

Thesis Title                    Absolute Quantitation of I-131 Activity  
   in Thyroid Gland by Scinticamera

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#### ABSTRACT

Iodine-131 treatment remains nowadays the treatment of choice for thyroid diseases, i.e. hyperthyroidism and cancer because of its low cost and low morbidity. In dose prescription, knowledge of iodide kinetics in each patient is crucial for proper planning of the treatment particularly in patients with delayed iodine excretion.

This study took efforts which served the ultimate goal of internal dosimetry to calibrate an equation used for the calculation of count rate from external counting by gamma camera to absolute activity of I-131 in thyroid gland. The equation described the dependence of activity on linear attenuation coefficient of thyroid gland ( $f$ ) and linear attenuation coefficient of neck tissue ( $\mu$ ) overlying the gland and the system calibration factor ( $C$ ). Factors effecting reliability in the determinations of  $f$  and  $\mu$  were identified as ra-

radiation absorption by aperture ring attached to the pinhole collimator, precise positioning of radioactive source with respect to detector central axis, and volume of radioactive solution. Under optimal setting and counting geometry,  $\mu$ ,  $f$  and  $C$  were determined as  $0.1098 \text{ cm}^{-1}$ ,  $0.9971 \text{ cm}^{-1}$  and  $1638.32 \text{ CPM}/\mu\text{Ci}$  respectively. The equation could correctly predict absolute uptake from 5-125  $\mu\text{Ci}$ .