

The effect of tobacco concentration on the DNA blood samples using the AC electrical impedance spectroscopy.

M.M.El-Zaidia¹, Sobhy E. Hassab El-Nabi², Huda Salman¹, Sameh Hassan¹

Faculty of Science, Menoufia University, Shebin El-koom, Menoufia, 32511, Egypt.

¹Physics Department,²Zoology Department.

KEYWORDS

Spectroscopy, electric impedance, Nyquist, DNA, blood, tobacco

SHORT SUMMARY

The effect of tobacco concentration on blood samples of DNA of female and male were studied using electrical impedance spectroscopy. It was found that female samples manifested more degradation with increase of tobacco concentration than male samples.

EXTENDED ABSTRACT

The electrical impedance of DNA of female and male healthy blood samples was recorded in vitro. The Nyquist Plots for female and male samples were of the same feature. The peak of each Nyquist Plot was increased and shifted to higher real electrical impedance values as tobacco concentration increased from 1 μl to 4 μl . The Bode module plots confirm these results for female and male DNA blood samples. The start values of the AC electrical resistance and electrical capacitance were 95.98 $\text{K}\Omega$ and 2.36 μF for female DNA and were 183.6 $\text{K}\Omega$ and 5.47 μF for male DNA, respectively. These values were changed to be 82.65 $\text{K}\Omega$ and 3.18 μF for female DNA and 177.35 $\text{K}\Omega$ and 5.30 μF for male DNA, respectively, under the effect of 1 μl tobacco concentration for each of them. The increase of tobacco concentration gradually more than 1 μl and up to 4 μl , these values reach 139.63 $\text{K}\Omega$ and 5.81 μF for female DNA, and 219.42 $\text{K}\Omega$ and 9.00 μF for male DNA, respectively. These results were attributed to the increase of covered area in the lungs alveolus by the smoke in female and male DNA. Finally, these results illustrate that the covered areas of the lung alveolus by the smoke were wider in the case of female DNA than that of male DNA.