

Isotropic detector measures light fluence, which is an important dosimetric quantity to predict outcome of photodynamic therapy. Our isotropic detectors are composed of optical fibers, each with a 0.3-mm diameter scattering tip, connected to a 4-channel in-vivo dosimetry system from Netherlands. In this study, the long-term stability of the overall detector sensitivity, defined as fluence rate per Voltage, was examined between October 1998 and July 2000 using a light source with known light fluence rate at 630-nm wavelength in a 4" integrating sphere. Detector sensitivity varied between 47 and 157 mW/V for different isotropic detectors connected to different channels (after pre-amplifier). The difference of different channels for the same fiber was within 4%. To our surprise, we found that the overall detector sensitivity for the same isotropic detector connected to the same photodiode channel changed by as much as 50% over time. The possible causes of the change are: 1) Coupling efficiency between the optical fiber and the photodiode, 2) Change of scattering properties of the isotropic detector tip, 3) photodiode sensitivity change. Among these reasons, coupling efficiency was the main cause. We concluded that one should always perform a calibration immediately before the use of the isotropic detectors to ensure the accuracy of the isotropic detector calibration.