

# Luminescent Solid Phase for Sialic Acid determination: A Promising Sensor for Milk-Adulterated Samples

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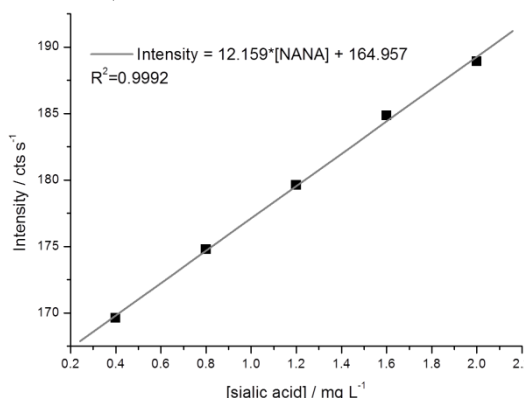
Lanthanides complexes present photophysical properties derived from their intraconfigurational transitions (4f-4f), whose emission spectra are characterized by narrow and well-defined bands (monochrome comportment)<sup>1</sup>. This work presents the synthesis, characterization and spectroscopic study of silica modified with thenoyltrifluoroacetate (TTA) and coordinated to an europium (III) ion, for the determination of sialic acid references. Elemental analysis and infrared spectroscopy suggest silica functionalization, as well as a coordination of the beta-diketone to the lanthanide ion.

The emission spectra of compound free and coordinated Eu-SilTTA to NANA showed significant changes with respect to the maximum emission and spectral profile, suggesting that the NANA ion is coordinated to the Eu (III). The values of the phenomenological intensity parameters show an increase in polarizability around the europium ion (III) in the case of Eu-SilTTA coordinated to NANA, as expected, since water molecules are less polarizable than sialic acid (Table 1). The results of the batch assay showed that luminescent silica can be used for sialic acid determination in milk adulterated samples, with a correlation coefficient equal to 0.9992; and a detection limit of 0.4 mg L<sup>-1</sup> (relative standard deviation - RSD%= 0.0028) (Figure 1).

Table 1. The phenomenological intensity parameters and spontaneous emission coefficients for the free Eu-SilTTA and bonded to NANA (2 mg L<sup>-1</sup>).

Compounds	A <sub>01</sub> (s <sup>-1</sup> )	A <sub>02</sub> (s <sup>-1</sup> )	A <sub>04</sub> (s <sup>-1</sup> )	Ω <sub>2</sub> (10 <sup>-20</sup> cm <sup>2</sup> )	Ω <sub>4</sub> (10 <sup>-20</sup> cm <sup>2</sup> )
Eu – SilTTA	250.87	629.96	114.94	21.59	8.09
Eu – SilTTA – NANA	698.50	1931.00	17.00	64.70	1.17

Figure 1. Analytical curve and correlation coefficient for the batch assay with NANA reference solutions (RSD%=0.0028).



1-Li, H.; Core, G. E. B.; Marciniak, B.; *Coord. Chem. Rev.* **1990**, 99, 55.

2-Brito, H. F.; Malta, O. L.; Menezes, J. F. S.; *J. Alloys Compd.* **2000**, 303-304, 336.

3-Tian, K. T.; Na, L. L.; Qi, C. Y.; Fen, M. S.; *Chin. J. Anal. Chem.* **2008**, 36, 1535.

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