

**Purpose:** Microdosimetry (measurement of radiation dose on the  $\mu\text{m}$  scale) suitable for micro-beam radiotherapy is a challenging task with known dosimeters such as ionization chambers and others dosimeters. The purpose of this work was to use gel dosimeters for dose determination across micro-beam radiotherapy fields.

**Method and Materials:** A gel dosimeter that was highly resistant to radiation was developed by using a free radical scavenger in the gel to reduce the rate of polymerisation. The samples were irradiated using the x-ray collimated micro-beam from a synchrotron in order to measure the synchrotron's high-dose. Gel scanning was performed using special type MRI scanner, Raman spectroscopy and also attempted using phase contrast imaging.

**Results:** It was found that using current equipment and techniques, that MRI with resolution down to  $20\ \mu\text{m}$  is possible, but given the size of the beam ( $30\ \mu\text{m}$ ), is unable to adequately describe the dose distribution across the beam. Raman spectroscopy measurements of gel have been shown to be possible, and work in this area is involved in gaining accurate measurements in this method. Comparative measurements made using CCD camera on the beams show similar results.

**Conclusions:** This work shows the dose measurement in gel down to the  $\mu\text{m}$  range is possible and could be applied in many fields such as microbeam radiotherapy.