SUPLEMENTARY INFORMATION

S-Nitrosocaptopril formation in aqueous acid and basic medium: vasodilator and angiotensin converting enzyme inhibitor

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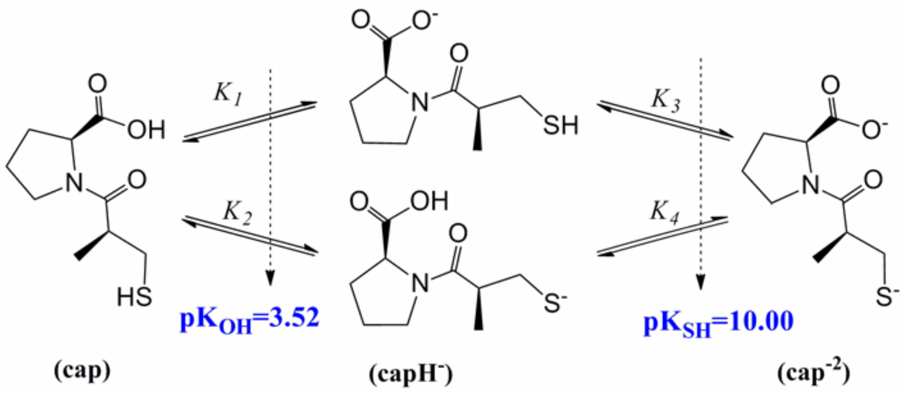
I. Potentiometric determination of pK$_{as}$ of captopril.



Scheme S1. Experimentally measured macroscopic acid ionization constants, K_{OH} and K_{SH}, and microscopic acid ionization constants K_i i=1, 2,3,4 that exists in the captopril molecule.

Method.- The macroscopic pK$_{as}$ (pK$_{OH}$ and pK$_{SH}$) of captopril has been determined by potentiometry. For that, 20 mL of aqueous solution of cap 8.8 mM (and 10.7 mM, data not included) that contains 0.10 M of NaCl has been titrated against NaOH 0.58 M, which was added in small aliquots (30 µL) in order do not change the ionic strength. After each addition the pH of the solution was recorded. The results are listed in the following table.

V(initial)=20 mL ; [cap]=(8.8 mM ; [NaOH]=0.58 M

V(NaOH)/mL	pH
0	2,82
0,03	2,96
0,06	3,1
0,09	3,25
0,12	3,4
0,15	3,55
0,18	3,71
0,21	3,89
0,24	4,12
0,27	4,46
0,3	5,57
0,33	8,92
0,36	9,32
0,39	9,57
0,42	9,76
0,45	9,94
0,48	10,1
0,51	10,27
0,54	10,44
0,57	10,63
0,6	10,82
0,63	11,02
0,66	11,17
0,69	11,31
0,72	11,41
0,75	11,5
0,78	11,57
0,81	11,64

