

Název: **BEHAVIOR OF DOXORUBICIN INVESTIGATED BY
FLUORESCENCE SPECTROSCOPY**

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LUMINESCENCE

Chemiluminescence

Crystalloluminescence

Electroluminescence

Mechanoluminescence

Photoluminescence

Radioluminescence

Sonoluminescence

Thermoluminescence

PHOTOLUMINESCENCE

- Phosphorescence
- Fluorescence

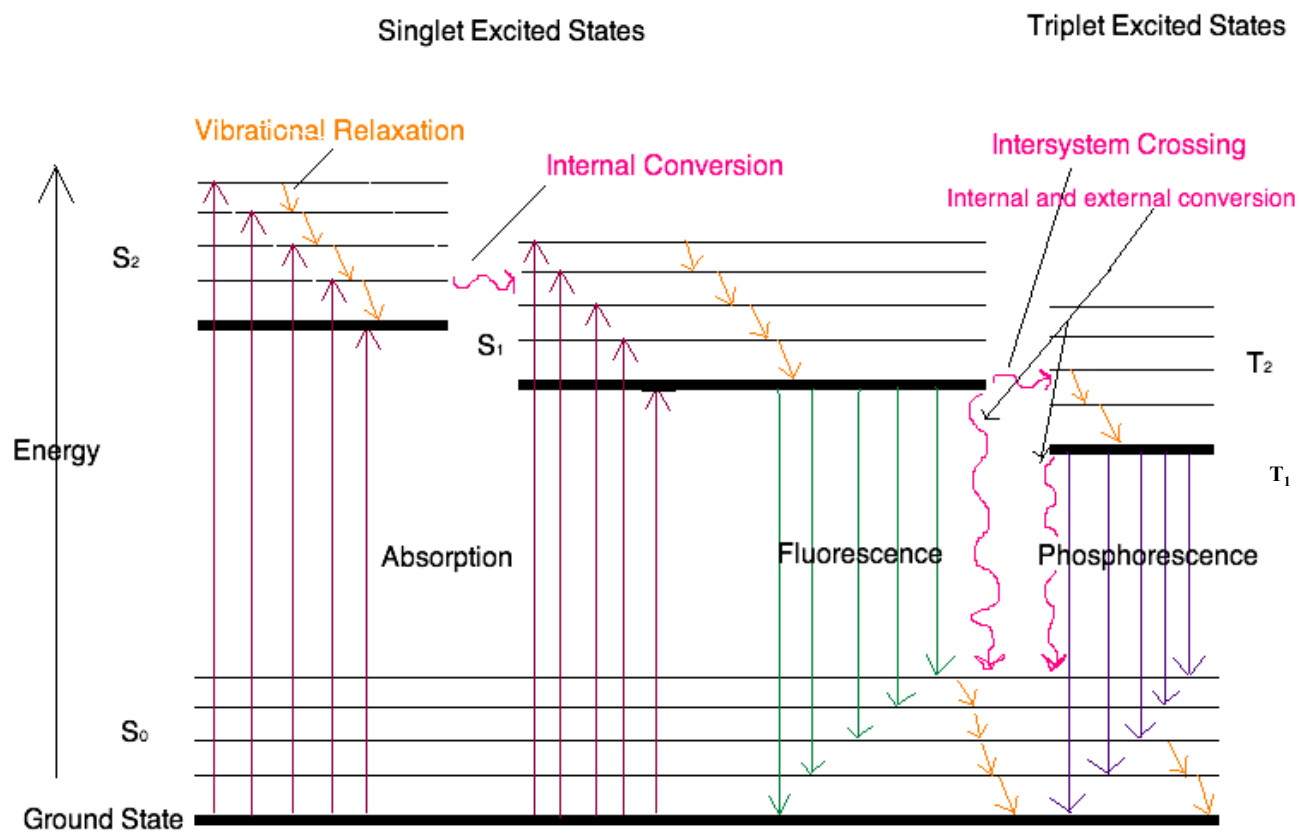
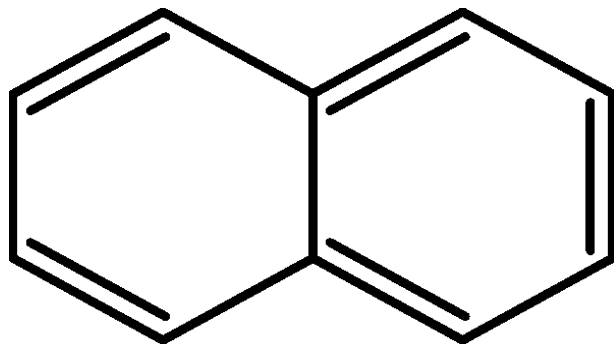


