

סמינריון

הנדך מוזמנת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 6.08.2020 (ט"ז באב תש"פ), בשעה 13:30 באמצעות הזום :

<https://technion.zoom.us/j/94883318482>

Meeting ID: 948 8331 8482

מרצה : מיכל בורק

מנחה : פרופ' איל זוסמן

על הנושא :

Electrospinning as an Alternative Method for Encapsulation and Preservation of Cells

The seminar will be given in Hebrew

תקציר ההרצאה :

Cell preservation is of great importance in various applications such as regenerative medicine, probiotic supplements, bioremediation, and agriculture. Conventional methods, such as cryopreservation, lyophilization, and spray drying, suffer from low recovery rates. The primary mechanism at which cell viability is reduced via these methods is thermal inactivation. In this research, we studied the electrospinning process as an alternative method to generate fibers ($\sim 0.2 \mu\text{m}$) with encapsulated cells, starting from cells suspended in a polymer solution. However, incorporating cells within the polymer fibers exposes the cells to high evaporation rates, high strain rates, and significant longitudinal stresses developed along the electrospinning jet. All can potentially reduce cell viability. We characterized these potential inactivation mechanisms by experimentally measuring the strain rate along the jet ($\sim 3000 \text{ s}^{-1}$), and calculating the deviatoric stresses using the Upper-Convected Maxwell (UCM model). It was found that all reach a maximal value at the jet transition zone between the stressed droplet and the formed jet. Furthermore, we found that by changing the process parameters such as the flow rate and the electrostatic field strength or the electrorheological properties and osmotic pressure of the spinning solution, these inactivation mechanisms can be reduced. In vitro studies were conducted using *Pseudomonas chlororaphis* within PVA (poly(vinyl alcohol)) fibers. We examined how different compositions can affect fibers physical properties and bacteria viability and found that adding glycerol ($\sim 2\%$ w/w) to the aqueous solution increased the release and viability rates of the cells ($\sim 10^8$ CFU/mg) after 72h.

בברכה,

ד"ר איתי סאס

מרכז הסמינרים