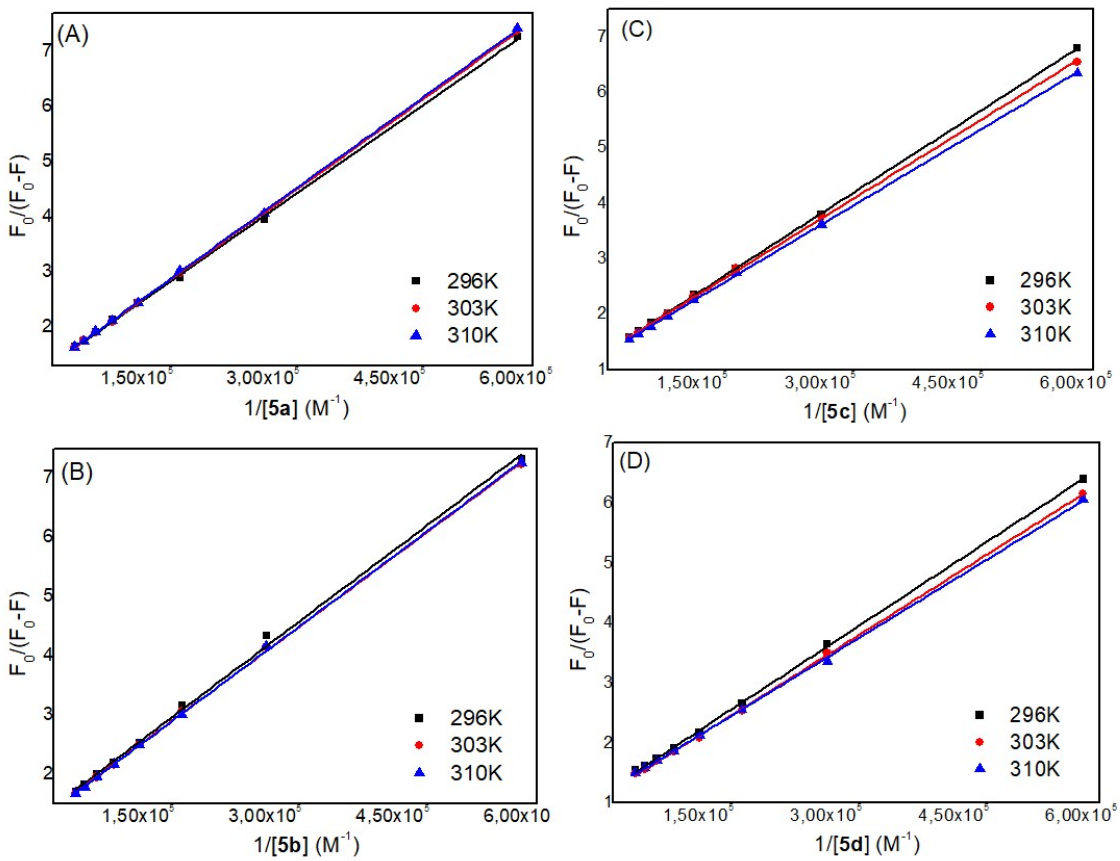


Figure S8. Modified Stern-Volmer plots for the interaction (A) HSA:**5a**, (B) HSA:**5b**, (C) HSA:**5c**, and (D) HSA:**5d** at 296, 303, and 310K. [HSA] = 1.00 × 10^{-5} M and [mesoionic compounds] = 0.17; 0.33; 0.50; 0.66; 0.83; 0.99; 1.15 and 1.32 × 10^{-5} M.

