Electronic Supplementary Material (ESI) for RSC Advances.

The Supplementary Information Section of Manuscript RA- ART-07-2021-5388 of Lajin for *RSC Advances*

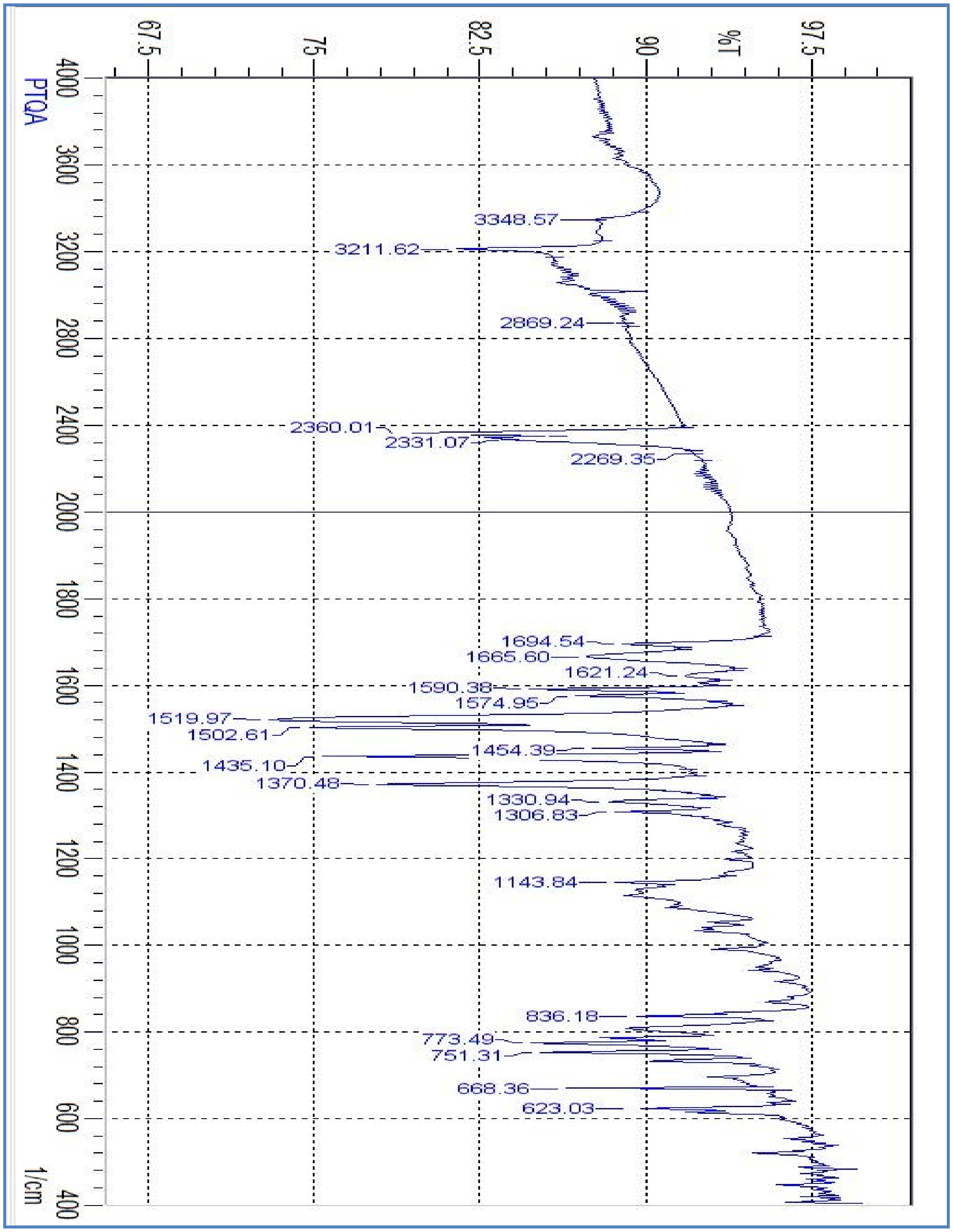


Fig. 1 ***SI**.** FTIR spectrum of N-(pyridin-2-yl)-quinoline-2-carbothioamide (PTQA).

