ANTIOXIDATIVE ACTIVITY AND METAL AND PH SENSING PROPERTIES OF HETEROAROMATIC BENZAMIDES



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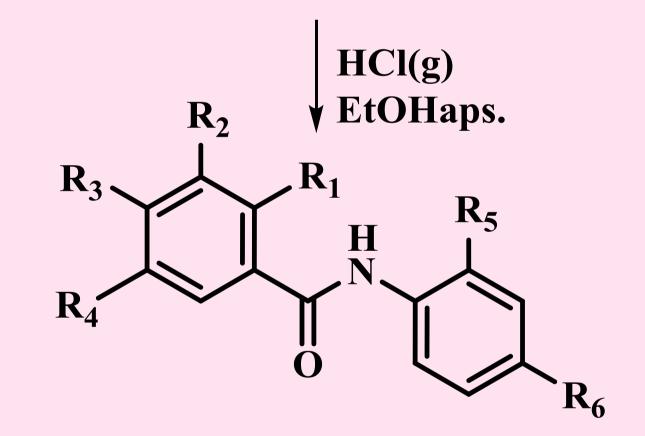
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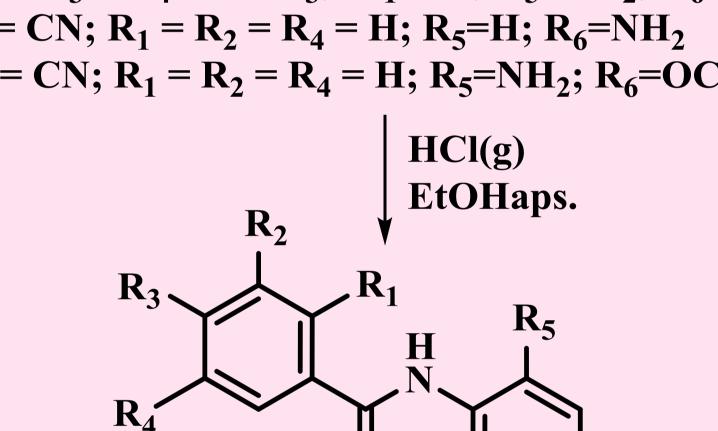
Within this work, we present the synthesis, spectroscopic characterization and antioxidative activity of novel methoxy and/or hydroxy derivatives of amino substituted benzamides. SOCl₂ For the synthesis of novel targeted toluene classical compounds, organic COOH **3** $R_5 = NO_2$; $R_6 = OCH_3$ synthesis reactions were used. Amino **1a** $R_1 = OCH_3; R_2 = R_3 = R_4 = H$ 2a $R_1 = OCH_3; R_2 = R_3 = R_4 = H$ 4 $R_5 = H; R_6 = NO_2$ substituted derivatives were prepared **1b** $R_1 = R_3 = OCH_3; R_2 = R_4 = H$ **2b** $R_1 = R_3 = OCH_3; R_2 = R_4 = H$ **2c** $R_2 = R_3 = R_4 = OCH_3; R_1 = H$ 1c $R_2 = R_3 = R_4 = OCH_3; R_1 = H$ by reduction of nitro analogues while 2d $R_3 = CN; R_1 = R_2 = R_4 = H$ 1d $R_3 = CN; R_1 = R_2 = R_4 = H$

