

عنوان مقاله:

Numerical Analysis of the Thermal Interaction of Cell Phone Radiation with Human Eye Tissues

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خلاصه مقاله:

Introduction: The present study aimed to present a numerical analysis of the penetration depth, specific absorption rate (SAR), and temperature rise in various eye tissues with varying distance between radiation source and exposed human eye tissues (i.e., cornea, posterior chamber, anterior chamber, lens, sclera, vitreous humor, and iris) at frequencies of 900 and 1800 MHz. **Materials and Methods:** A theoretical model was proposed based on the tissue dielectric and thermal properties, Maxwell equations, Joules law of heating, and microscopic form of Ohm's law to find the realistic situation of the cell phone radiation interaction with various human eye tissues. **Results:** According to the results, the anterior chamber had the highest temperature rise, compared to the vitreous, sclera, lens, cornea, and posterior chamber. By assuming the distance of 5 cm and exposure time of 30 min, the maximum rise in temperature for the anterior chamber was estimated to be 1.2°C and 2.2°C for 900 and 1,800 MHz frequencies, respectively. **Conclusion:** As the findings indicated, the anterior chamber had the maximum rise in temperature, compared to other investigated tissues. This could be due to the disposal of excess heat by the perfusion of the blood in the vitreous, posterior chamber, sclera, and lens tissues and the cooling effects produced due to convection/conduction in the cornea tissue. However, the anterior chamber tissue had no such mechanism for heat disposal.

کلمات کلیدی:

Human Eye, Temperature Elevation, Radiation Effects

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