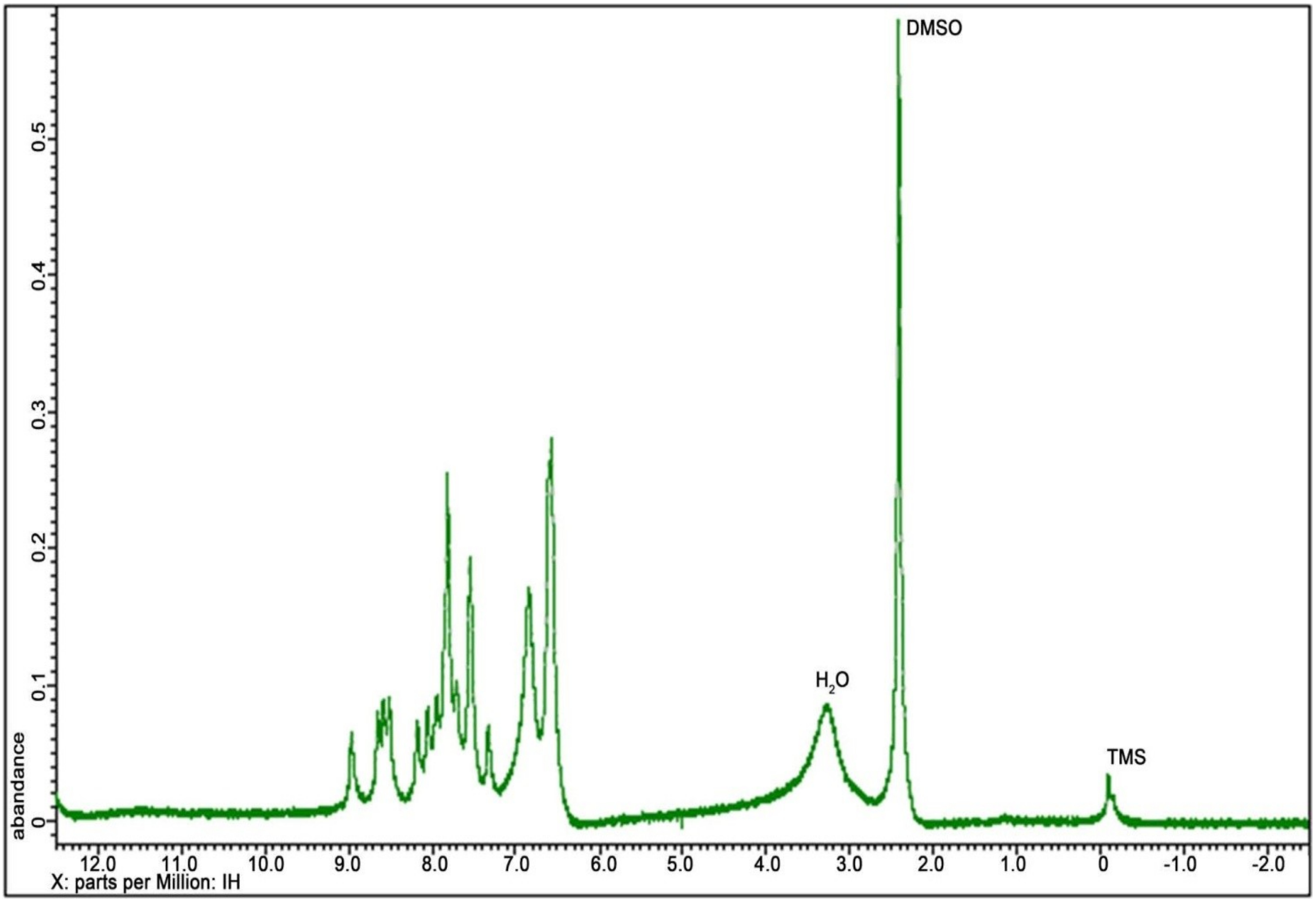
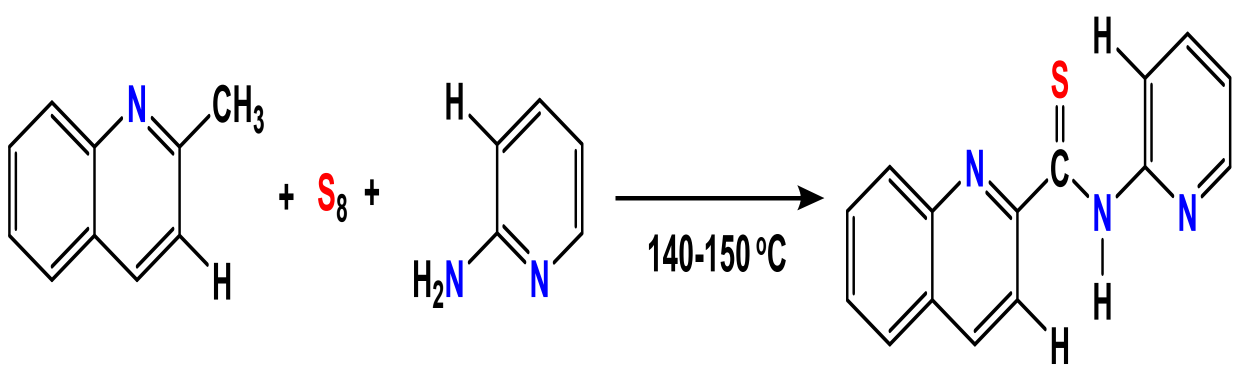


Fig.2 *SI*.* [1]HNMR spectrum of N-(pyridin-2-yl)-quinoline-2-carbothioamide (PTQA)



Scheme 1 *SI:** Structure of N-(pyridin-2-yl)-quinoline-2-carbothioamide (PTQA)