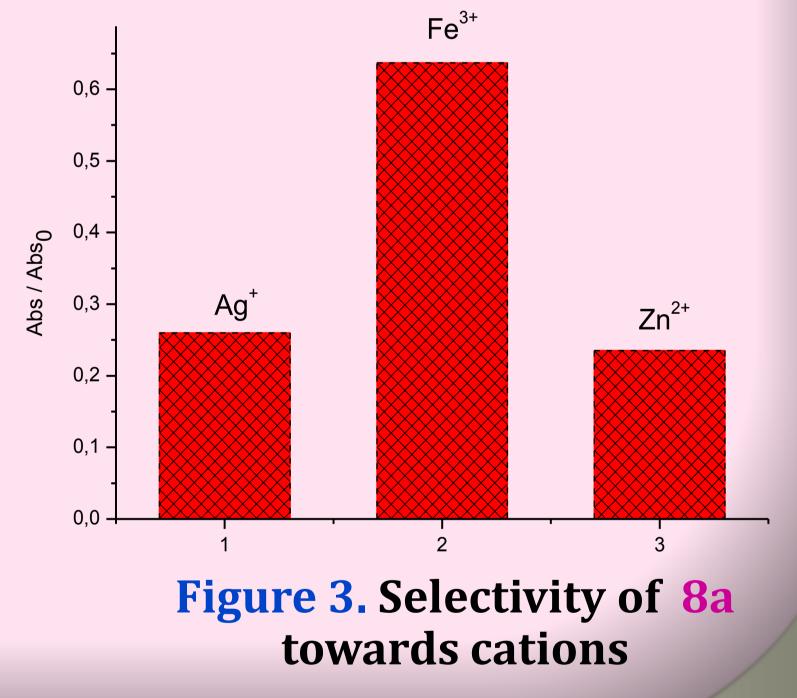
hydroxy substituted benzamide derivatives obtained by the removal of methoxy protecting groups with BBr₃. Structures of newly prepared compounds were confirmed by means of ¹H and ¹³C NMR, UV/Vis and fluorimetric spectroscopy.



8a $R_1 = OH; R_2 = R_3 = R_4 = H; R_5 = H; R_6 = NH_2$ 8b $R_1 = OH; R_3 = OCH_3; R_2 = R_4 = H; R_5 = H; R_6 = NH_2$ 8c $R_2 = R_3 = R_4 = OH; R_1 = H; R_5 = H; R_6 = NH_2$



