Effect of relative humidity on the migration of benzophenone from paperboard into the food simulant Tenax and modelling hereof

The aim of this study was to investigate the effect of relative humidity on the migration of benzophenone from paperboard into the food simulant Tenax®. Kinetic migration investigations were carried out with three relative humidities in the interval between 39% and >73%. All investigations were carried out at a constant temperature of 34°C. It was found that the migration of benzophenone after more than 30 days was 4.8 times higher at a relative humidity of 64%-71%, and 7.3 times higher at a relative humidity of >73%, compared with that at a relative humidity of 39%-49%. Diffusion and partition coefficients were derived from the results by using a software for modelling migration in multilayer materials. Both the diffusion coefficient and the partition coefficient, between paperboard and Tenax®, decrease with increasing relative humidity. The experimental results were correctly modelled only when the paperboard was regarded as a one-layer system as compared with a two-layer system: where the main part of the paperboard (B1) has a high diffusion rate and a thin part of the paperboard (B2) in contact with the foodstuff has a lower diffusion rate.

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