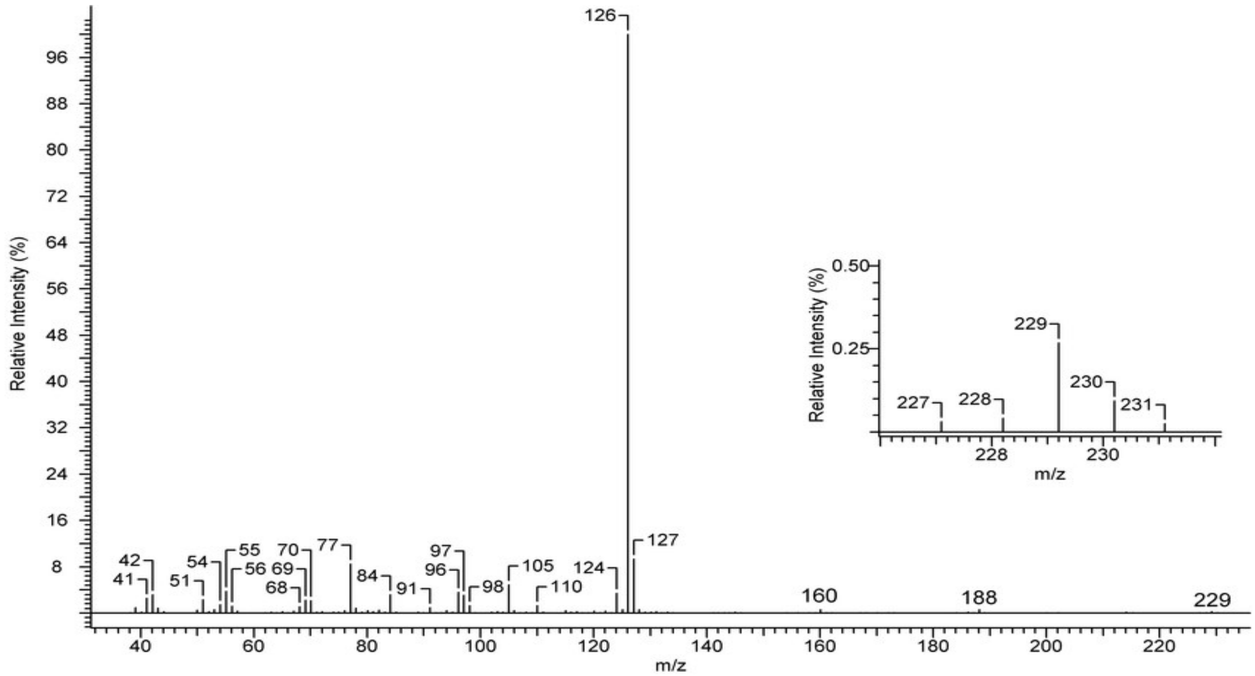


Fig. 3 *SI.** Mass spectrum of N-(pyridin-2-yl)-quinoline-2-carbothioamide (PTQA)

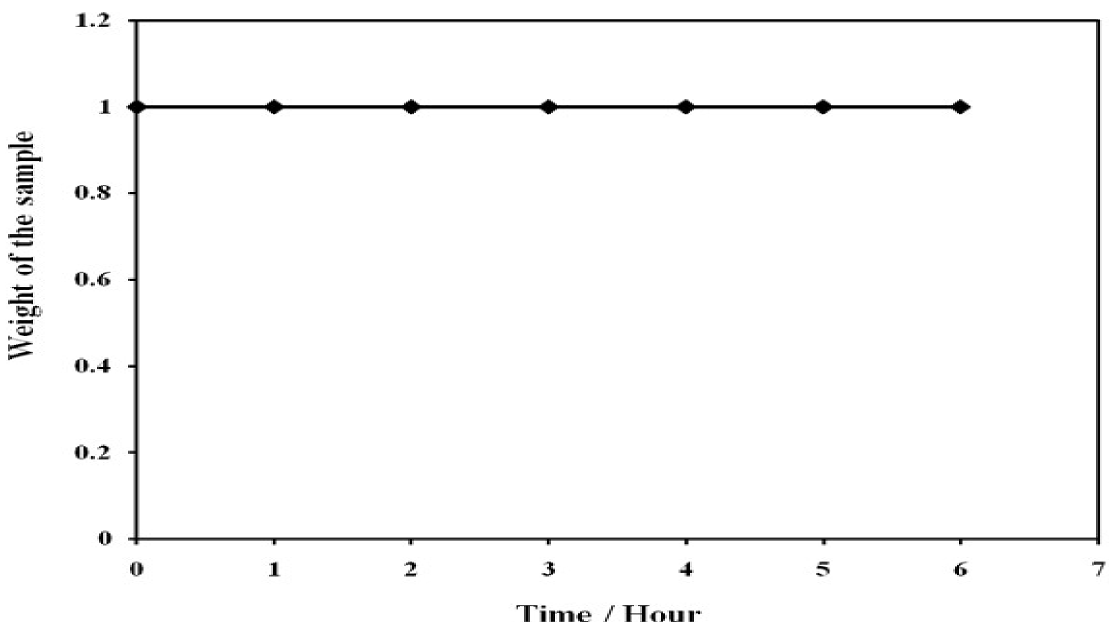


Fig. 4 *SI.** Thermo-gravimetric curve of N-(pyridin-2-yl)-quinoline-2-carbothioamide (PTQA) at 80-85°C.

NMR Spectrum of Thallium(Tl)

Thallium (Tl) has two high sensitivity NMR active nuclei, ^{203}Tl and ^{205}Tl. ^{205}Tl is more sensitive and yields less broad signals than ^{203}Tl (**Fig. 5 *SI****). ^{205}Tl is therefore the preferred thallium nucleus. Both nuclei are spin-half and yield narrow signals in the absence of oxygen. Many thallium salts bind oxygen from the air which typically causes strong oxidizing capacity of other compound especially ligand by paramagnetic broadening of 10's of Hz. Thallium has a very wide chemical shift range (**Fig. 2 *SI****). ^{203}Tl (**Fig. 2 *SI****) yields signals that are less sensitive and slightly broader than ^{205}Tl. Therefore ^{205}Tl NMR is the preferred thallium nucleus.