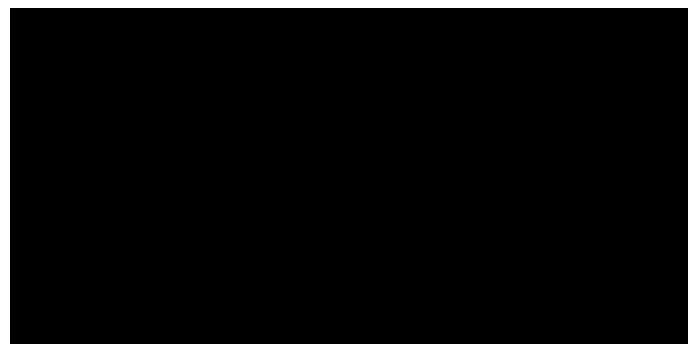
Fig. 1: Jablonski diagram describing the electronic levels of molecules and possible transitions between different singlet and triplet states.

FLUORESCENCE

- Light emitted by singlet excited states of molecules following absorption from an external resource.
- Requirement for fluorophore: A molecule with a rigid conjugated structure (usually a polyaromatic hydrocarbon or heterocycle).



Naphthalene



Pyridine

FLUORESCENCE

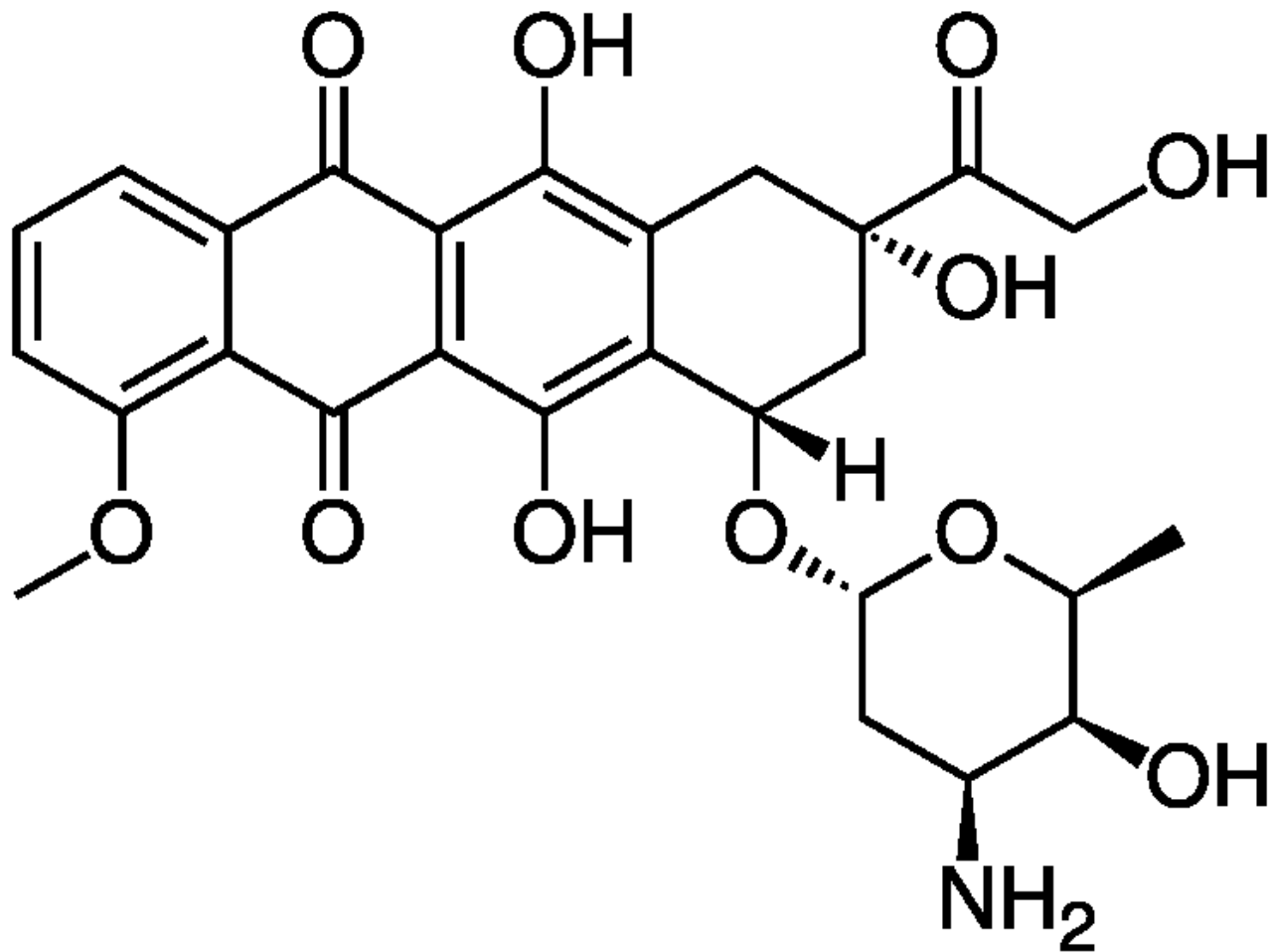
- Many factors influence on fluorescence properties:
 - Viscosity (proportional)
 - Temperature (inversely proportional)
 - Solvent
 - pH of solution
 - Concentration of fluorophore

