|  |  |  |
| --- | --- | --- |
| הטכניון - מכון טכנולוגי לישראל  TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY | הפקולטה להנדסה כימית  ע"ש וולפסון  The Wolfson Department of Chemical Engineering |  |

**Wolfson Department of Chemical Engineering Seminar**

**Monday, July 8th, 2024 at 13:30**

**Room 4**

**Development and characterization of polymeric systems containing cellulose encapsulated essential oils**

**Koranit Shlosman Balasha1**

**PhD final seminar**

Advisors: Prof. Em. Yachin Cohen2, Prof. Michael S. Silverstein3, Dr. Dmitry M. Rein2

1 Interdisciplinary Program in Polymer Engineering, Technion-Israel Institute of Technology

2 Department of Chemical Engineering, Technion-Israel Institute for Technology

3 Department of Materials Science and Engineering, Technion-Israel Institute for Technology

The fight against crop loss and spoilage due to microbial harms has become a high world priority. Mitigation of these harms utilizes pesticides, which are associated with different diseases in humans and negatively affect the environment. Essential oils (EOs), naturally occurring aromatic compounds known for centuries for their wide antimicrobial activity, are promising alternatives to pesticides. An interesting application of EOs is their incorporation into plastics, vastly used in the agriculture field, such as in antibacterial packaging which release EOs to eliminate bacteria. However, their volatility and susceptibility to heat limits their use in such application.

In this research, cellulose-encapsulated EOs via emulsification were produced and were melt compounded with low density polyethylene (LDPE), and films were fabricated. The encapsulation was shown to improve the EO’s thermal stability and to slower their releasing rate. These properties were beneficial in LDPE films incorporated with the encapsulated EOs, that exhibited improved and prolonged anti-mold activity in Alfalfa plant. This is a further step in eliminating the use of harmful pesticides in agriculture and provides a more sustainable solution for crop deterioration.