ABSTRACT

Water phantom is a standard phantom for absolute dosimetry in linear accelerator calibration. The utilization of a slab phantom as a substitute for a water phantom in absolute dosimetry necessitates a slab phantom to a water phantom correction factor to determine the equivalent of absorbed dose in the slab phantom compared to the absorbed dose in the water phantom.

This study aims to determine the absorbed dose correction factor for a 6 MV photon beam in a solid/slab phantom relative to a water phantom. The procedures for measuring absorbed radiation dose in both the solid/slab phantom and the water phantom were based on the International Atomic Energy Agency Technical Report Series No. 398 dosimetry protocol. Measurements used a cylindrical ionization chamber with an $N_{D,w,Q0}$ value of 5.275 cGy/nC on a Linear Accelerator X at a Yogyakarta radiotherapy center. The experimental setup adhered to the following conditions: a source-to-surface distance (SSD) of 100 cm; a radiation field size of 10 cm x 10 cm; a detector depth of 10 cm within the phantom; and detector voltages of +400 V, +100 V, and -400 V.

The absorbed dose correction factor for a 6 MV photon beam measured in a solid/slab phantom relative to a water phantom is 1.0365. This correction factor can be used for absolute dosimetry of a 6 MV photon beam from a Linear Accelerator X when a slab/solid phantom is used for calibration.

Keywords*: Photon Beam, Absolute Dosimetry, Correction Factor, IAEA TRS-398, Linear Accelerator, Slab Phantom, Water Phantom.*