- Application on mineralogy, gemology, and chemical sensors in fluorescence spectroscopy.

FLUORIMETRIC ANALYSIS

- Measurements performed by multifunctional microplate reader Tecan Infinite 200PRO (Tecan, Switzerland)
- Samples were placed in transparent 96 well microplate with flat bottom by Nunc (ThermoScientific, USA)
- Fluorescence was measured with $\lambda_{\text{ex}}=480\text{nm}$ and λ_{em} was in the range of 510nm to 850nm per 5nm steps. Each value is average of 5 measurements
- Solutions of 20 mM sodium acetate (pH 4, 5), 20 mM sodium phosphate (pH 6, 7, 8), 20 mM sodium borate (pH 9, 10), ethanol (EtOH) (10, 20, 30, 50, 70, 100%), acetonitrile (ACN) (10, 20, 30, 50, 70%), and dimethyl sulfoxide (DMSO) (10, 20, 30, 50, 70, 100%) were used. Solutions of different concentration of DOX (1-500 $\mu\text{g}/\text{ml}$) were analysed.

STRUCTURE OF DOXORUBICIN



RESULT AND DISCUSSION

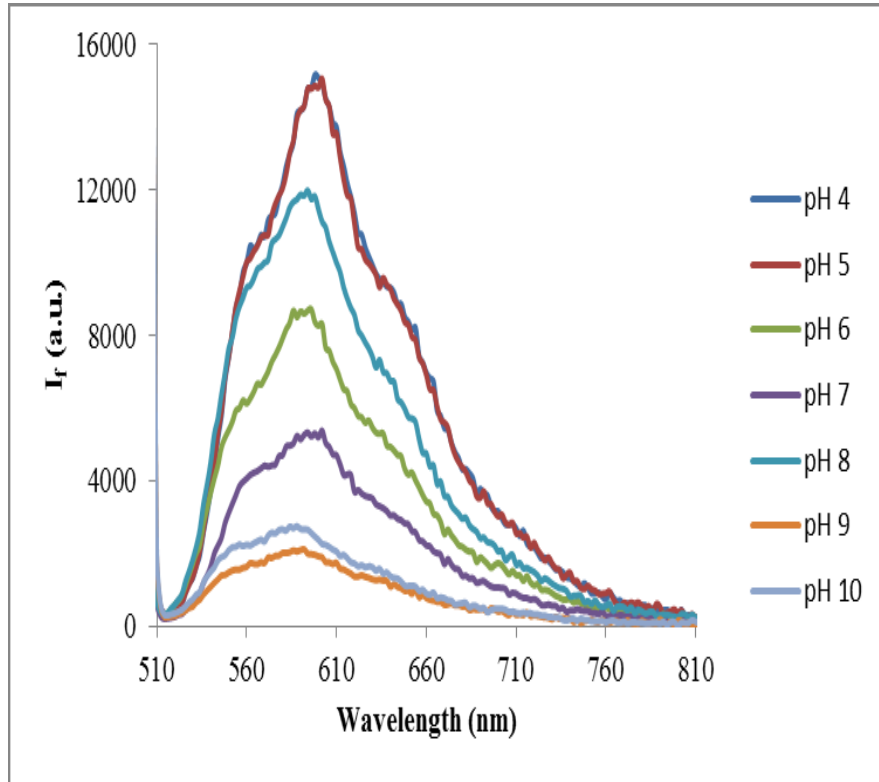


Fig. 1: Emission spectra ($\lambda_{ex} = 480$ nm) of DOX under various pH. Solutions of 20 mM sodium acetate (pH 4, 5), 20 mM sodium phosphate (pH 6, 7, 8), 20 mM sodium borate (pH 9, 10) were used.

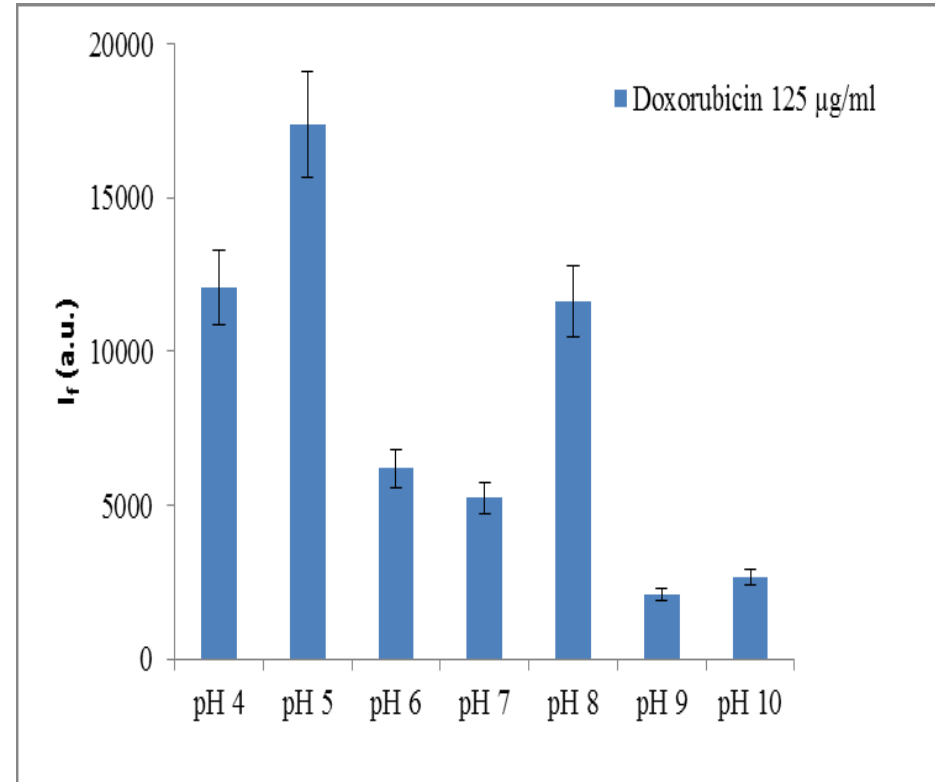


Fig. 2: Fluorescence intensity in the emission maxima of DOX 125 $\mu\text{g/ml}$ under various pH. Solutions of 20 mM sodium acetate (pH 4, 5), 20 mM sodium phosphate (pH 6, 7, 8), 20 mM sodium borate (pH 9, 10) were used.