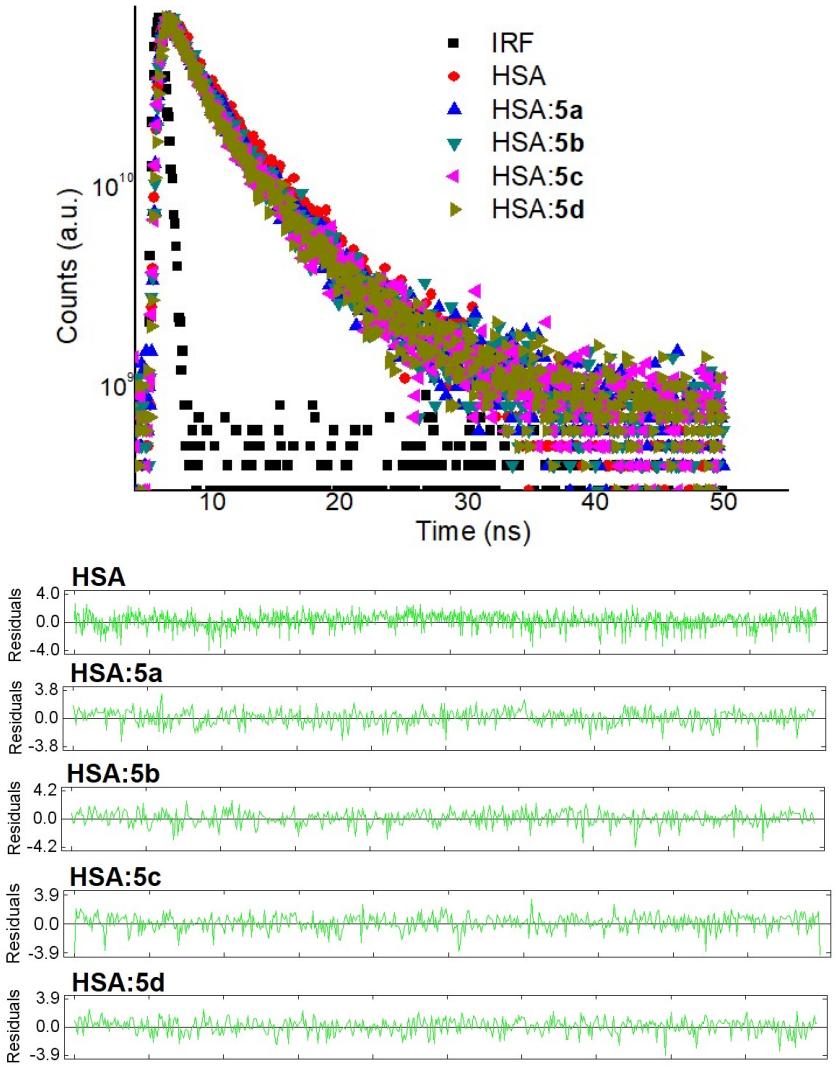


Figure S9. Time-resolved fluorescence decay for the interaction between HSA and the mesoionic compounds **5a-d** in a PBS solution. [HSA] = 1.00 × 10^{-5} M and [mesoionic compounds] = 1.32 × 10^{-5} M. IRF is the instrument response factor.

