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Radiopharmaceuticals & Radiochemistry & Dosimetry: Radiopharmacy

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A software for automated calculations of technetium-99m generator

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Introduction: In the day-to-day practice of radiopharmacy it is important to know at every moment the available activity in a ⁹⁹Mo/^{99m}Tc generator. The calculation of such activity is not too complicated, but it is annoying and time-consuming. **Objective:** The aim of this project is to develop a software to calculate ⁹⁹Mo and ^{99m}Tc activities, elution efficiency, specific activity and other parameters in a ⁹⁹Mo/^{99m}Tc generator. **Materials and methods:** We have written the solutions of the Bateman equations and other equations in Visual Basic 6.0 $A_{99Mo} = A_{99Mo}(0) \exp(-\lambda_{99Mo} t)$ $A_{99mTc} = A_{99Mo} 0.86 \lambda_2 [(\exp(-\lambda_1 t) - \exp(-\lambda_2 t)) / (\lambda_2 - \lambda_1) \exp(-\lambda_1 t)] m_{Tc} (\mu g) = 1.9 \cdot 10^{-4} A_0 (mCi) / F$ $F = \lambda_1 [(\exp(-\lambda_1 t) - \exp(-\lambda_2 t)) / 1.162 (\lambda_2 - \lambda_1) \exp(-\lambda_1 t)]$ where 1 = ⁹⁹Mo and 2 = ^{99m}Tc **Results:** We have developed a form called Generator Calculator for automatic calculation of ⁹⁹Mo and ^{99m}Tc activities, elution efficiency, specific activity and eluted mass of ^{99m}Tc and ⁹⁹Tc in a ⁹⁹Mo/^{99m}Tc generator. This form is included in software called Nucleolab, which is freely available at <http://www.radiofarmacia.org/nucleolab-english/> **Conclusion:** Generator Calculator is a new software, with an easy-to-use interface, that makes the calculation complexity of ⁹⁹Mo/^{99m}Tc generator activities completely hidden for the user, saving you the time that you previously spent on these laborious calculations and reducing the risk of error.

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