ポリプロピレンに含まれる難燃剤の経皮曝露試験を通じた安全性評価

（東ソー株式会社[1]・静岡県立大[2]）○井立 寛人[1]・石田 真穂[2]・徳村 雅弘[2]・白井 智大[1]・宮崎 高則[1]・牧野 正和[2]
Safety evaluation of Flame Retardants in polypropylene by dermal exposure ([1]*Tosoh Corporation*, [2]*University of Shizuoka*) ○Hiroto Idate,[1] Maho Ishida,[2] Masahiro Tokumura,[2] Tomohiro Shirai,[1] Takanori Miyazaki,[1] Masakazu Makino[2]

Flame retardants (FRs) are indispensable chemicals to our safe and affluent lives, which are used to improve the fire resistance performance of materials such as plastics and fibers. On the other hand, there are concerns about the adverse effects of some FRs on the human body and the environment, and the safety evaluation of FRs has attracted much attention in recent years. In this study, we evaluated the safety of polypropylene resin containing brominated flame retardants (BFRs) by a dermal exposure test using an artificial skin model. The results indicated that skin absorption of BFRs with relatively large molecular weight and high lipophilicity (Log K_{ow} = 6.6~13.0) was below the detection limit. On the other hand, BFRs with low molecular weight and moderate lipophilicity (Log K_{ow} = 4.5) exhibited skin permeability. In the presentation, we will also report the result of a similar dermal exposure test on polymeric BFRs.
Keywords : Flame Retardants; Dermal Exposure; Safety Evaluation

難燃剤はプラスチックや繊維などの可燃性を低下させる添加剤であり、我々の豊かな生活に欠かせない化学物質である。一方、難燃剤の中にはヒトや生態系に害を及ぼす可能性があり、その安全性評価は近年ますます重要となっている[1, 2]。

本研究では、臭素系難燃剤を含むポリプロピレン樹脂と人工皮膚モデルを使用した経皮曝露試験にて、難燃剤種と樹脂劣化状態が皮膚吸収に与える影響を解析した。その結果、比較的に分子量が大きく親油性が高い（logK_{ow}=6.6～13.0）難燃剤の皮膚透過量は検出限界以下であった。一方で、低分子量かつ適度な親油性を有する（logK_{ow}=4.5）難燃剤は皮膚吸収を認めた。また、高分子型の臭素系難燃剤に関して同様の経皮曝露試験を実施したので、併せて報告する。

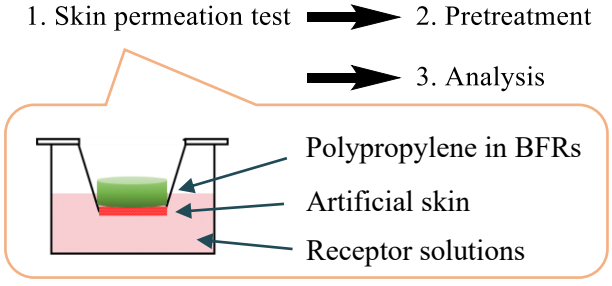

Fig. 1 Procedure of skin permeation measurement of BFRs

Table. 1 Skin permeation test results

BFRs	MW	log K_{ow}	Skin Permeation (ng / mL)
A	778	4.5	530
B	951	6.6	<20
C	1067	13.0	<20
D	943	13.0	<20

1) Liu, X. et al. *Chemosphere* **2017**, *168*, 272.
2) Abdallah, M. A.; Harrad, S. *Environ. Int.* **2018**, *118*, 26.

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