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Proceeding Paper

Fluorescent Properties Study of 2-AminoPyridine Derivatives †

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Abstract: New fluorescents 2-amino-3-cyanopyridine derivatives have been synthesized through a facile one-pot, a four-component strategy under solvent-free microwave heating, this strategy will be added later. Here, we are interested in the evaluation of the fluorescent staining capacity of three derivatives with different substituents using fluorescence microscopy. The study was based on the effect of solvents on the electronic spectra of our compounds.

Keywords: fluorescence property; solvent effect; 2-amino-3-cyanopyridine

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1. Introduction

Small fluorescent molecules have emerged as essential tools for contemporary analytical methodologies applied in the biosciences field [1]. In this regard, 2-amino-3-cyanopyridine derivatives presents a set of features that suits them as the best fluorescent probes for biological applications [2]. They are characterized by presenting high photostability, molar absorption molar coefficients, and modest Stokes shifts, great features for fluorescence applications [3,4]. As such, they have been used in covalent and non-covalent labeling of amino acids, proteins, DNA, among other biological materials [5,6].

The observed shifts of the electronic absorption and emission bands of organic compounds induced by solvents are commonly understood as an indication of the extent of charge reorganization upon electronic excitation, respectively radiative excited-state deactivation.

Considering all these facts, we are interested in the study of the effect of seven solvents of the different polarities on fluorescence of three 2-amino-3-cyanopyridine derivatives. The results recorded were reported using fluorescence microscopy analysis.

2. Materials and Methods

For the photophysical characterization, UV-vis absorption spectra were obtained in chloroform solution using a Universal Measurement Spectrophotometer (U.MS.) Cary 7000 UV-Vis-NIR Agilent Technology, and steady-state fluorescence spectra were acquired on a Shimadzu RF-6000 Spectrofluorophotometer using a cm^{-1} quartz cuvette in right angle (RA) geometry at 25 °C in air-equilibrated conditions.

The titration studies were carried out at a constant concentration of the probe (1.0×10^{-4} M) in seven solvents.

The synthesis and structural characterization of 2-Amino-pyridine derivatives have been reported elsewhere.

3. Results and Discussion

The synthesized heterocycles were exhibited fluorescence. The solvatochromic study of 2-amino-3-cyanopyridine derivatives in dimethyl sulfoxide (DMSO), ethanol (EtOH), acetonitrile (CH_3CN), chloroform ($CHCl_3$), N, N-dimethylformamide (DMF), ethyl acetate (AcOEt), water (H_2O), is shown in Table 1.

From the data, it is evident that as the solvent polarity increases a high wavelength shift was observed for DMSO, and hence further studies were carried out using DMSO as the main solvent.

