

**Purpose:** To characterize the response of detectors used for the dosimetry in small photon beams, especially for stereotactic radiation therapy.

**Methods:** Measurements were performed with active detectors dedicated to the dosimetry in small fields (high resolution diodes IBA SFD, Sun Nuclear EDGE, PTW 60016 and PTW 60017; PTW 31014 0.015 cm<sup>3</sup> PinPoint chamber, PTW 31018 microLion liquid chamber and PTW 60003 natural diamond) and with passive dosimeters suitable for small fields (TLD micro-cubes, EBT2 radiochromic films). They were irradiated in a Cobalt 60 beam for investigation of reproducibility and drift and for study of the response as a function of the dose, in X-ray linac beams ranging from 4 to 18 MV for study of the response as a function of the beam energy and as a function of the dose rate, and in small and large 6 MV X-ray beams of different irradiating systems for study of the influence of beam size.

**Results:** Regarding the reproducibility of the detector response, diodes give the best results, especially the EDGE and the PTW 60016 diodes with reproducibility better than 0.3%. The SFD diode reveals problem of stability, with sudden unexplainable large drift of the response. Both the PTW diodes undergo a slight variation of the response as a function of the dose rate. The detectors showing the highest variation of the response as a function of beam energy are the unshielded diodes. On the contrary, shielded diodes reveal more important impact of their non tissue equivalent composition on the measurement of output factors in very small fields (Huet et al., 2011; Bassinet et al., 2011). Correction factors depend on the measurement depth.

**Conclusions:** This study will help to determine an optimized methodology for the measurement of the data characterizing the small photon beams used in radiotherapy.