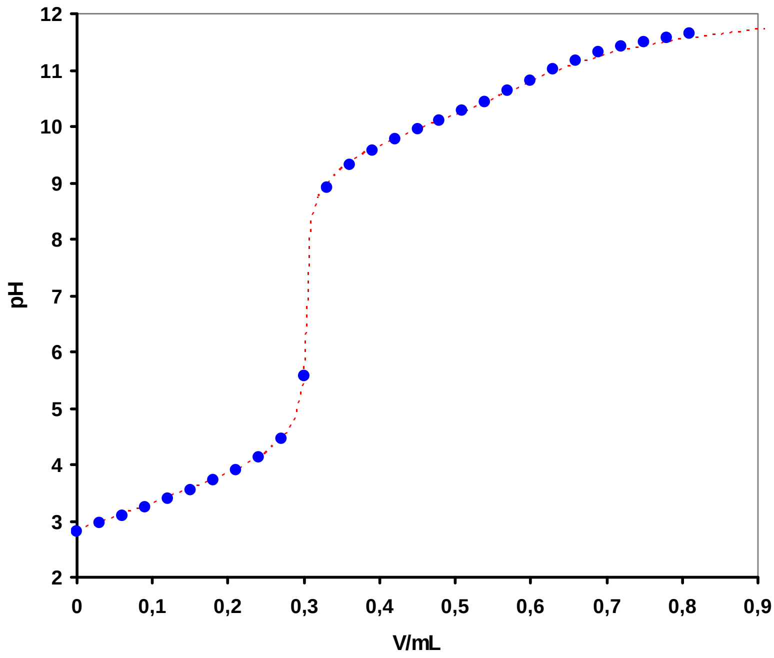


Figure S1. Experimental results of the potentiometric titration of 20 mL of cap 8.8 mM against NaOH 0.58 M; the X-axis correspond to the added volume of titrant (NaOH), and the Y-axis indicates the measure pH after the addition of titrant. The red dotted line shows the calculated data from Hyperquad 2003 when pK_1=3.52 (=pK_{OH}) and pK_2=10.00 (=pK_{SH}); the ionic strength was kept constant (NaCl) at 0.10 M.

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2. Kinetic reactions fit to biexponential equation;

$$A = A_\infty + C_1 \cdot \exp(-k_1 t) + C_2 \cdot \exp(-k_2 t)$$

According to J. H. Espenson "*Chemical Kinetics and Reactions Mechanisms*" *2nd ed*, 1995, McGraw-Hill, chp. 4 and adapted to our system:

$$C_1 = \frac{(\varepsilon_{NOcap} - \varepsilon_{tBN})k_1 + (\varepsilon_{tBN} - \varepsilon_{RSSR})k_2}{k_2 - k_1}[tBN]_o$$

$$C_2 = \frac{(\varepsilon_{RSSR} - \varepsilon_{NOcap})k_1}{k_2 - k_1}[tBN]_o$$

According to Fig 3(b), at λ=325 nm, $\varepsilon_{NOcap} >> \varepsilon_{tBN}$ or ε_{RSSR} and $k_2 << k_1$; therefore C_1 must be negative and C_2 positive. On the other hand, the ratio of $C_1/C_2 \sim -1$. The obtained results in fitting process of the experimental data to the biexponential equation are in total agreement with these observations. A representative case follows:

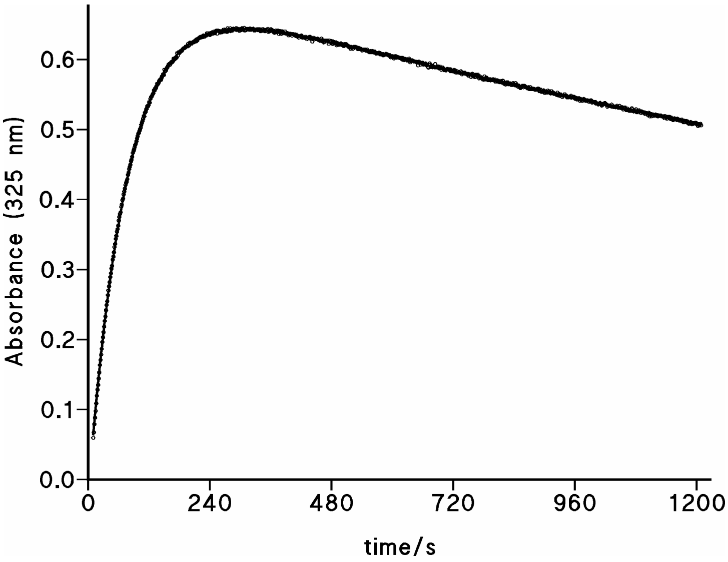

Fig. S2 Plot of absorbance readings at 325 nm against time for the reaction of cap 12.7mM and tBN 1.3 mM in aqueous basic medium of 0.085 M carbonate-bicarbonate buffer of pH 10.1

The solid line (undistinguishable due to the high points number –approximately 1000) corresponds to the calculated points from the biexponential equation with the following values of the parameters: A_∞ = -0.04±0.02 ; C_1 = (-0.7431±0.0005) ; k_1= (1.309±0.002)×10^{-2} s^{-1}; C_2 = 0.78±0.02, and k_2 = (2.58±0.09)×10^{-4} s^{-1} (correlation coefficient=0.9999).