RESULT AND DISCUSSION

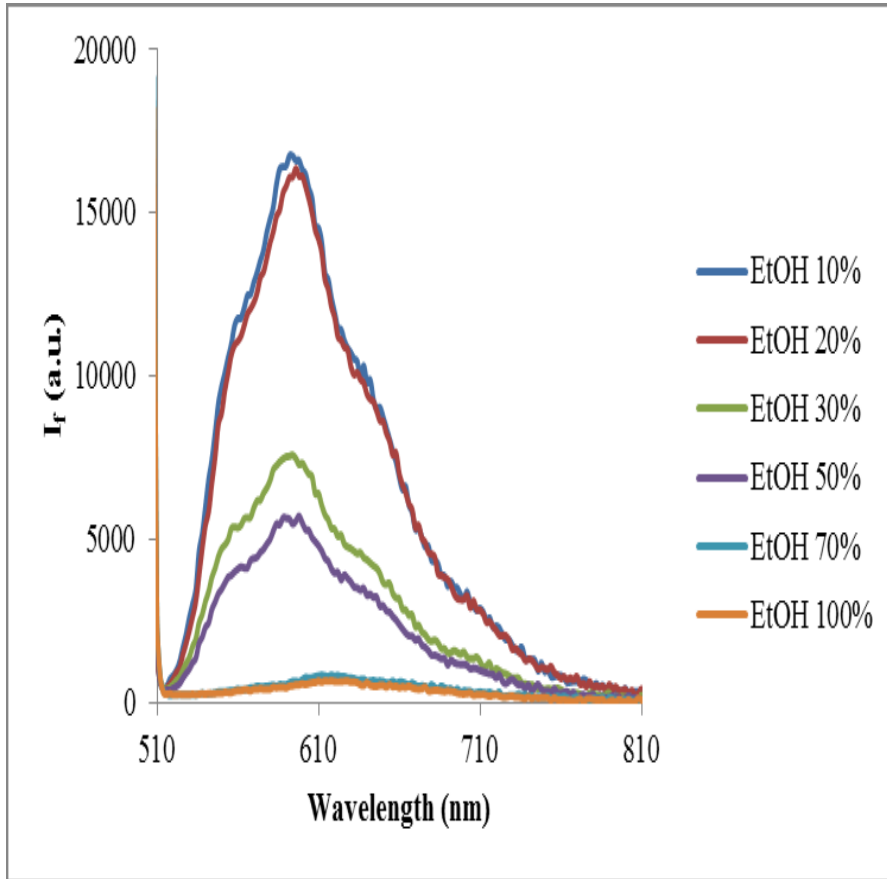


Fig. 3: Emission spectra ($\lambda_{\text{ex}} = 480 \text{ nm}$) of DOX (125 µg/ml) dissolved in EtOH.