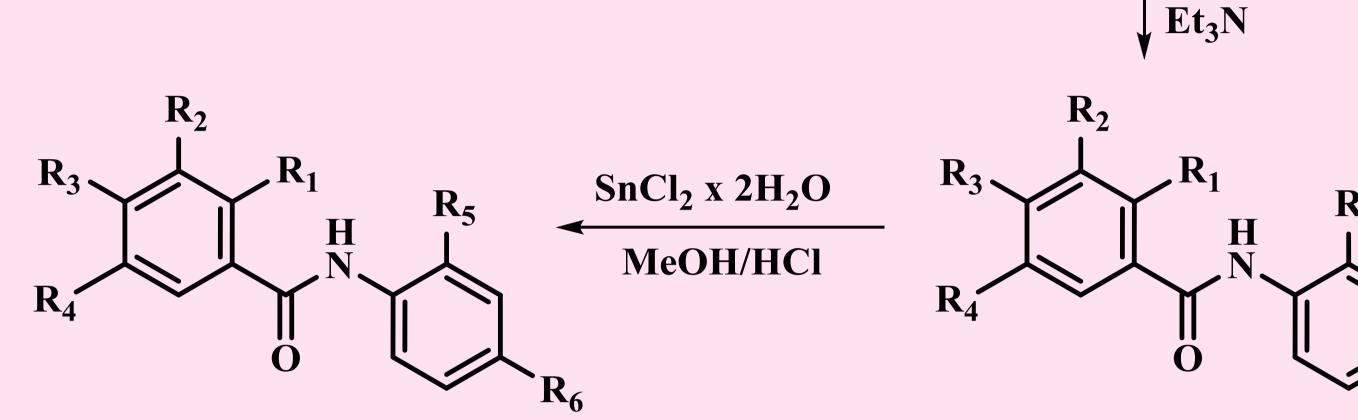




 $\begin{cases} 6a \ R_1 = OCH_3; R_2 = R_3 = R_4 = H; R_5 = H; R_6 = NH_2 \\ 6b \ R_1 = R_3 = OCH_3; R_2 = R_4 = H; R_5 = H; R_6 = NH_2 \\ 6c \ R_1 = R_3 = OCH_3; R_2 = R_4 = H; R_5 = NH_2; R_6 = OCH_3 \\ 6d \ R_2 = R_3 = R_4 = OCH_3; R_1 = H; R_5 = H; R_6 = NH_2 \\ 6e \ R_2 = R_3 = R_4 = OCH_3; R_1 = H; R_5 = NH_2; R_6 = OCH_3 \\ 6f \ R_3 = CN; R_1 = R_2 = R_4 = H; R_5 = H; R_6 = NH_2 \\ 6g \ R_3 = CN; R_1 = R_2 = R_4 = H; R_5 = NH_2; R_6 = OCH_3 \end{cases}$

5a $R_1 = OCH_3$; $R_2 = R_3 = R_4 = H$; $R_5 = H$; $R_6 = NO_2$ 5b $R_1 = R_3 = OCH_3$; $R_2 = R_4 = H$; $R_5 = H$; $R_6 = NO_2$ 5c $R_1 = R_3 = OCH_3$; $R_2 = R_4 = H$; $R_5 = NO_2$; $R_6 = OCH_3$ 5d $R_2 = R_3 = R_4 = OCH_3$; $R_1 = H$; $R_5 = H$; $R_6 = NO_2$ 5e $R_2 = R_3 = R_4 = OCH_3$; $R_1 = H$; $R_5 = NO_2$; $R_6 = OCH_3$ 5f $R_3 = CN$; $R_1 = R_2 = R_4 = H$; $R_5 = H$; $R_6 = NO_2$ 5g $R_3 = CN$; $R_1 = R_2 = R_4 = H$; $R_5 = NO_2$; $R_6 = OCH_3$

toluene



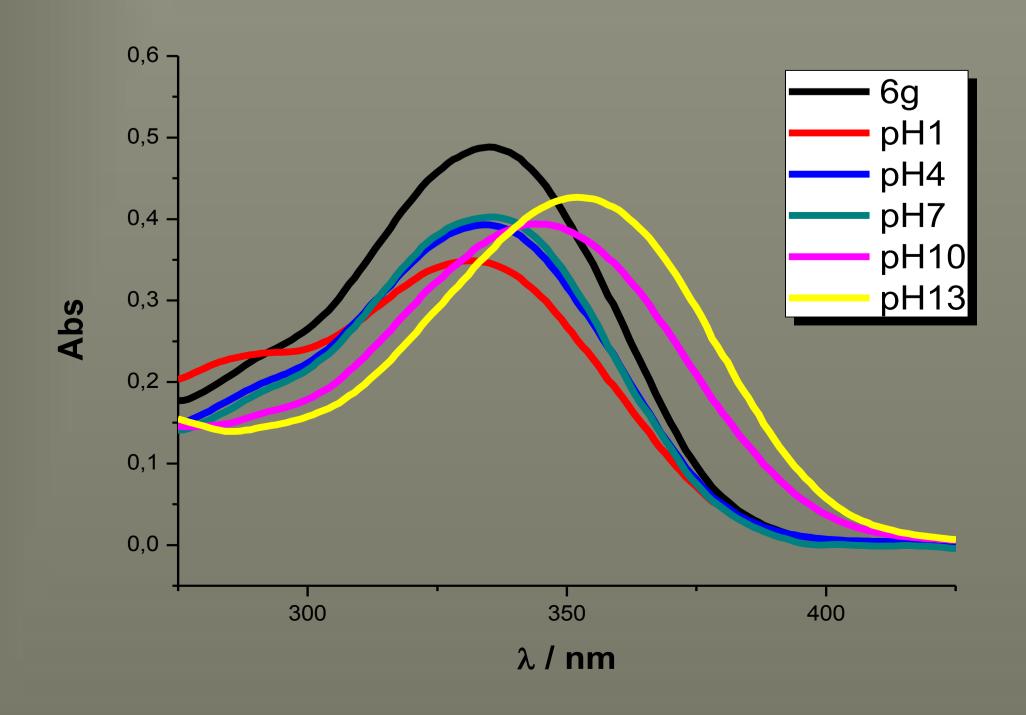
9a $R_1 = OH; R_2 = R_3 = R_4 = H; R_5 = H; R_6 = NH_3^+CI^-$ 9b $R_1 = OH; R_3 = OCH_3; R_2 = R_4 = H; R_5 = H; R_6 = NH_3^+CI^-$ 9c $R_2 = R_3 = R_4 = OH; R_1 = H; R_5 = H; R_6 = NH_3^+CI^-$

