Kalibrasi film gafchromic xr-rv3 terhadap energi sinar-x radiologi intervensional dan komisioning scanner perfection v700 = calibration of gafchromic xr-rv3 film for interventional radiology x-ray energy and commissioning perfection v700 scanner

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Abstrak

Telah dilakukan kalibrasi film Gafchromic XR-RV3 yang dilakukan di Secondary Standard Dosimetry Laboratory (SSDL) BATAN untuk pengukuran dosis kulit pasien selama prosedur intervensional dipandu fluoroskopi. Film dikalibrasi di udara dan di fantom dengan dosis penyinaran 1, 5, 10, 15, 50, 100, 200, dan 300 cGy pada kualitas berkas 70, 80, 90 dan 100 kV. Persamaan faktor kalibrasi dihasilkan dari grafik hubungan nilai kerapatan optik (OD) dengan dosis. Hasil dari pengukuran faktor kalibrasi di udara dan di fantom merupakan persamaan polinomial orde kelima dengan R=1. Dalam penelitian ini juga dilakukan komisioning scanner Perfection V700 di Laboratorium Fisika Medis dan Biofisika yang bertujuan untuk menguji konsistensi scanner, homogenitas scanner, homogenitas film dan suhu ruang penyimpanan film, serta menentukan faktor fading film.

Hasil penelitian menunjukkan bahwa film memiliki komposisi yang tersebar merata pada setiap lapisannya. Berdasarkan respon scanner disarankan untuk melakukan pemindaian pada bagian pusat bedscanner namun tidak disarankan untuk melakukan pemindaian secara berulang. Selama penyimpanan dan proses pembacaan film sebaiknya suhu ruangan dijaga konstan. Berdasarkan lama waktu pemindaian film selama 72 hari, diperoleh laju penurunan nilai pixel film yaitu 314.3 pixel/pekan serta dihasilkan faktor koreksi fading y = -0.002x + 4.701 dengan R2=0.997, sebagai kompensasi waktu pemindaian yang berbeda.
<hr>Calibration of Gafchromic XR-RV3 film has been done at Secondary Standard Dosimetry Laboratory (SSDL) BATAN for measurement of patient skin dose during fluoroscopically guided interventional procedures. The film was calibrated free-in-air and on-phantom with exposure doses of 1, 5, 10, 15, 50, 100, 200 and 300 cGy at four x-ray beam qualities of 70, 80, 90 and 100 kV. Calibration factor function was generated from the graph equation between the optical density (OD) and doses. The resulted calibration factor free-in-air and on-phantom were defined in fifth order polynomial function with R=1. In this study commissioning perfection V700 scanner at the Laboratory of Medical Physics and Biophysics which aimed for consistency testing of scanner, the homogeneity of scanner, the homogeneity of film, and the temperature during storage, as well as determined the fading factor of film, was also performed.

The results shows that the composition of film layer was spread equally. Based on the response of scanner, it is recommended scan at center of flatbed but not recommended to perform repeatedly scanning. The room temperature during storage and the process of film reading should be kept constantly. Based on 72 days of the film scanning time, the decrease rate of film pixel value is 314.3 pixel/week and fading correction factor is in term of y = -0.002x + 4.701 with R2=0.997 to compensate reading time variation.