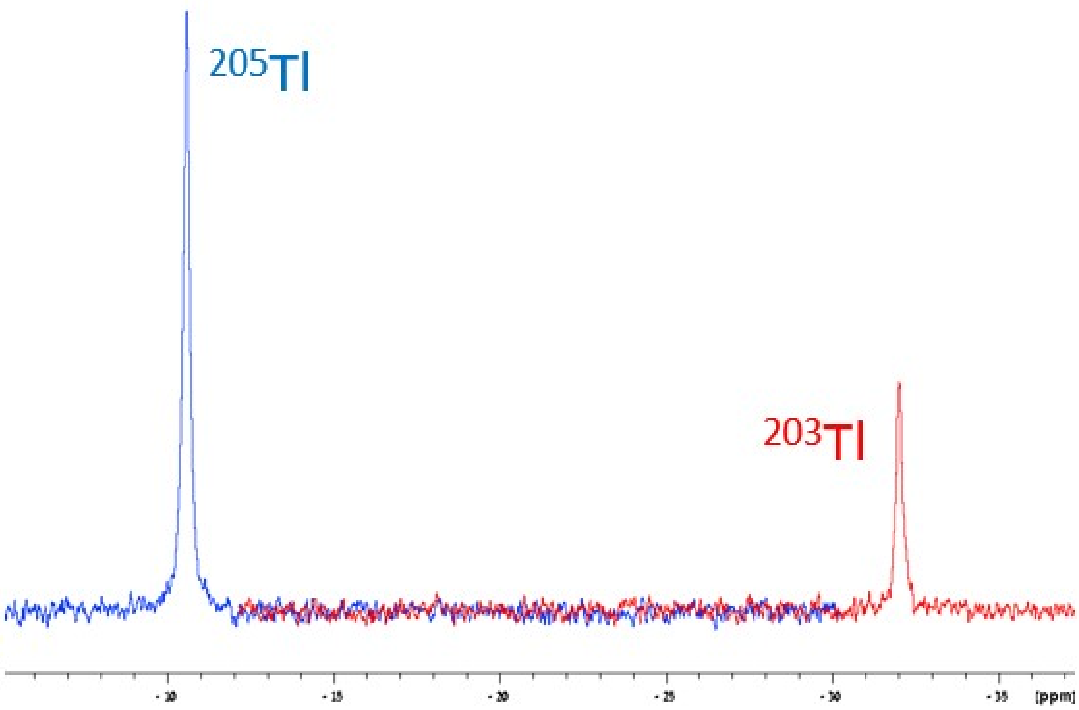


Fig. 5 *SI**. Comparison of ^{203}Tl and ^{205}Tl NMR for $TlNO_3$ in H_2O**

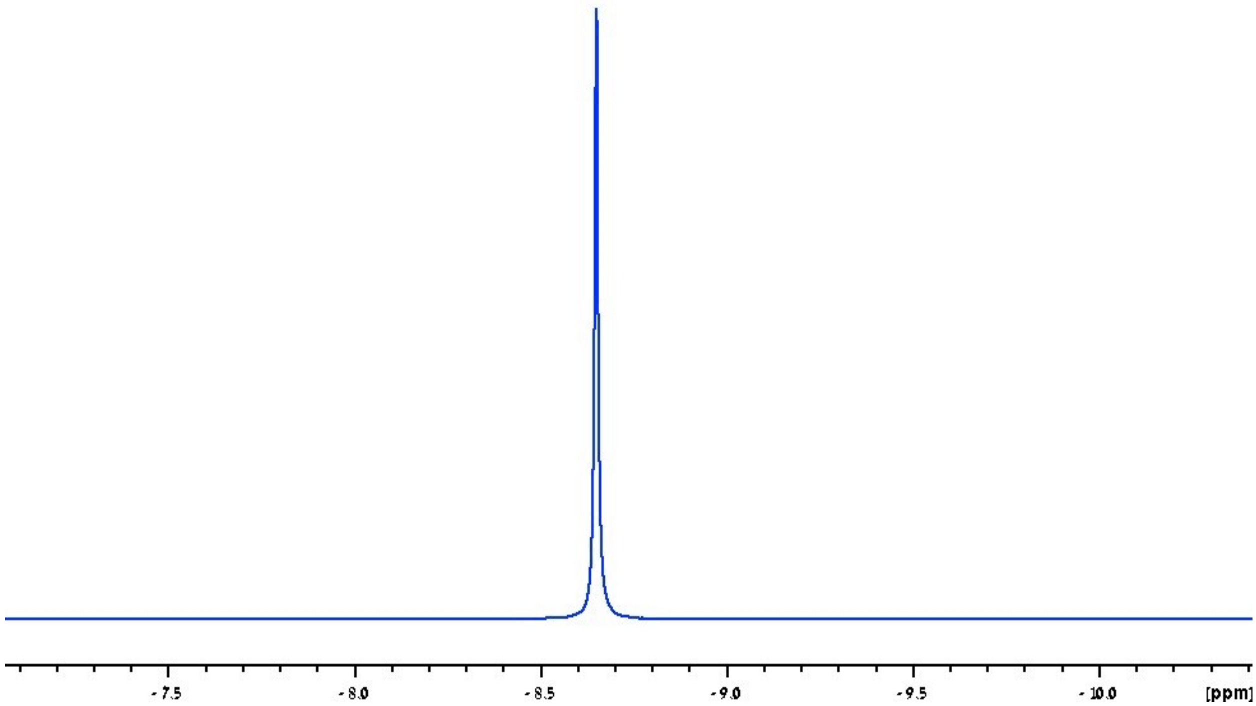


Fig. 6 ***SI**. ^{205}Tl NMR for $TlNO_3$ in H_2O**

