

# Pseudomonas aeruginosa Membrane Capacitive Relative Power Consumptions

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**Introduction:** Study the electrical properties of microorganisms is a great importance to control their hostile effect especially, some organisms such as *Pseudomonas aeruginosa* (PA), when infection with this type of bacteria causes high percentage of patients' mortality in hospitals. Depending on interaction differences between bacterial cell with electrical current and human cell with electrical current, bactericidal effect may be achieved. This study observed the behavior of PA when it was exposed to different frequency values of clinically safe alternative current to prove the capacitive characteristic of bacterial membrane and find difference between powers consumed by bacterial sample for each frequency value. **Method:** PA isolates were activated by using Trypticase Soya Broth (TSB), 10 percent of  $3.24 \times 10^8$  cfu/ml of PA mixed with agarose and poured in petri dish to solidify at room temperature. Electrical current of 20 Vp-p applied to the sample via movable Nichrome electrodes or built in Nickel electrodes, 2 cm apart between anode and cathode electrodes, electrical current measured and recorded during stimulation using multi-function voltmeter.

**Results:** The results proved that in general when the frequency of electrical current increased (analysis of variance (ANOVA)  $P > 0.05$ ), the current pass through PA samples increased relatively which refer to decrease in samples' impedance due to increase in frequency from 0.366 Hz and reach maximum at 40 KHz where it become constant until 60 KHz then began to reduced again until it reaches constant value at 120 KHz.

**Conclusion:** Clinically accepted electrical current values of different frequencies values interact in different manner with PA samples, and the electrical current consumption by PA affected and in general increased by increasing its frequency. This study also shows that there is different impedance values to different electrical current frequencies values which prove some part of impedance affected by frequency change which prove that PA membrane has a capacitive effect

**Note:** This work is partly presented at Webinar on Clinical Pharmacy, going to be held on May 31st, 2021 GMT+1.