Gel dosimetry for radiation therapy using MRI is a new and promising technique. One of the obstacles when bringing this method into clinical practice is the lack of a specially designed software able to convert MRI-images into absorbed dose data and to perform comparisons with dose data from other sources.

Numerous image processing tasks are required for an complete 3D evaluation. A thorough comparison with 3D dose distributions from dose planning systems requires additional image processing. Commercially available standard image processing software may solve any image processing task. However, for general gel dosimetry purposes such systems involves an extensive effort in programming and/or a non-flexible user interface. These systems are thus not suitable for general dosimeter gel use by medical physicists not initiated in advanced image processing. Therefore, there is a need for a flexible and user-friendly stand-alone software, specifically designed for dosimeter gel evaluation.

In this work such image processing software was developed on a PC-based computer and the Windows95/NT operating system. The software comprises several methods for voxel-by-voxel calculation of T1/T2 relaxation time images for different MRI pulse sequences, using unlimited number of curve fitting points and arbitrary image volume size. The program supports further numerous medical image formats including e.g. DICOM-standard and RTOG-standard used by dose planning systems. Moreover, spatial conversions as translations, rotations and sizing enables complete 3D-matching and comparison of 3D dose distributions from dosimeter gel measurements and dose planning systems. The software has proven to be a powerful 3D gel dosimetry evaluation tool.