

PURPOSE: To test the Fricke dosimeter response to sunlight near the Equator. **MATERIALS AND METHODS:** Fifty cylindrical glass vials filled with Fricke solution (FS) were placed horizontally floating in a polyethylene water tank in such a way that half of their volumes were underneath the water. These vials were exposed to sunlight 5 hours per day for a period of 10 days in the city of Recife, Brazil (8°3'S, 34°56'W). During the course of the exposure the water temperature was monitored by means of a thermocouple. Every day 5 vials were removed from the water tank, and their optical densities (OD) were measured using a spectrophotometer. The OD was corrected for the mean temperature of the water tank during exposure and the solution's temperature during readout. Vials with Fricke solution were also kept in an oven for 5 hours per day at the same mean temperature as those exposed to sunlight. The change in the OD caused by the sunlight was obtained by subtracting the OD of the exposed vials from the corresponding ones stored in the oven. Both sets of vials were stored in a refrigerator at 15°C until the next exposure. **RESULTS:** The mean temperature during the irradiation was 33 ± 1.4 °C. The net OD of the Fricke solution was proportional to the sunlight exposure time with a slope of 0.0010 ODh^{-1} ($r^2=0.99$). For a 50 hours exposure the net OD was 0.05 ($\pm 5\%$), which would correspond to an exposure of 14 Gy from a ^{60}Co source which produces 0.000023 M of Fe^{3+} . **CONCLUSIONS:** The FS is relatively sensitive to direct sunlight exposure. Because this dosimeter relies on the oxidation of Fe^{2+} to Fe^{3+} by free radicals, it could be evaluated as means to estimate the free radical exposure in humans for various sunlight conditions