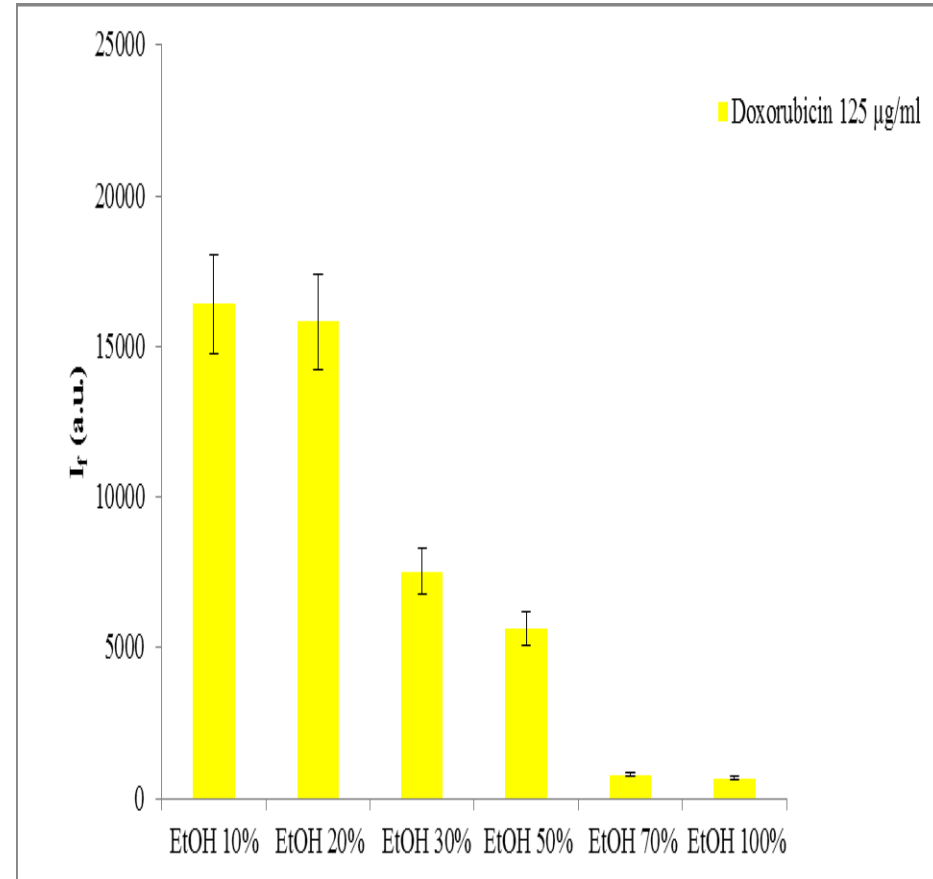


Fig. 4: Fluorescence intensity in the emission maxima of DOX (125 µg/ml) dissolved in EtOH.

RESULT AND DISCUSSION

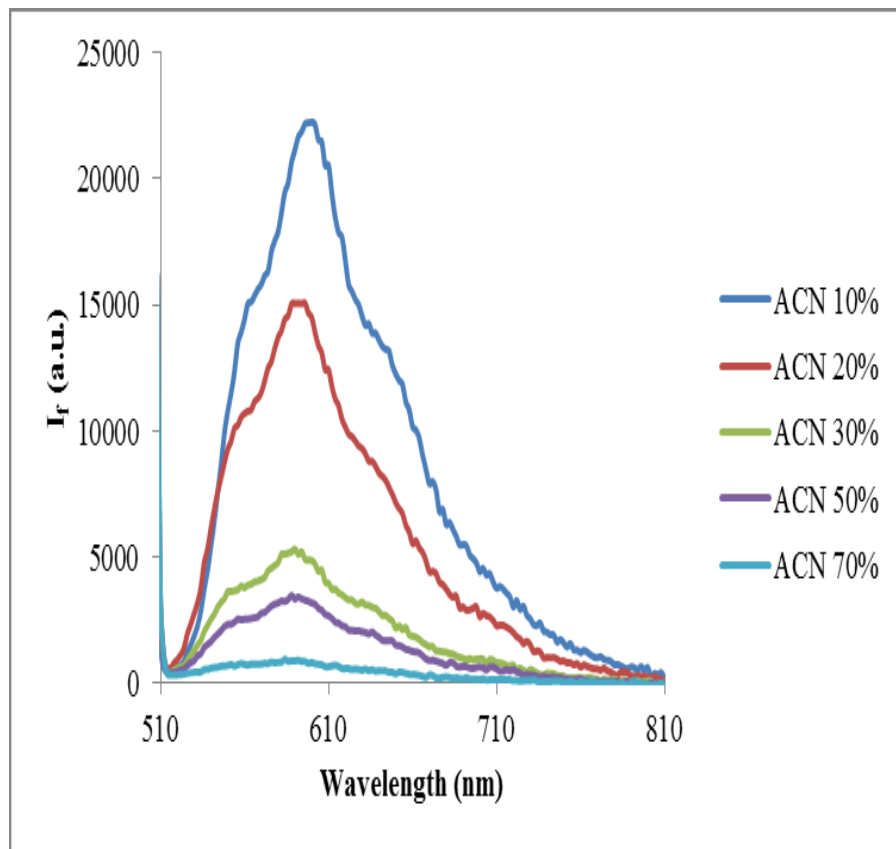


Fig. 5 Emission spectra ($\lambda_{\text{ex}} = 480 \text{ nm}$) of DOX (125µg/ml) dissolved in ACN.

