Optimized procedures for manganese-52: Production, separation and radiolabeling

Pressed chromium-powder cyclotron targets were irradiated with 16MeV protons, producing $^{52}$Mn with average yields of $6.2\pm0.8$MBq$\mu$Ah. Separation by solid-phase anion exchange from ethanol-HCl mixtures recovered $94.3\pm1.7\%$ of $^{52}$Mn and reduced the chromium content by a factor of $2.2\pm0.4\times10^5$. An additional AG 1-X8 column was used to remove copper, iron, cobalt, and zinc impurities from the prepared $^{52}$Mn in 8M HCl. The macrocyclic chelator DOTA was rapidly radiolabeled with $^{52}$Mn in aq. ammonium acetate (pH 7.5R.T.) with a radiochemical yield >99% within 1min and was stable for >2 days in bovine serum. The improved separation and purification methodology facilitates the use of 52Mn in basic science and preclinical investigations.

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