

**EFFECTS OF NANO-SECOND PULSED ELECTRIC FIELDS (nsPEF) ON
HUMAN PROSTATE CANCER CELL LINE - LNCaP**

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ABSTRACT

The effects of Pulsed Electric Fields have been a period of study since past few decades, which was mainly on the electroporation, bacterial decontamination and biofouling. But the development of technology to produce nanosecond duration pulsed electric fields has allowed analysis of the effects of ultrashort duration, high intensity electric fields on living cells. In this thesis we investigated the effects of nanosecond pulsed electric fields (nsPEF) on the protein concentration, DNA concentration and 11 β Hydroxysteroid Dehydrogenase type 2 (11 β HSD2) enzyme activity in human prostate cancer cell line – LNCaP. nsPEF application of pulse duration 60 ns with electric field intensity of 32.5kV/cm were applied to cells in train of 1, 5, or 10 pulses. The protein concentration was determined by a Bio-Rad DC protein assay, while Hoechst 33258 was useful in quantitative determination of DNA in these cells. Both the protein concentration and DNA concentration declined by 18.77% (1 Pulse) and 19.04 % (10 Pulse) compared to Controls. LNCaP cells showed a decrease in DNA of 5.29 % (1 Pulse), 8.95 % (5 Pulse) and 18.36 % (10 Pulses) compared to Controls. The enzyme 11 β HSD2, which is present in the LNCaP cell culture also showed a reduction in activity supporting our hypothesis that the ultrashort pulses are affecting the intracellular structures.