

عنوان مقاله:

Construction a CO₂ Incubator for Cell Culture with Capability of Transmitting Microwave Radiation

محل انتشار:

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نویسندگان:

Mansour Tayebi Khorami - *Department of Medical Physics and γ Genetics, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz*

Nahid Chegeni - *Department of Medical Physics and γ Genetics, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz*

Maryam Tahmasebi Birgani - *Genetics, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz*

Amir Danyaei - *Department of Medical Physics and γ Genetics, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz*

خلاصه مقاله:

Background: The objective of this study was to design and construct a CO₂ incubator with nonmetallic walls and to investigate the viability of the cells and microwave irradiance inside this incubator. Methods: Because the walls of conventional incubators are made of metal, this causes scattering, reflection, and absorption of electromagnetic waves. We decided to build a nonmetallic wall incubator to examine cells under microwave radiation. Incubator walls were made using polyvinyl chloride and Plexiglas and then temperature, CO₂ pressure, and humidity sensors were placed in it. Atmel® ATmega1284, a low-power CMOS 8-bit microcontroller, collects and analyzes the sensor information, and if the values are less or more than the specified limits, the command to cut off or connect the electric current to the heater or CO₂ solenoid valve is sent. Using a fan inside the incubator chamber, temperature and CO₂ are uniform. The temperature of the points where the cell culture plates are placed was measured, and the temperature difference was compared. Ovarian cancer cells (A2780) were cultured in the hand-made and commercial incubators at different times, and cell viability was compared by the MTT method. Microwave radiation in the incubator was also investigated using a spectrum analyzer. The survival of cells after microwave irradiation in the incubator was measured and compared with control cells. Results: The data showed that there was no significant difference in temperature of different points in hand-made incubator and also there was no significant difference between the viability of cells cultured in the hand-made and commercial incubators. The survival of irradiated cells in the incubator was reduced compared to control cells, but this reduction was not significant. Conclusion: This incubator has the ability to maintain cells and study the effects of electromagnetic radiations on the desired cells, which becomes possible by using this device.

کلمات کلیدی:

Cell viability, CO₂ incubator, microwave radiation, nonmetallic walls

