

令和3年度厚生労働科学研究費補助金  
(食品の安全確保推進研究事業)

分担研究報告書

2. 乳幼児用玩具から溶出する可塑剤・難燃剤の分析

|       |        |               |         |
|-------|--------|---------------|---------|
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【目的】マウシング行動による乳幼児用玩具を介した化学物質の曝露量を推定するため、人口唾液を用いた溶出試験により、玩具から人の口腔内への溶出を模擬した化学物質の溶出量を調べる。

【方法】前年度実施した材質試験において対象とした玩具製品より、フタル酸エステル類及びリン系難燃剤が検出された75製品を選定し、表面積およそ10 cm<sup>2</sup>となるよう切断し、振とうしながら人口唾液で抽出した。得られた抽出液は、内部標準法により各成分をLC-MS/MSで分析した。

【結果・考察】対象成分のうち12成分が検出され、中でも比較的検出率の高かったものはDCHP(77%)、DBSb(76%)、DEHP(69%)、TOTM(55%)、DINCH(49%)であった。また、比較的溶出量の高かった成分として、ATBC(最大値: 55000 ng/10 cm<sup>2</sup>/hr)、DBP(最大値: 47000 ng/10 cm<sup>2</sup>/hr)、DIBP(最大値: 34000 ng/10 cm<sup>2</sup>/hr)が検出されており、これらは主に塩化ビニル樹脂(PVC)やポリエチレンテレフタレート(PET)などを素材とするボール、人形、指人形などから多く溶出する傾向が見られ、「指定おもちゃ」に該当する可能性のある6歳未満を対象とした製品も含まれていた。リン系難燃剤は、対象としたもののうち4成分が検出され、TPHPは検出率が100%と最も高く殆どの製品から検出された。次にTBOEP(14%)、TCEP(9.3%)、TCPP(2.6%)であった。また、検出された各成分の最大値は、TCPP(150 ng/10 cm<sup>2</sup>/hr)、TCEP(84 ng/10 cm<sup>2</sup>/hr)、TPHP(72 ng/10 cm<sup>2</sup>/hr)、TBOEP(28 ng/10 cm<sup>2</sup>/hr)であり、可塑剤と比較して検出率及び濃度は低い傾向にあった。

【結論】本実験結果より、可塑剤・難燃剤を初めとする多種類の成分が「指定おもちゃ」を含む玩具を介して乳幼児に曝露される可能性が示された。また、口腔内へ溶出する成分は、必ずしも製品中に多く含まれるものだけでなく、低濃度のものであっても物性の違いや他の製品との接触、日常での使用状況など、製品の表面に付着した成分が影響している可能性も考えられた。

A. 研究目的

近年、子供の成長や健康影響に対する化学物質曝露による影響が着目される中、特に柔軟性や難燃性のある合成樹脂やゴム製品を作る上で多くの可塑剤・難燃剤が使用されている。こ

れらの原材料から成る玩具は、小児が日常生活を送る上でも接触頻度が非常に高く、化学物質に対する特異的な曝露機会となり、特に、感受性の高い乳幼児期に玩具を口に入れるマウシ

ングによる経口曝露は、化学物質曝露による乳幼児へのリスクを評価する上でも無視できないものである。そこで本研究では、乳幼児用玩具の使用による規制対象化合物及び未規制化合物に関する曝露量を調べるため、玩具から人の口腔内への各成分の溶出量について、溶出試験を行い、玩具を介したマウシング行動による乳幼児への曝露量を推定することとした。

## B. 研究方法

### B.1. 実験試薬

対象とした成分は、前年度行った材質試験の結果から、製品中で検出された主な成分を対象とした。フタル酸エステル類は、玩具製品中で規制対象とされる6成分を含む9種類のフタル酸エステル類と7種類の代替成分(DBP、BBP、DEHP、DNOP、DINP、DIDP、DIBP、DMP、DEP、DCHP、DEHA、DINA、ATBC、DINCH、DBSb、TOTM)を対象とした。リン系難燃剤(PFRs)は14成分(TMP、TEP、TPP、TIBP、TBOEP、TCEP、TEHP、TCEP、TCIPP、TDCIPP、TPHP、TCsP、EHDPPhP、CsDPPhP)である。

