The Faculty of Biotechnology and Food Engineering
M.Sc. Graduate Seminar

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Advisor: Prof. Sima Yaron

Research topic:

Salmonella's survival profiles in pasteurized tahini

*****Lecture will be held in English*****

Abstract

Salmonella enterica is the leading human pathogen responsible for bacterial foodborne outbreaks worldwide. In the recent years, low water activity foods have gained the attention as transmission agents, where contamination can occur at multiple steps along the food chain. Our research focuses on the foodstuff tahini, which is often linked to *Salmonella* infection cases. Thermal treatments are suggested to reduce pathogen populations in low water and high fat content food (LW-HF), but they are not efficient in the removal of *Salmonella*. Still, little is known about *Salmonella*'s behavior and its resistance to high temperatures in a LW-HF environment. This research, studies the survival profiles of *S.* Typhimurium in tahini at elevated temperatures by the identification of food related factors such as water amount (%), a_w, and oil (fat) amount (%) that could influence this response. Particularly, a_w can modify the thermal resistance of the bacteria and fat is suggested to provoke a cross-protection effect against high temperatures. We found that thermal treatments are suitable to kill only a partial population of *Salmonella*. 1.7 hours, 1 hour and 34.6 minutes are required to achieve a 1-log reduction at 70°C, 80°C and 90°C respectively. Moreover, we observed that a second thermal treatment at 80°C was significantly less effective than the first thermal treatment, demanding 3 hours to reach a 1-log reduction. The survival of *Salmonella* in 100% tahini was almost 4 log higher than in different water/tahini emulsions studied after 30 minutes of treatment. By the addition of only 5% of water, the survival of *Salmonella* declined considerably (3 log). Likewise, the resistance of *Salmonella* in 100% tahini was approximately 3,000 times greater than in the 100% tahini oil and tahini oil/tahini mixtures after 30 minutes of treatment. Finally, we analyzed the distribution of *Salmonella* cells throughout tahini oil and observed that they aggregate in 100% oil while they spread in oil/water emulsions (50 w/w %) as single cells, suggesting a local protection during heat treatments. We conclude that the current pasteurization process as it is performed today in the industry, might not be enough to kill *Salmonella* cells in tahini, and that the "history" of the bacteria has a powerful impact on its tolerance to heat. Furthermore, we confirmed the crucial role of water activity (a_w) in the resistance of *Salmonella* at high temperatures. However, we believe that fat might not play such an important role in the protection of *Salmonella* against heat as it is suggested.

Wednesday 4/11/2020, 14:00 – 14:30

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