Source: J. Hinton, "Thallium NMR spectroscopy", *Bull. Magn. Reson*, 1992, **13**, 90-108.
URL: http://chem.ch.huji.ac.il/nmr/techniques/1d/row6/tl.html

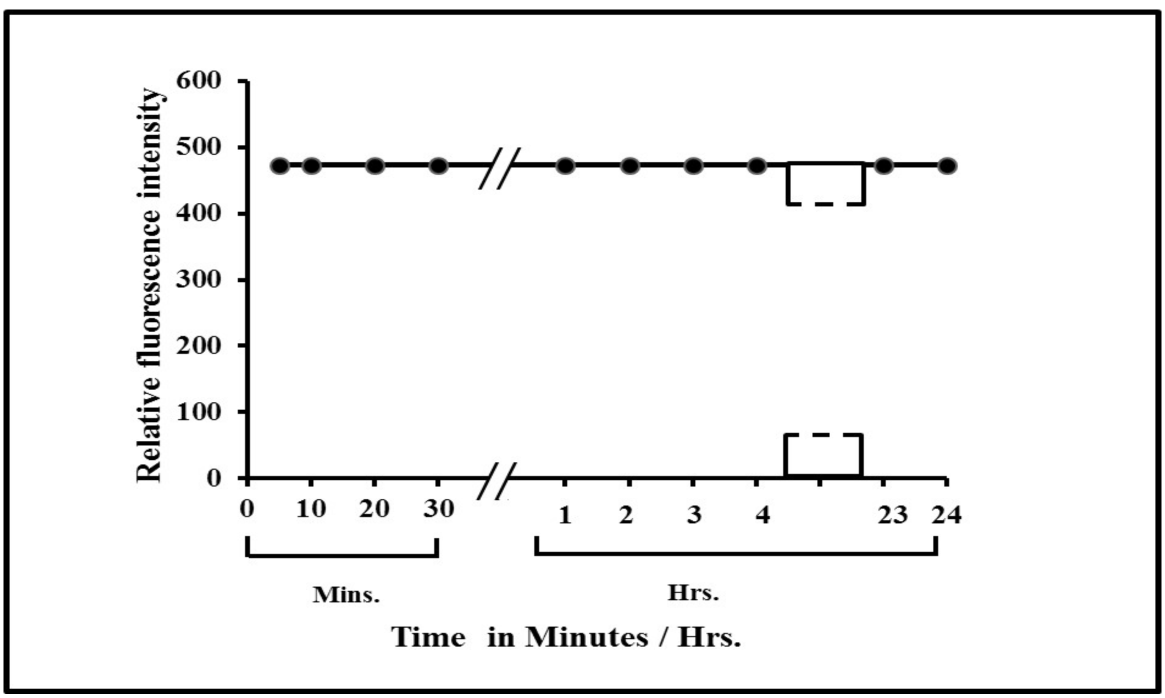


Fig. 7 ***SI**.** Effect of the time on the fluorescence of Tl^{III}-PTQA system.

