

OVERALL MIGRATION ASPECTS FOR PLASTIC FOOD CONTACT MATERIALS WITH FOOD SIMULANTS USING SPSS STATISTICS

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Abstract

Food can come into contact with several materials and articles before being consumed during production, processing, storage, preparation and serving. Plastic is the most widely used packaging material globally. Overall migration represents the total amount of non-volatile substances that can migrate from a food packaging material into food. It can be determined gravimetrically by exposing the item to a food simulant for a specified and appropriate length of time. The aim of the research was to evaluate the overall migration phenomenon for several food contact materials according to the conditions specified in Regulation (EU) no. 10/2011 [6].

Simulants A (10% ethanol), B (3% acetic acid), C (10% ethanol), D1 (ethanol 50%) and D2 (olive oil) were used to quantify overall migration from the following plastic food contact materials: polyethylene terephthalate (PET), polypropylene (PP), high-density polyethylene (HDPE), medium-density polyethylene (MDPE) and low-density polyethylene (LDPE) using 4 different testing conditions: OM1 (10 days at 20 °C), OM2 (10 days at 40 °C), OM3 (2 hours at 70 °C) and OM4 (1 hour at 100 °C). Migration testing is represented by the measurement of the overall migration by a gravimetric determination of all chemical substances that migrate to the simulant. SR EN 1186-2003 standards were used for the analysis of overall migration (parts 1, 2, 3, 7 and 9). Interpretation and analysis of the data was made using SPSS Statistics Data Editor Program. The variability was determined with ANOVA method.

The overall migration studies using food simulants mentioned above shows that the migration rate was very low, far below the allowed limit (10 mg/dm²). ANOVA one-way analysis indicates significant differences between the means for average migration related to product type, simulants and extraction conditions ($\bar{\sigma} < 0.05$). At high temperature the overall migration is increasing. The same is when the extraction time is higher.

The overall migration limit is a measure for the inertness of the material. All tested materials can be used as food packaging materials given that conditions used for testing cover most of the conditions used in practice.

Key words: Overall migration, Plastic, FCM, simulants, SPSS.