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Article

A study on biological effects of low-intensity millimeter waves

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[more]

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IEEE Transactions on Plasma Science (Impact Factor: 1.1). 09/2002; 30(4):1489 - 1496.
DOI: 10.1109/TPS.2002.804179
Source: IEEE Xplore

ABSTRACT

Resonance-like biological effects of millimeter-wave radiation at frequencies of approximately 42 GHz on the growth rate of E. coli and on DNA have been reported in several scientific publications. In order to explore these nonthermal effects, we have measured the growth rate and the absorption spectrum of E. coli, irradiated by millimeter waves in the frequency range from 41 to 43 GHz. In addition, the effect of this radiation on DNA was studied by measuring plasmid transformation efficiency. Both the growth rate variations with varying frequency and the variations in the result of the plasmid transformation efficiency experiments were found to be statistically insignificant. Resonance-like absorption features observed in the absorption spectrum of E. coli were identified as modes generated in the millimeter-wave system, when the sample was inserted. The experimental results indicate that resonance effects are unlikely in this particular frequency range.

REFERENCES **CITED IN** (20)

Source

"Along with examining the effects THz radiation has on mammalian cells, several other studies have been conducted on the effects this radiation has on bacterial organisms. A study investigating the effects of 41-43 GHz radiation on Escherichia coli found no significant differences in the growth rate and absorption spectrum between non-irradiated and irradiated cells [8]. Similarly, a study examining the response of E. coli in logarithmic phase to 99 GHz CW radiation concluded that cell viability, colony characterization, and metabolic activities were not affected by 1 or 19 hour exposures to this radiation [9]. "

Article: Investigating the Effects of Terahertz Radiation on Bacillus subtilis
Jillian P. Giles · Brittany J. Raitt · Cecil S. Joseph · Mark E. Hines · Robert H. Giles
[Show abstract]
Proceedings of SPIE - The International Society for Optical Engineering

Source

Article: Low-intensity electromagnetic irradiation of 70.6 and 73GHz frequencies enhances the effects of disulfide bonds reducer on Escherichia coli growth and affects the bacterial surface oxidation–reduction state

Heghine Torgomyan · Armen Trchounian

[Show abstract]

Biochemical and Biophysical Research Communications 09/2011; 414(1):265-9. DOI:10.1016/j.bbrc.2011.09.069 · **2.30 Impact Factor**

Source

"As the power densities used in the above cited reports were low (b10 mW/cm 2), the effects on growth rate were considered as non thermal ones by the reporters. On the other hand, some researches that attempted to reproduce these non thermal experiments have reported no effects [16] [17] or similar results at higher frequencies [18]. The reasons for these controversial reports could reside in the difference between the biological species, experimental procedures, the uncertainty of biological meaningful exposure metrics, and the difficulties in rigorously performing the required controls. "

Article: The response of giant phospholipid vesicles to millimeter waves radiation

Alfonsina Ramundo-Orlando · Giovanni Longo · Mauro Cappelli · Marco Girasole · Luciano Tarricone · Amerigo Beneduci · Rita Massa

[Show abstract]

Biochimica et Biophysica Acta 05/2009; 1788(7):1497-507. DOI:10.1016/j.bbamem.2009.04.006 · **4.66 Impact Factor**

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SIMILAR PUBLICATIONS

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Grigory E. Brill, Nadezda P. Panina

[The potentials for using low-intensity millimeter waves in the combined sanatorium-health resort treatment of peptic ulcer patients (experimental and clinical research)].
L A Serebrina, A F Leshchinskiĭ, T A Zolotareva, S A Korobov, N A Okat'eva, M A Lutovskaia

[The use of low-intensity millimeter waves in gastric and duodenal peptic ulcer].
L A Komarova, G I Egorova, L A Baĭkina