APPLICATION OF DATA ANALYSIS METHODS IN DETERMING THE MIGRATION KINETIC OF POLIMER ADDITIVIES

Norbert Magyar[1]*, Csaba Kirchkeszner[2], Noémi Petrovics[2], Ilona Kovácsné Székely[1], Zsuzsanna Eke[3]

[1]Department of Methodology for Business Analyses, Faculty of Commerce, Hospitality and Tourism, Budapest Business School, Budapest, HUNGARY
[2]Hevesy György PhD School of Chemistry, Eötvös Loránd University, Budapest, HUNGARY
[3]Joint Research and Training Laboratory on Separation Techniques, Institute of Chemistry, Eötvös Loránd University, Budapest, HUNGARY

*corresponding author: Magyar.Norbert@uni-bge.hu

Plasticizers are often added as additives to plastics that come into contact with food, therefore the investigation of their migration is crucial. The migration kinetics of stabilizer-type additives from polylactic acid (PLA) and polypropylene (PP) were assessed. Depending on the plasticizer concentration, the swelling of plastics was also examined. The necessary contact time to reach the steady-state was obtained with the use of variography by determining the range (in this case the contact time) beyond which the observations are uncorrelated. ANOVA was applied to find significant differences in the additives' concentration of the plastics on the plateaus. The migration and swelling kinetic curves were classified by hierarchical cluster analysis, with Ward's method. The results showed that the concentration of the plasticizer has a strong connection with migration rate of additives. Similarity was showed by hierarchical cluster analysis in the migration kinetics of stabilizers from plastics with low plasticizer concentration at high temperature, to that at low temperature from plastics with high plasticizer concentration.