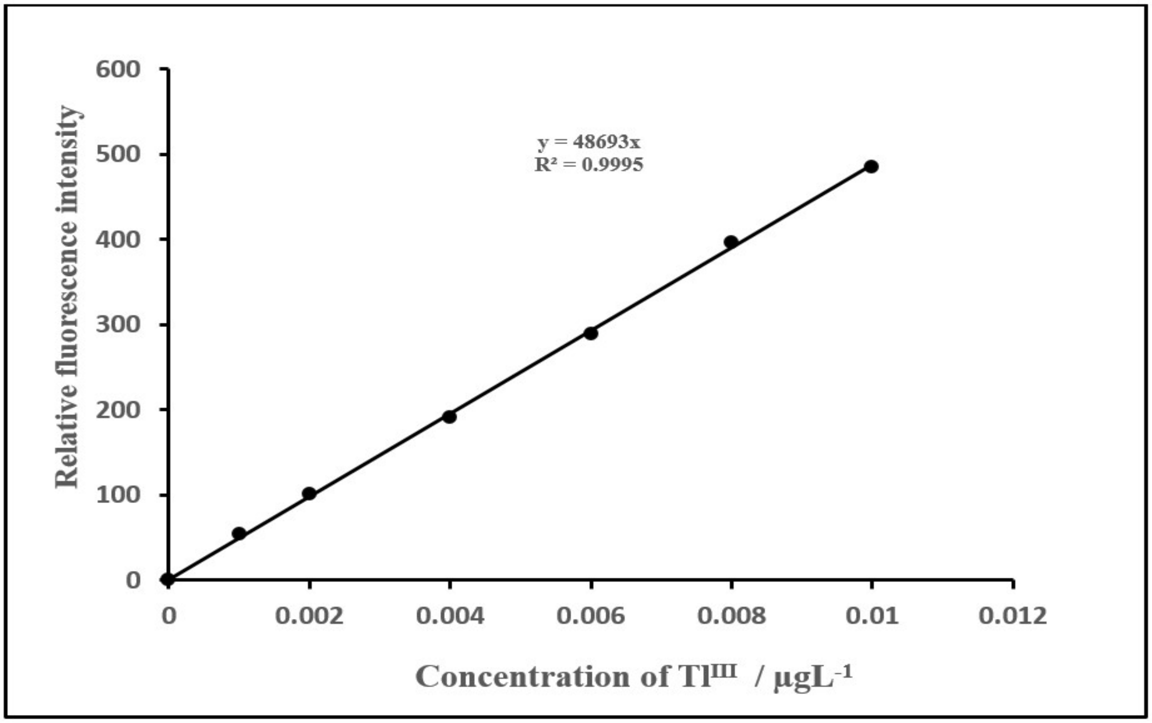


Fig. 8 *SI.** Calibration graph A: 0.001-0.01-µgL^{-1} of thallium^{III}
Bandwidth: Ex.slit-3, Em.slit-5
Sensitivity: High

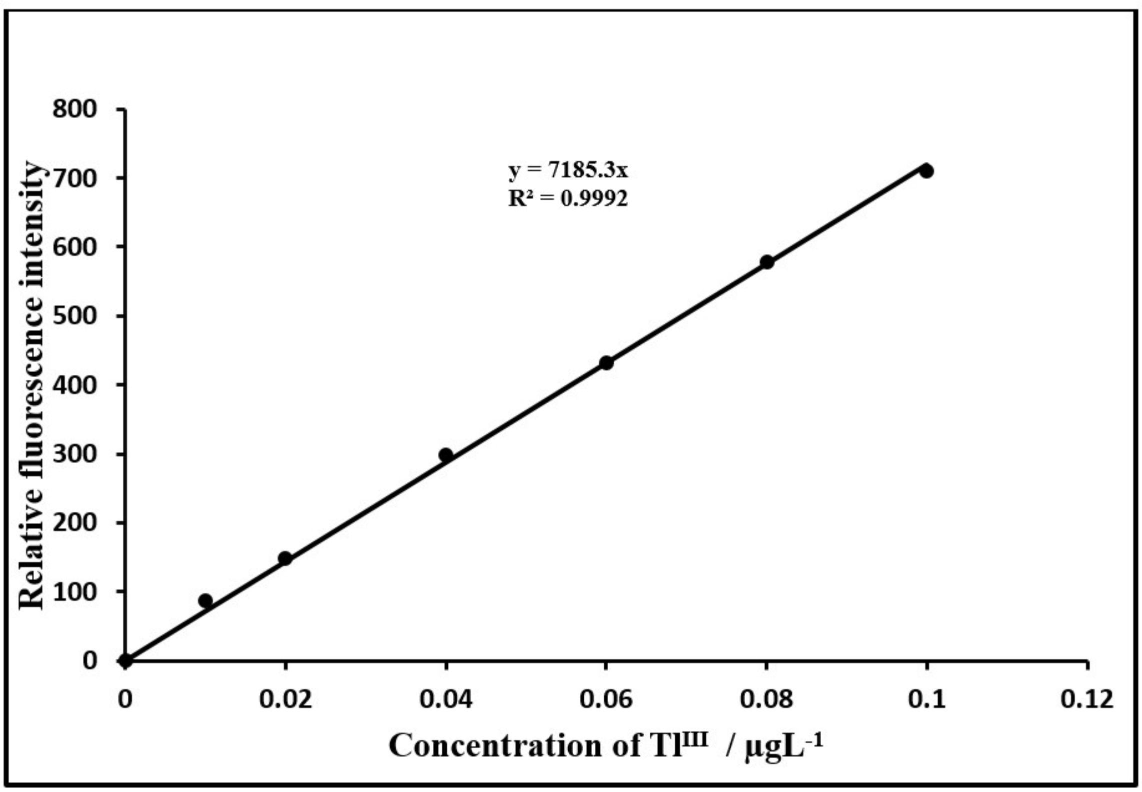


Fig. 9 *SI.** Calibration graph B: 0.01- 0.1-µgL^{-1} of thallium^{III}
Bandwidth: Ex.slit-3, Em.slit-3
Sensitivity: High.