Scheme 1.

 $O \xrightarrow{R_6} R_6$ 7a R₁ = OCH₃; R₂ = R₃ = R₄ = H; R₅ = H; 7b R₁ = R₃ = OCH₃; R₂ = R₄ = H; R₅ = H; 7c R₁ = R₃ = OCH₃; R₂ = R₄ = H; R₅ = NH₃⁺Cl⁻; R₆ = OCH₃ 7d R₂ = R₃ = R₄ = OCH₃; R₁ = H; R₅=H; R₆ = NH₃⁺Cl⁻ 7e R₂ = R₃ = R₄ = OCH₃; R₁ = H; R₅=H; R₆ = NH₃⁺Cl⁻ 7e R₂ = R₃ = R₄ = OCH₃; R₁ = H; R₅ = NH₃⁺Cl⁻; R₆ = OCH₃ 7f R₃ = CN; R₁ = R₂ = R₄ = H; R₅ = H; R₆ = NH₃⁺Cl⁻ 7g R₃ = CN; R₁ = R₂ = R₄ = H; R₅ = NH₃⁺Cl⁻; R₆ = OCH₃

Table 1. Reducing activity % with DPPH and reducing power

To explore and confirm the possibility of synthesized derivatives for their application as metal or pH sensors, UV/Vis and fluorimetric titrations of aqueous compounds solutions with metal chloride salts or different buffers were performed.



FRAPmmolFe² DPPH/ µM Comp. /mmol comp. $30,02\pm4,1$ $2307, 42\pm 63, 87$ 7a $1905,99\pm 87,57$ $18,4\pm3,1$ **7b** $1677,96\pm93,2$ $26,56\pm1,8$ **7d** 1763,47±219,52 $30,45\pm2,1$ **7e** $1763, 47\pm32, 66$ $30,73\pm8,1$ **7f** 989,11±85,02 $18,12\pm0,28$ 7g 2283,67±62,12 $23,80\pm0,3$

mmol_{Fe²⁺/mmol_c using the FRAP assay of tested compoundsComp.DPPH/μMFRAPmmolFe²
/mmol comp.The antioxidant properties of chosen
compounds were determined by DPPH7a30.02+4.12307.42+63.87and FRAP methods.}

