



PAPER

Keratinocyte cellular damage induced by pesticide doses below the cytotoxic level evidenced by electrical impedance and broadband dielectric spectroscopy

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Abstract

The cellular response of a normal human keratinocyte cell line exposed to non-cytotoxic doses of a deltamethrin-based pesticide was investigated by means of two different electrical impedance data spectroscopy approaches: Nyquist plot and broadband dielectric spectroscopy. The measurements have shown that the membrane capacity increases with pesticide concentration and this facilitates the electric current through cell membranes. Furthermore, the impedance of the extracellular matrix also increases with pesticide concentration, thus reducing the electric current outside the cell. Dielectric permittivity changes in the cellular samples at frequencies larger than 100 Hz. Fluorescence (FL) measurements emphasized an increase in neutral membrane lipids as a consequence of the pesticide exposure. Comparison of FL response of pesticide exposed cells with the control ones showed a time increase in the emission intensity, suggesting the existence of a membrane lipid response aimed at repairing the cell damage due to pesticide exposure. Therefore, both spectroscopic techniques have been demonstrated as potential means to investigate the response to cell stress and damage. This opens up new possibilities in the early diagnosis of cellular modifications related to the pesticide exposure of cells.

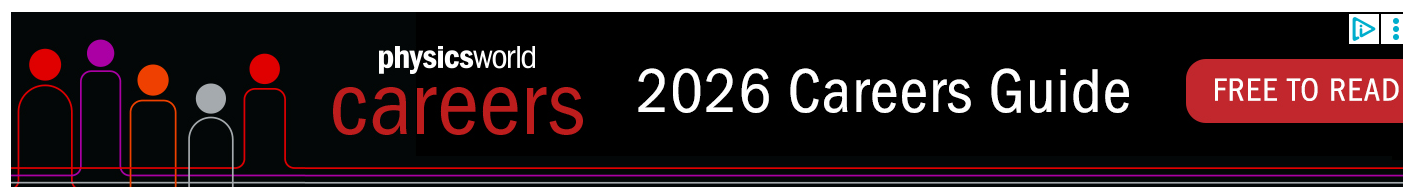
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