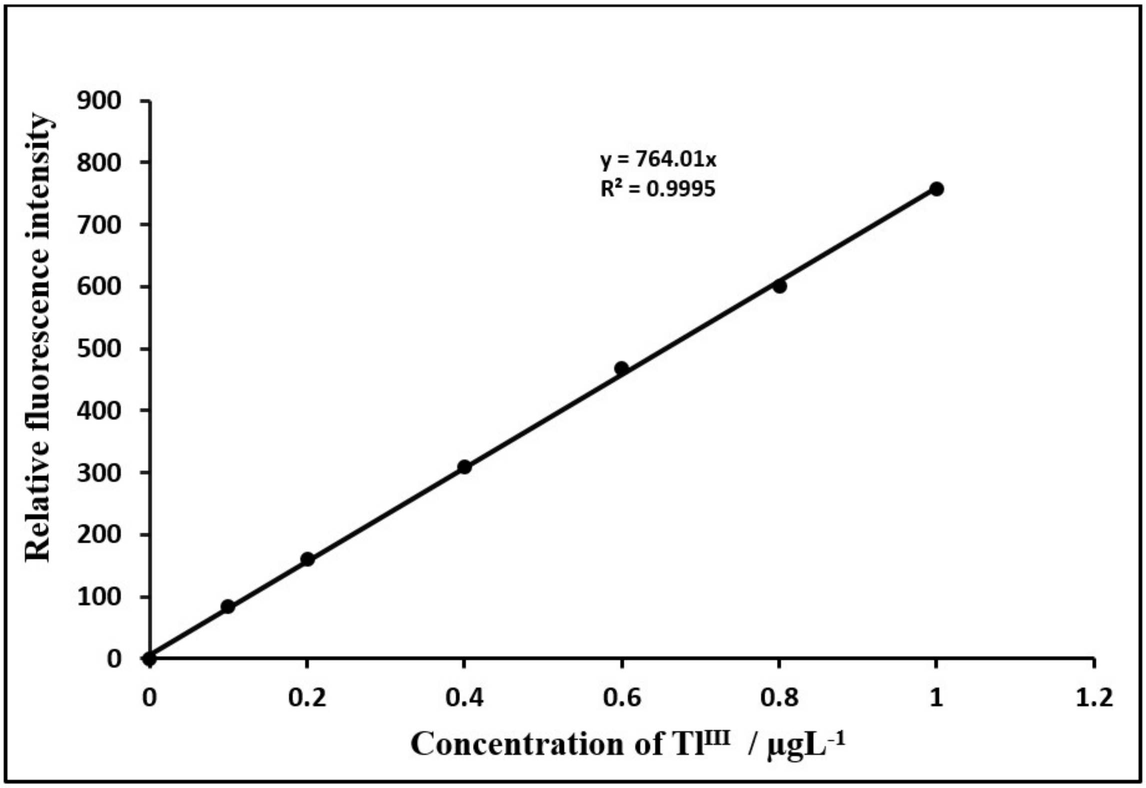


Fig. 10 *SI**.** Calibration graph C: 0.1 - 1- μgL^{-1} of thallium^{III}
Bandwidth: Ex.slit-5, Em.slit-1.5
Sensitivity: High

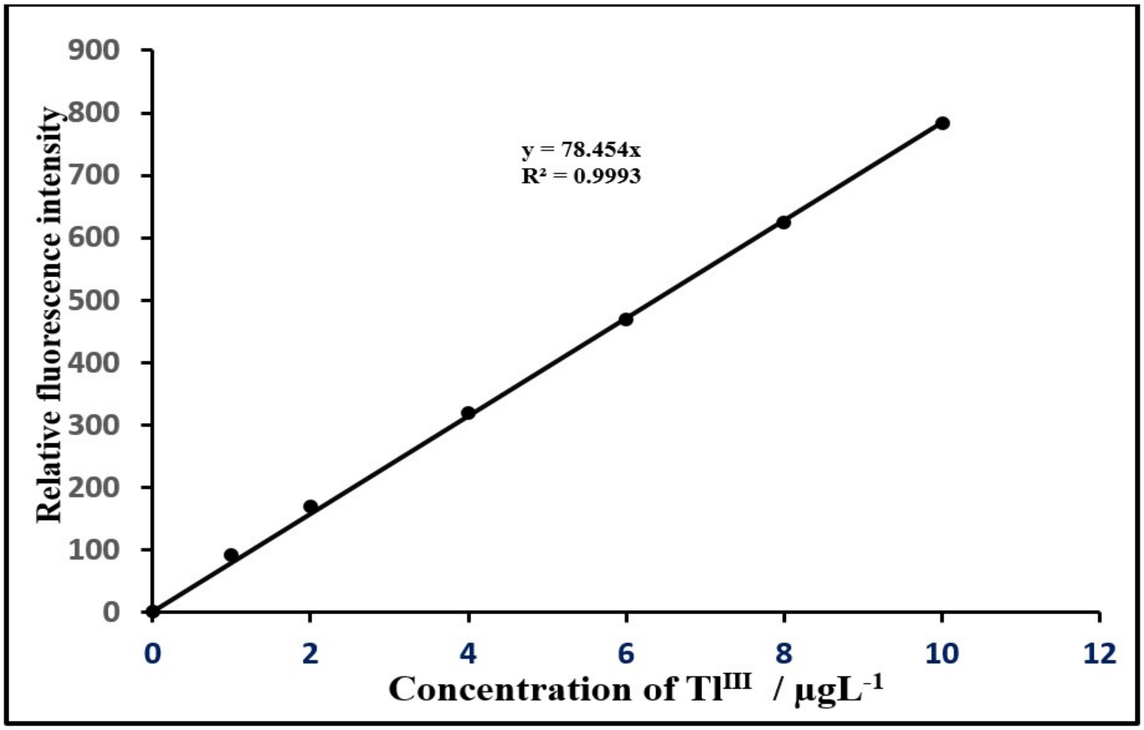


Fig. 11 *SI.** Calibration graph D: 1-10- µgL-1 of thallium^{III}
Bandwidth: Ex.slit-3, Em.slit-5
Sensitivity: High