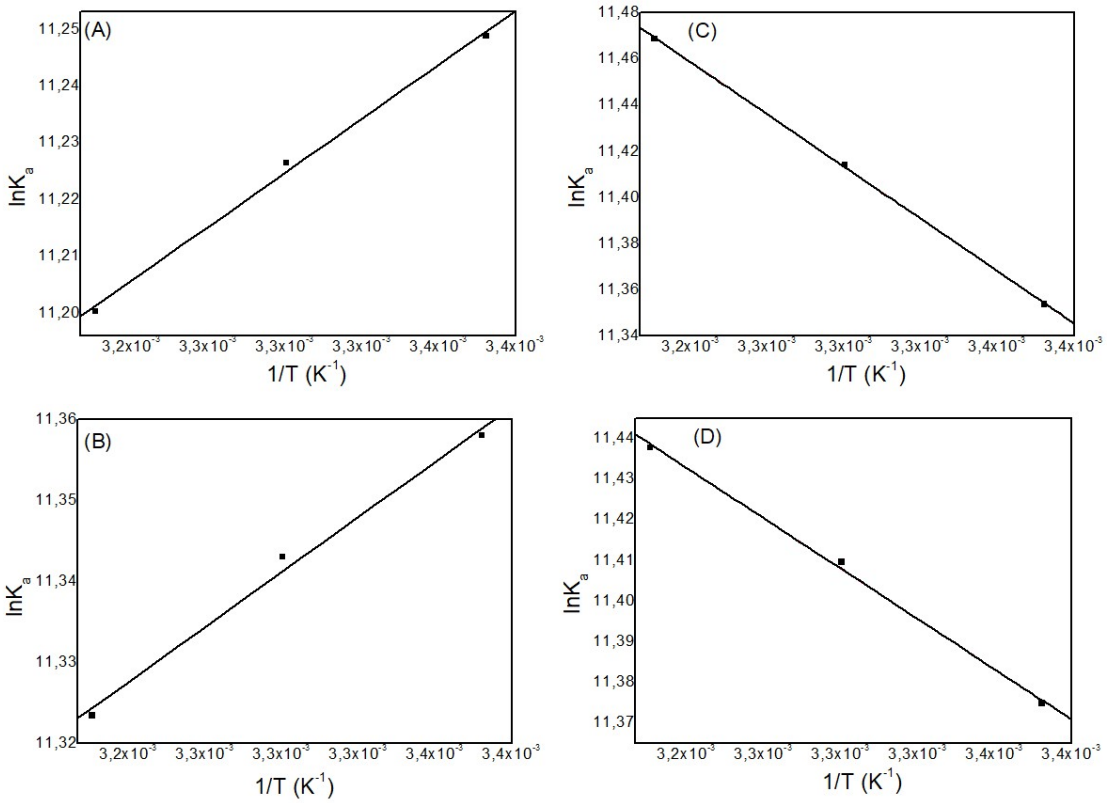


Figure S10. Van't Hoff plot for the interaction (A) HSA:**5a**, (B) HSA:**5b**, (C) HSA:**5c**, and (D) HSA:**5d** at 296, 303, and 310K.

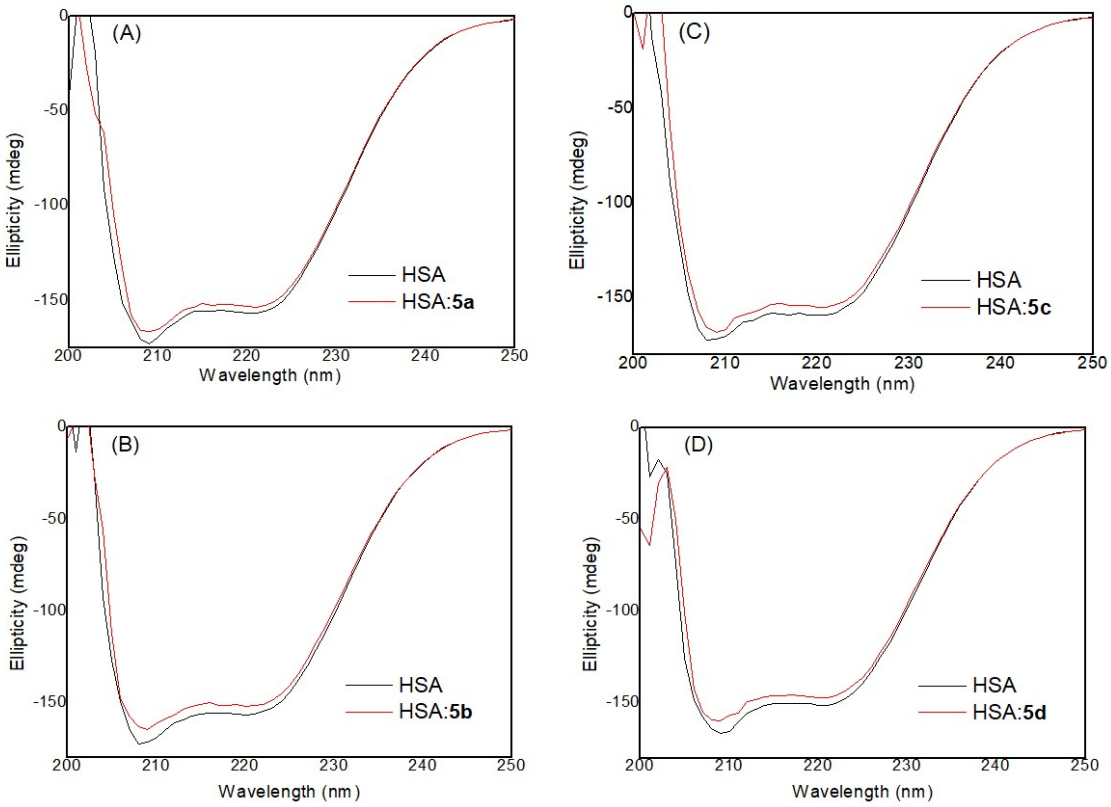


Figure S11. Circular dichroism spectra for (A) HSA:**5a**, (B) HSA:**5b**, (C) HSA:**5c**, and (D) HSA:**5d** at 310K. [HSA] = 1.00×10^{-5} M and [mesoionic compounds] = 1.32×10^{-5} M.