Quantitative MRI studies of mass limited samples require application of appropriate RF coils to ensure homogenous $B_1$ field distribution within the sample. To facilitate imaging of submillimetre object with sufficient SNR, the RF coil has to be scaled down to match the size of the sample. The two straightforward RF microcoil designs are micro solenoid and planar helix. Fabrication of submillimetre coils according to those patterns is challenging as it requires application of micromachining and other complicated microtechnologies such as X-ray or optical lithography, electroplating and electrodeposition.

There are several concepts of MRI RF coils such as TEM resonators or surface coils exploiting microstrip line. However application of microstrip to MRI microimaging was not reported so far. We present a novel design of MRI RF volume microcoil, based on a microstrip structure. The coil consists of two parallel microstrip elements conducting RF currents in opposite direction thus creating a homogenous RF field in the space between the microstrips.

Theoretical calculations and FEM electromagnetic virtual prototyping were used to optimize the coil geometry in order to achieve optimal SNR distribution within the sample volume, high Q factor and predict electric properties (tuning and matching) of the coil.

Results of $B_1$ RF field distribution obtained from FEM simulation and MRI $B_1$ field mapping experiment are presented. MRI images of capillary phantoms and biological objects obtained with use of the double microstrip RF microcoil on an 11.7T Bruker scanner are presented as well.

The double microstrip RF microcoil presents an interesting alternative to commercially available MRI microcoils as its construction is cost effective and efficient. MRI results agree with theoretical calculations and FEM simulations.

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