Exposure Assessment /Risk characterisation

In this guide

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50. As humans are unlikely to be exposed to TMBPF-DGE and its related derivatives from any other source than food packaging coating materials, the exposure assessment provided to the FSA was based on oral exposure resulting from food packaging applications.

51. When estimating the worst-case dietary exposure of TMBPF-DGE, the hydrolysis and chlorinated products that form during the manufacturing process and application of light metal food packaging coating materials need to be considered. Hence, in an effort to ensure the most conservative migration calculation, all TMBPF-DGE monomer derivatives were included in the migration sum, including TMBPF-DGE.2H2O, and a total monomer dietary concentration (DC) of 92.8 µg/6 dm^2 (equivalent to 92.8 µg/kg food or drink) was used in the assessment.

52. An estimated daily intake (EDI) of 92.8 µg TMBPF-DGE monomers per person per day was determined by multiplying the dietary concentration by the total weight of food consumed by an individual per day (the conventional 1 kg food per person per day).

53. In the absence of any concerns for mammalian genotoxicity, developmental toxicity or bioaccumulation, the supplied documentation used the oral NOAEL of 100 mg/kg bw per day from the combined 28-days repeated dose toxicity study and an uncertainty factor of 1000 (100 for inter- and intra-species differences and a factor of 10 for subchronic to chronic extrapolation) to establish an acceptable daily intake (ADI) of 0.1 mg/kg. Therefore, for a 60 kg human the most conservative oral reference dose would be 6 mg/person per day.

54. For substances of low potential for mammalian carcinogenicity, the hazard quotient (HQ) approach can be used to quantify toxicological risk. The HQ is the ratio of estimated exposure to the ADI. A HQ of 1 or lower means adverse non-cancer effects are unlikely and thus use of the substance can be considered acceptable, for HQs greater than 1 the potential for adverse effects increases. The HQ for TMBPF-DGE and its monomers was 0.016.

55. The Committees agreed with the use of an uncertainty factor of 1000 to extrapolate from a 28-day study to lifetime exposure in humans. However, Members did not think that it was appropriate to establish a HBGV due to the lack of a long term/chronic toxicity study and other database deficiencies.

56. Comparing the estimated exposure with the NOAEL of 100 mg/kg bw per day for the 28-day study resulted in a margin of exposure (MOE) of at least 67,000. This is well above the factor of 1000 (default of 100 x 10, as the NOAEL is from a subchronic study) considered appropriate to assess the level of concern from chronic exposure to the substance.

Toxicological Threshold of Concern

57. No previously established HBGV was available for TMBPF-DGE.

58. The threshold of toxicological concern (TTC) is a pragmatic, scientifically valid methodology to assess the acceptability of chronic exposure to substances of unknown toxicity found in food (EFSA, 2019). Considering the definitions for the three Cramer Classes, the COT concluded that TMBPF-DGE was Cramer Class III.

59. The estimated daily intake derived from the total monomer dietary concentration used for the migration of TMBPF-DGE was 92.8 µg/person, or 1.5 µg/kg bw and 1.2 µg/kg bw for a 60 kg and 78 kg person, respectively. The value is for the sum of all TMBPF-DGE derivatives detected in acetonitrile after 24 hours.

60. The estimated intake would be at or just below the TTC value of 1.5 µg kg/bw per day for a Cramer Class III compound.