Abstracts

EM Local Heating with HF Electric Fields

M.K. Hessary and K.-M. Chen. "EM Local Heating with HF Electric Fields." 1984 Transactions on Microwave Theory and Techniques 32.6 (Jun. 1984 [T-MTT]): 569-576.

Capacitor-plate applicators consisting of a pair of flat-plate electrodes, energized by a HP voltage, are utilized to induce heating inside a biological body for the purpose of hyperthermia cancer-therapy. In this paper, a theoretical analysis for such applicators is presented. A pair of coupled integral equations for the unknown total induced electric field inside the body and the charge density on the electrodes is derived and solved numerically for several different cases. The distribution of the specific absorption rate (SAR) of energy inside the body is obtained for each case. The body-electrode coupling is taken into account. A theoretical scheme for synthesizing proper potential distributions on two arrays of subelectrodes for inducing a desirable SAR ditribution inside the body is also developed. Using such arrays of subelectrodes, the excessive heating at the fat layer of the body may be avoided. An experiment has been conducted to test the theory.

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