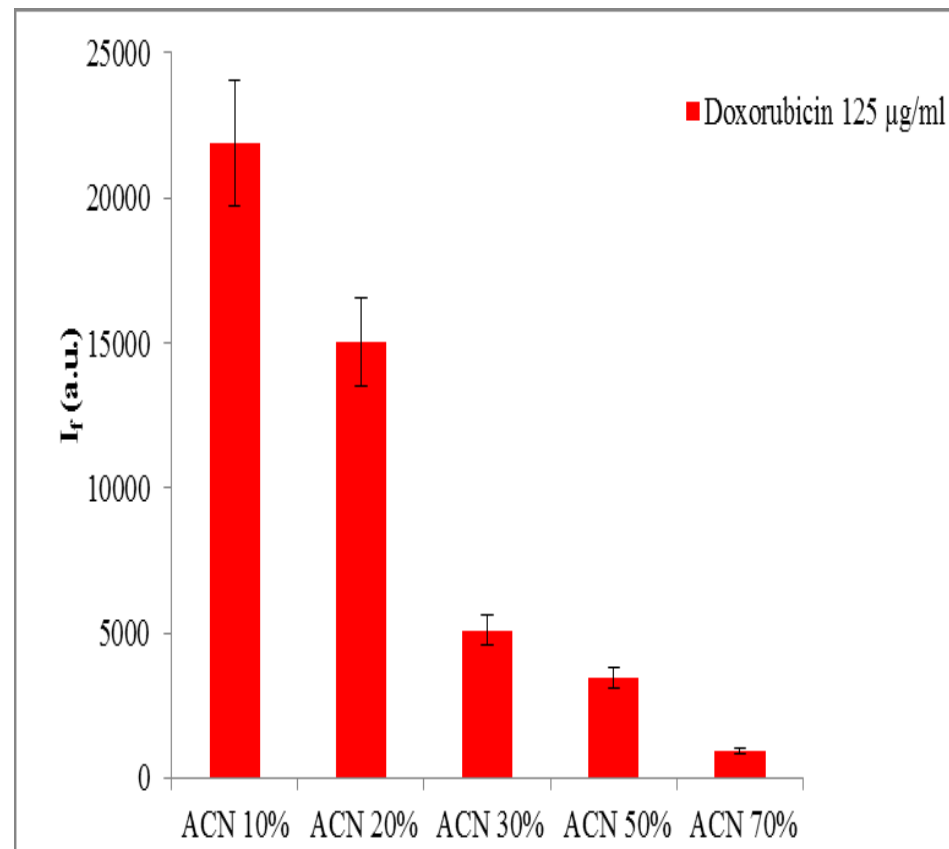


Fig. 6: Fluorescence intensity in the emission maxima of DOX (125µg/ml) dissolved in ACN.