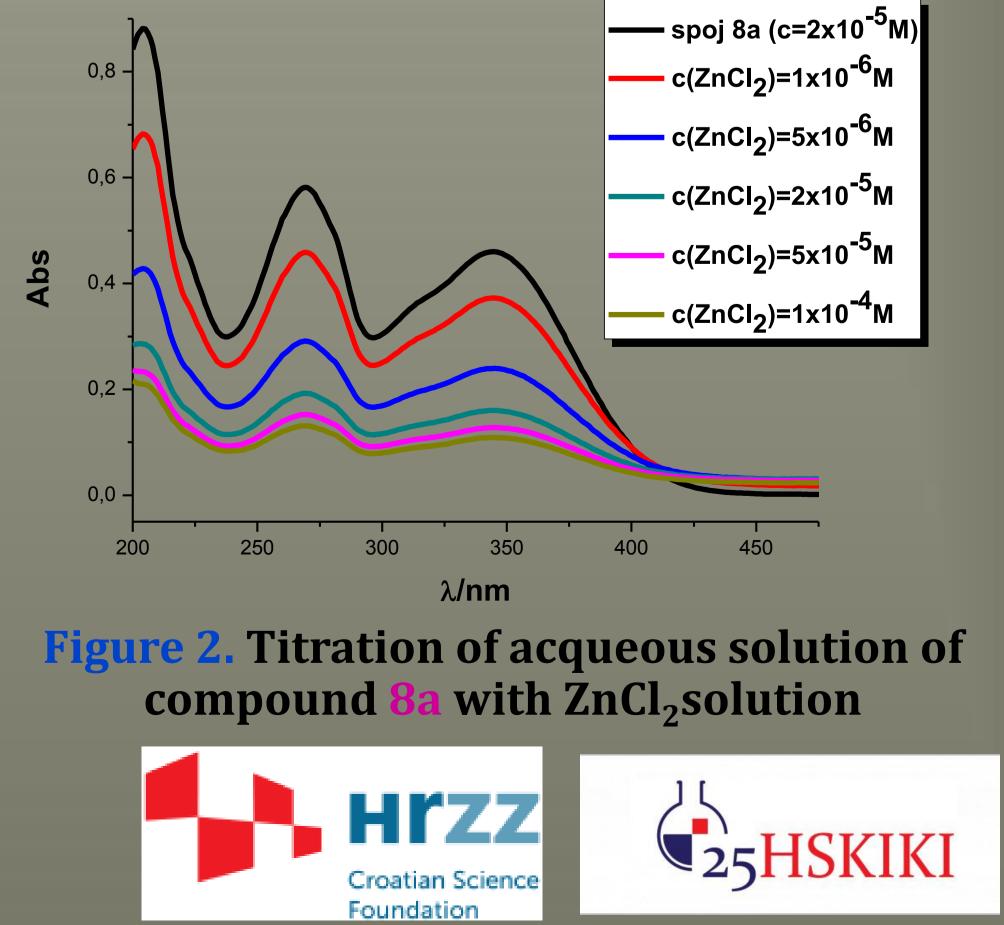
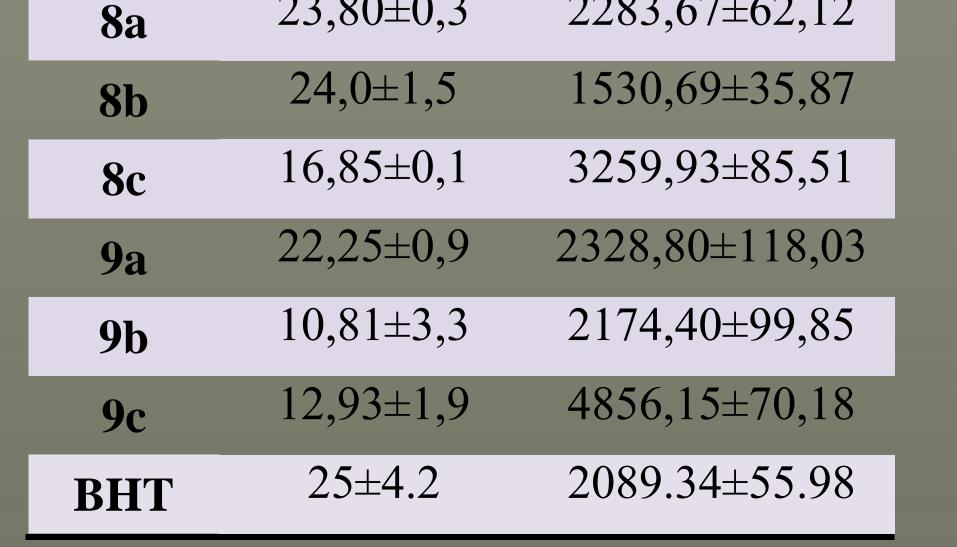


Figure 1. pH titration of compound 6g



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