



# AULA VIRTUAL de RADIOFARMACIA

Plataforma Virtual de Formación Continuada en Radiofarmacia

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## Lectura recomendada

### Selective Polarographic Determination of Stannous Ion in Technetium Radiopharmaceutical Cold Kits

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**Intriduction:** The aim of this work was to develop a selective method for quantification of Sn(II) and Sn(IV) in dimercaptosuccinic acid (DMSA), ethylcysteinate dimer (ECD), methylenediphosphonic acid (MDP), and pyrophosphate radiopharmaceutical cold kits by differential pulse polarography.

**Methods:** A dripping mercury electrode 150 polarographic/stripping analyzer with a conventional 3-electrode configuration was used with 3 M H<sub>2</sub>SO<sub>4</sub> and 3 M HCl supporting electrolytes for Sn(II) and Sn(IV), respectively. The polarographic analysis was performed using a 1-s drop time, 50-mV·s<sup>-1</sup> scan rate, -50-mV pulse amplitude, 40-ms pulse time, and 10-mV step amplitude. To quantify Sn(IV), oxidation of Sn(II) by H<sub>2</sub>O<sub>2</sub> was performed. The calibration curves for Sn(II) and Sn(IV) were obtained in the range of 0–10 µg·mL<sup>-1</sup>.

**Results:** The analytic curves for Sn(II) in 3 M H<sub>2</sub>SO<sub>4</sub> and Sn(IV) in 3 M HCl were represented by the following equations:  $i$  (µA) = 0.098 [Sn(II)] + 0.018 ( $r^2 = 0.998$ ) and  $i$  (µA) = 0.092 [Sn(IV)] + 0.016 ( $r^2 = 0.998$ ), respectively. The detection limits were 0.21 µg·mL<sup>-1</sup> for Sn(II) and 0.15 µg·mL<sup>-1</sup> for Sn(IV). In DMSA, ECD, MDP, and pyrophosphate, 90.0%, 64.9%, 93.2%, and 87.5%, respectively, of the tin was present as Sn(II). In this work, selective determination of Sn(II) and Sn(IV) was achieved using 2 supporting electrolytes (H<sub>2</sub>SO<sub>4</sub> and HCl). In 3 M H<sub>2</sub>SO<sub>4</sub>, only Sn(II) produced a polarographic wave with the maximum current in -370 mV. Under the same conditions, no current could be determined for Sn(IV). In 3 M HCl, Sn(II) and Sn(IV) were electroactive and the maximum currents of the 2 waves appeared in -250 and -470 mV. No other components of the lyophilized reagents had any influence.

**Conclusion:** The developed polarographic method was adequate to quantify Sn(II) and Sn(IV) in DMSA, ECD, MDP, and pyrophosphate cold kits.



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