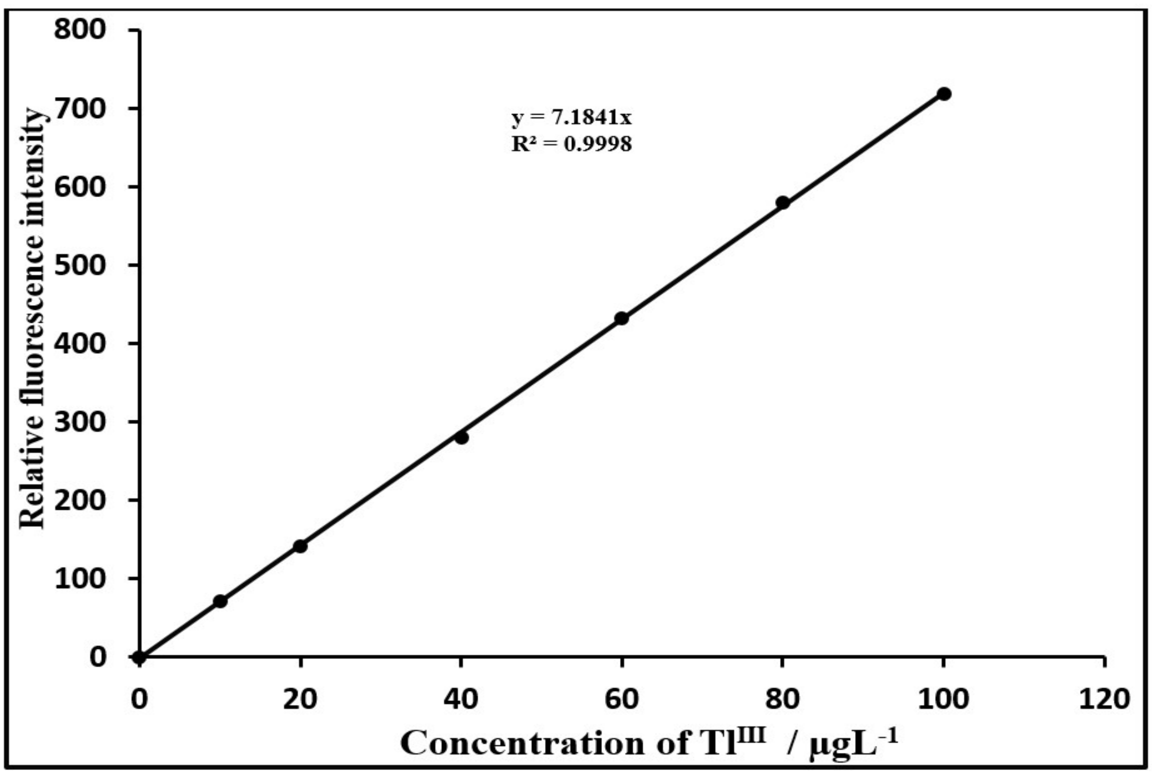


Fig.12 *SI**. Calibration graph E: 10-100 - µgL^{-1}of thallium^{III}
Bandwidth: Ex.slit-5, Em.slit-3
Sensitivity: High

Table 1*SI.**Table of tolerance limits of foreign ions[a], tolerance ratio [species (x) / Tl(w/w)

Species x	**Tolerance Ratio x/Tl (w/w)**	**Species x**	**Tolerance Ratio x/Tl (w/w)**
Aluminum	1000	Iron (III)	500[b]
Ammonium	1000	Lead (II)	1000
Azide	1000	Magnesium	1000
Arsenic (III)	1000	Manganese (II)	1000
Arsenic (V)	100[b]	Manganese (VII)	300[c]
Ascorbic acid	1000	Mercury (II)	1000
Antimony	1000	Molybdenum (V)	100[c]
Barium	1000	Nitrate	1000
Bromide	1000	Nickel	1000
Bismuth (III)	1000	Oxalate	1000
Beryllium (II)	1000	Potassium	1000
Calcium	1000	Selenium (IV)	100[c]
Chloride	1000	Selenium (VI)	1000
Cobalt (II)	1000	Silver	1000
Cobalt (III)	1000	Sodium	1000
Copper (I)	1000	Strontium	1000
Copper (II)	1000	Sulfate	1000
Chromium (III)	1000	Tellurium (IV)	1000
Chromium (IV)	100[c]	Tellurium (VI)	1000
Cadmium	1000	Titanium (IV)	1000
Carbonate	1000	Tartrate	1000
Cesium	1000	Thallium (I)	500[b]
Citrate	1000	Thiocyanate	1000
Cerium (III)	1000	Thiourea	1000
Cerium (IV)	100[b]	Tungsten (VI)	1000
Cyanide	1000	Tin (II)	1000
EDTA	1000	Tin (IV)	1000
Fluoride	1000	Uranium (VI)	1000
Iodide	1000	Vanadium (V)	500[b]
Iron (II)	1000	Zinc	1000

[a] Tolerance limit was defined as ratio that causes less than ± 5 percent interference.
[b]With 10 mgL^{-1} tartrate.
[c]With 10 mgL^{-1}EDTA.