

In previous CCSR studies high activity radioactive sources (usually ^{241}Am) and expensive HPGe detectors were used in-vivo and in-vitro. To make this technique more suitable for clinical applications, we have investigated the possibility of using a standard diagnostic tube as an X-ray source with a continuous spectrum and CdTe and NaI detectors.

New forward-backward approach allowed us to use small scattering angles and to increase detection efficiency for Coherent scattering. A feasibility test of this method was performed using a set of ten phantoms containing different concentrations of cadaver trabecular bone ash dissolved in petrolatum.

Very good sensitivity was obtained using the forward/ backward method at low angles around 7.5° . Reasonable albeit decreased sensitivity and a better defined region of interest were obtained at higher angles, between 10° and 20° . The sensitivity of the forward-backward method was found to decrease rapidly for scattering angles greater than 25° .

A major advantage of x-ray based CCSR using small angle scattering is increased (scattering) cross sections and efficiency compared to the usual approach of a gamma ray radionuclide source and large angles. The new approach also has the advantage of significantly reduced exposure time and dosage to the patient. Forward-backward CCSR has the additional advantage of being able to use inexpensive detectors that don't require liquid nitrogen cooling as compared to past CCSR studies which relied upon HPGe detectors.