

Bio-aging of Polyethylene And Its Impact on Sorption of Organics

Microplastics (MPs) are of global concern due to their prevalence and potential harm to the food chain owing to their interactions with heavy metals and organic contaminants (OCs). Also, MPs age in the environment, which may have an impact on how they interact with hydrophobic OCs. While UV aging of MPs has been extensively investigated, biological aging has not received as much attention. To investigate the impact of aging on the sorption of OCs on pristine and bio-aged polyethylene, triclosan (TCS), and 2,3,6-trichlorophenol (TCP) were used. To age MPs, biochemical methane potential (BMP) anaerobic reactors and aerobic reactors containing high-density polyethylene (HDPE) were operated under mesophilic conditions. MPs were subsequently characterized for any evidence of aging, then put through sorption experiments with TCS and TCP. The findings of this investigation demonstrated the bio-aging of HDPE as identified using Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and differential scanning calorimetry (DSC). The output of sorption results yields quite different results for the two OCs tested; while the sorption affinity of TCS was very high for both pristine and bio-aged samples, that of TCP for pristine and bio-aged samples differed quite significantly, with no affinity towards bio-aged samples. Such change of sorption interactions with bio-aging could have important implications regarding environmental impact of MPs.

By Maha Dassouki Dit Tahan

Advisor: Prof. Dr. İpek İmamoğlu

Co-Advisor: Prof. Dr. F. Dilek Sanin

Date:05.04.2023 & Time: 15:40

Join Zoom Meeting

Join URL: <https://zoom.us/j/98266024510?pwd=QWRodDRNZE9NbUtGOVNYVjNrUnk4dz09>

Meeting ID: 982 6602 4510 & Passcode: 560987