Journal of Acoustical Engineering Society of Iran, Vol. 6, No. 2, 2019

The effect of low intensity dual frequency ultrasonic waves on the viability of the B16-F10 melanoma cell

A. Adelnia[1], M. Mokhtari-Dizaji[*1], S. Hoseinkhani[2], M. Bakhshandeh[3]

1. Department of Medical Physics, Faculty of Medical Sciences, Tarbiat Modares University
2. Department of Biochemistry, Faculty of Biosciences, Tarbiat Modares University
3. Radiology Technology Department, Faculty of Paramedical Sciences, Shahid Beheshti University of Medical Sciences

Abstract

In this study, the effect of single and dual-frequency sonication on cell death of B16-F10 melanoma cells is investigated at constant temperature. Here, 20 groups were studied. The test groups consisted of: control and sham, 40 kHz (intensity: 0.24 W/cm^2), 1 MHZ (intensity: 0.5 W/cm^2) and the dual frequency groups which each frequency group included seven subgroups of 30, 120, 60, 150, 300, 600 and 1200 s. Cell viability was measured by MTT assay. The result demonstrated that the cell viability for 40 kHz with 30 s sonication time was 96%, which decreased to 6% by increasing the sonication time up to 1200 s. In dual frequency, cell viability decreased in all subgroups, and its amount ranges from 95% at a sonication time of 30 s to 3% at 1200 s sonication time. The same process happens for 1 MHz frequency with a lower relative slope (97% to 15% when sonication time increased from 30 s 1200 s). Ultrasound waves caused the B16-F10 melanoma cell death in constant temperature. Dual frequency sonication caused more cell death especially at higher sonication time, possibly due to cavitation.

Keywords: Ultrasonic wave, Dual frequency sonication, B16-F10 melanoma cell, Cell death, ultrasound.

pp. 1-8 (In Persian)

[DOR: 20.1001.1.23455748.1397.6.2.6.9]

[*] Corresponding author E-mail: mokhtarm@modares.ac.ir