RESULT AND DICUSSION

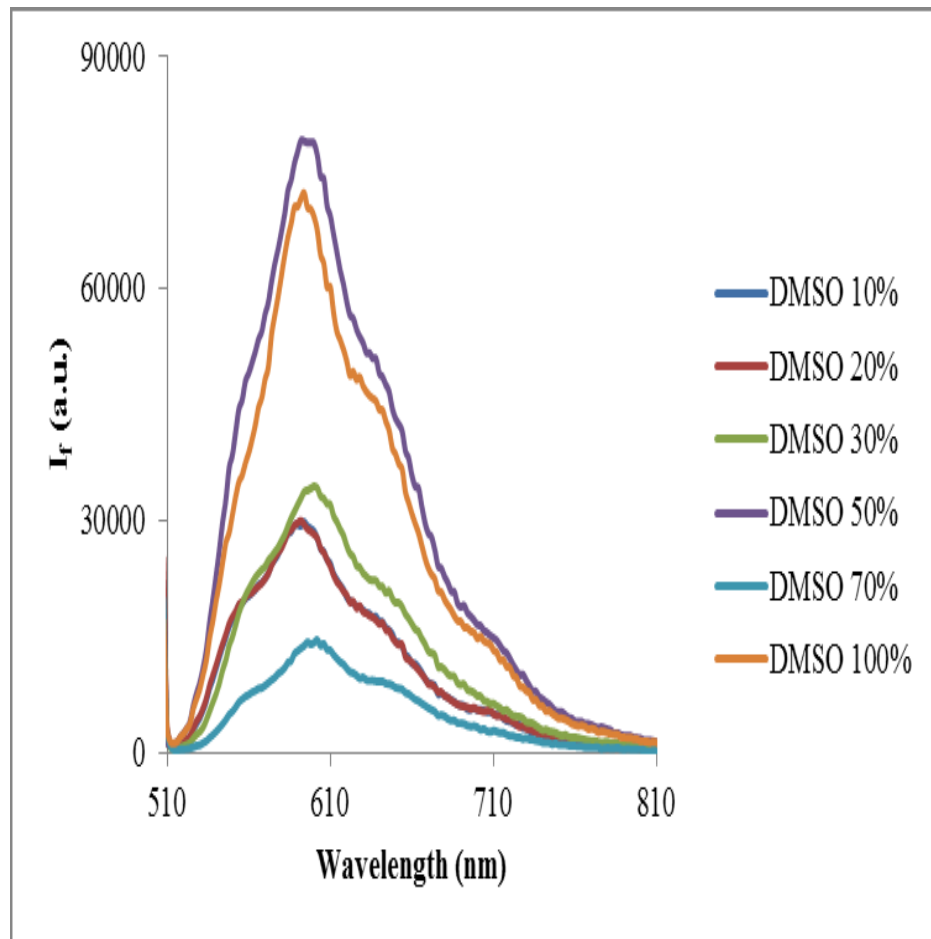


Fig. 7: Emission spectra ($\lambda_{\text{ex}} = 480 \text{ nm}$) of DOX (125µg/ml) dissolved in DMSO.

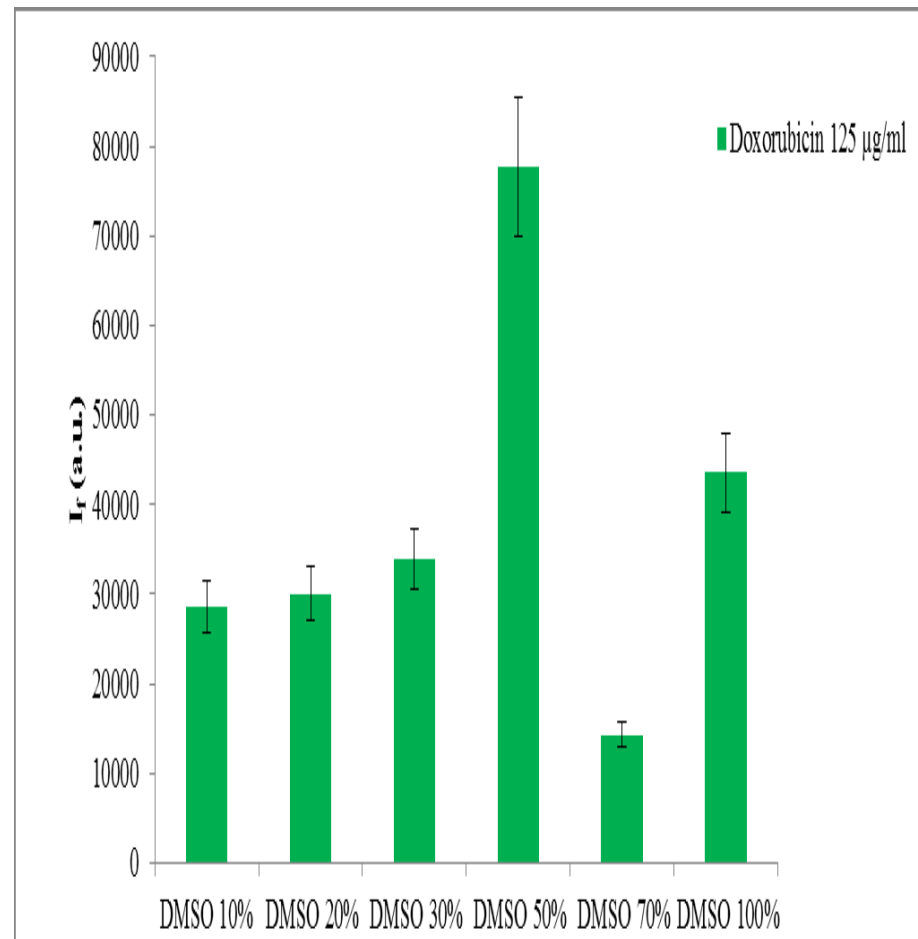


Fig. 8: Fluorescence intensity in the emission maxima of DOX (125µg/ml) dissolved in DMSO.

CONSLUSION

- Fluorimetry is the suitable method for the analysis of DOX under various conditions.
- Based on the results can be concluded that fluorescence of DOX depends on the pH of solution.
- Fluorescence intensity of DOX dissolved in organic solvents is higher than DOX is dissolved in inorganic solvents.

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Thank You For Your attention!