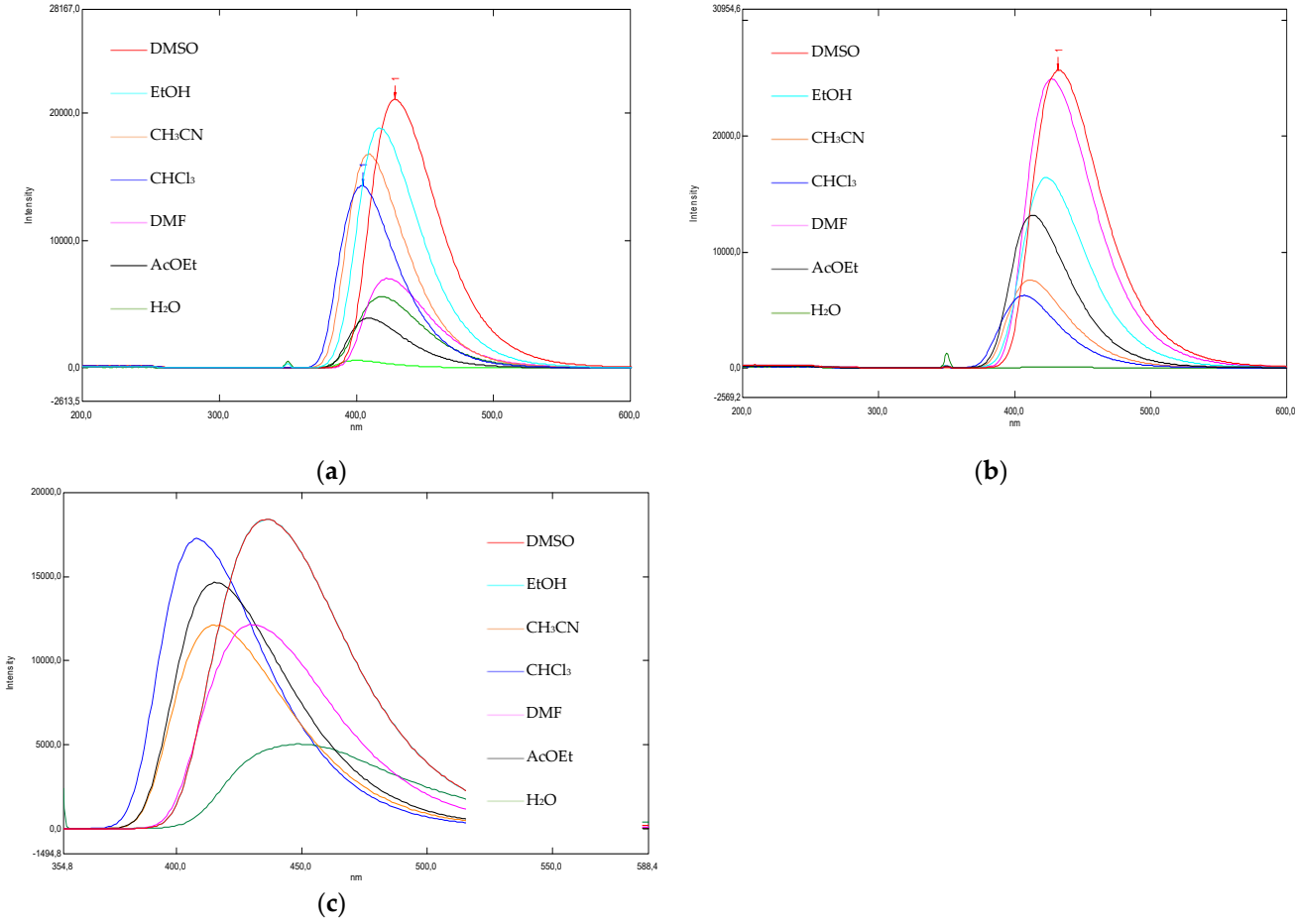
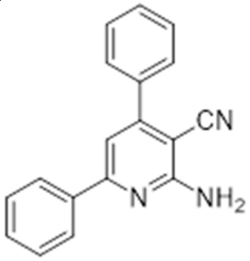
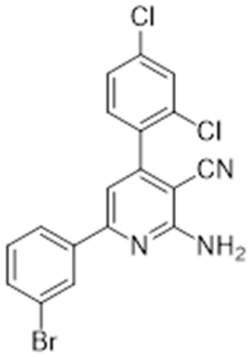
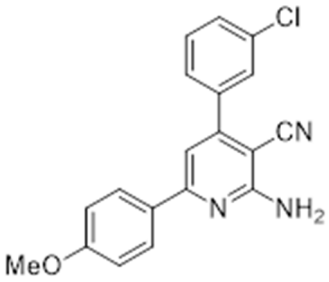


Figure 1. Solvent effect of 2-Amino-pyridine (1.0×10^{-4} M) (**a**) **1a**; (**b**) **1b**; (**c**) **1c** in DMSO, EtOH, CH_3CN, $CHCl_3$, DMF, AcOEt, and H_2O.

Table 1. Solvent Effect on Fluorescence Spectra of 2-Amino-pyridine Derivatives.

Compound		DMSO	EtOH	CH_3CN	$CHCl_3$	DMF	AcOEt	H_2O
1a		λ_{max} 428 ε 21,118.1	λ_{max} 416 ε 18,843.8	λ_{max} 409 ε 16,806.6	λ_{max} 405 ε 1129.8	λ_{max} 422 ε 7028.1	λ_{max} 408 ε 3922	λ_{max} 417 ε 1148

1b		λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}
		432	423	411	407	427	414	350
		ε	ε	ε	ε	ε	ε	ε
		25,719.3	16,445.9	7582	6251.2	24,980.3	13,176.3	1257.7
1c		λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}	λ_{max}
		437	436	415	408	429	415	350
		ε	ε	ε	ε	ε	ε	ε
		18,405.6	18,415.6	12,138.9	17,282.7	12,147.4	14,666.6	6173.8

4. Conclusions

The three compounds under study display fluorescence with wavelength shifts between 350 and 437 nm. The results support the concept that associated the polarity of the compounds with the solvents.

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