



Clinical & Quality Efficiency of Fractionated Nanocolloid Kits in Pre-Operative Visualization of Sentinel Lymph Nodes: A Cost-Effective Strategy for Public Sector Hospitals

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BACKGROUND

Sentinel lymph node (SLN) mapping is vital for staging breast cancer, melanoma & gynecologic cancers. High radiopharmaceutical cost & wastage challenge public-sector sustainability. Fractionating 99mTc-Nanocolloid kits can cut per-patient cost while preserving quality.

OBJECTIVE

To evaluate the clinical, quality & cost efficiency of fractionated 99mTc-Nanocolloid kits for pre-operative SLN visualization in a public-sector tertiary hospital.

METHODS

- Cross-sectional study — 51 breast-cancer patients, April–October 2025, DUHS Nuclear Medicine & Theranostics.
- Fractionated 99mTc-Nanocolloid (4 equal aliquots, stored –22°C, used within 1 month) — mean dose 39 ± 3 MBq via intradermal peri-areolar injection (all 4 quadrants).
- Static imaging acquired 30–45 min post-injection; two blinded NM physicians scored visualization & quality.
- Quality Control: Radiochemical purity (RCP), pH, osmolality & energy spectrum on a standard fractionated batch.
- Per-patient cost of fractionated vs. standard single-batch kit use was compared.

RESULTS

98%

SLN visualization rate (50/51)

2 ± 1

Nodes visualized (mean)

0.920

Inter-rater Kappa (CI 0.851–0.988)

75–92%

Per-patient cost savings

QC Parameter	Result	Reference Range
pH	6.7 ± 0.3	6.5 – 7.5
Osmolality	294 mOsm/kg	250 – 350 mOsm/kg
Energy spectrum photopeak	147.50 keV	140 ± 10%
Retention Factor (TLC)	99.92%	≥ 95%

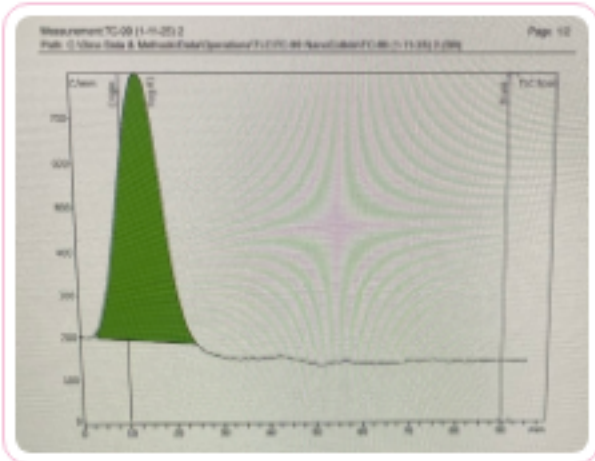


Fig 1. TLC radiochromatogram of reconstituted fractionated 99mTc-Nanocolloid, confirming high radiochemical purity (RCP 99.92%) with a single sharp peak at the origin/Rf region and no free pertechnetate migration to the solvent front.

CONCLUSION

Fractionating 99mTc-Nanocolloid kits is a clinically reliable, quality-assured & cost-effective strategy for SLN mapping in breast cancer. It cuts radiopharmaceutical waste, sustains diagnostic accuracy, and improves access in resource-limited public healthcare systems — supporting broader adoption across LMIC Nuclear Medicine departments.