### B.2. 玩具試料

対象とする乳幼児用玩具については、厚生労働大臣が指定する「指定おもちゃ」(乳幼児が口に接触することにより健康を損なう恐れがあるおもちゃ)を初め、ベビー用品販売メーカーや一般社団法人日本玩具協会等における統計データに基づき幅広く市場に普及する玩具について、前年度実施した材質試験において対象とした製品の中から対象成分が検出された75製品を選定した(Table 2-1)。これらの玩具は、3 mm程度に小さく切断した後、容器に保存して密閉後分析までの間冷暗所にて保存した。

### B.3. 人口唾液

人口唾液は、以下に示す試薬を表示の通り測り取り、1 Lの超純水に溶解させた後、pH=6.8に調整した<sup>1)</sup>。

Table 2-2 人工唾液

|  |        |
|--|--------|
| MgCl <sub>2</sub> · 6 H <sub>2</sub> O | 0.17 g |
| CaCl <sub>2</sub>                      | 0.11 g |
| K <sub>2</sub> HPO <sub>4</sub>        | 0.57 g |
| K <sub>2</sub> CO <sub>3</sub>         | 0.53 g |
| NaCl                                   | 0.33 g |
| KCl                                    | 0.75 g |
| DDW                                    | 1.0 l  |

※ pH=6.8 に調整, DDW=超純水

### B.4. 溶出・分析方法

玩具試料は、表面積が10 cm<sup>2</sup>となるよう切断し、人口唾液10 mlを加えインキュベーターで振とうしながら30分間(40°C)溶出した。その後、アセトニトリルで5倍希釈し、内部標準物質を加えLC-MS/MSにより分析した。このとき、Phenylカラム(RESTEK)ではDEHPとDEHTのピークが重なるため、ODSカラム(Titan, Spelco)により別途DEHPの分析を行った(Table 2-3, 2-4, 2-5)

## C. 結果及び考察

### C.1 検量線

各成分の検量線は、いずれも相関係数(フタル酸エステル類:  $r^2 > 0.9744$ , リン系難燃剤:  $r^2 > 0.9906$ )の良好な直線性を示した。そのため本調査では、同位体標識物質を内標準物質とする内標準法を定量法として定めた。

### C.2. 玩具から溶出する可塑剤及び難燃剤

#### フタル酸エステル類及び代替成分

検出されたフタル酸エステル類と代替物質の結果をTable 2-6に示す。対象とした成分のうち12成分が検出され、中でも比較的検出率の高かった成分はDCHP(77%)、DBSb(76%)、DEHP

(69%)、TOTM (55%)、DINCH (49%) であった (Table 2-8)。また、比較的溶出量の高かった成分としては、ATBC (最大値: 55000 ng/10 cm<sup>2</sup>/hr)、DBP (最大値: 47000 ng/10 cm<sup>2</sup>/hr)、DIBP (最大値: 34000 ng/10 cm<sup>2</sup>/hr) が検出されており、これらは主に塩化ビニル樹脂 (PVC) やポリエチレンテレフタレート (PET) などを素材とするボール、人形、指人形などからも溶出することが確認された。こうした玩具には、乳幼児が使用する可能性の高いものも含まれており、「指定おもちゃ」に該当するものも含まれていた。

#### リン系難燃剤

検出されたリン系難燃剤の結果を Table 2-7 に示す。対象とした成分のうち 4 成分が検出され、中でも TPHP は検出率が 100% と高く殆ど全ての製品から検出された。次に TBOEP (14%)、TCEP (9.3%)、TCPP (2.6%) であった。また、検出された各成分の最大値は、TCPP (150 ng/10 cm<sup>2</sup>/hr)、TCEP (84 ng/10 cm<sup>2</sup>/hr)、TPHP (72 ng/10cm<sup>2</sup>/hr)、TBOEP (28 ng/10 cm<sup>2</sup>/hr) であり、可塑剤と比較すると比較的濃度は低い傾向が見られた。このとき、溶出試験において、いくつかの製品から TCEP が検出されたものの、TCEP は本研究で対象とした製品中からは検出されていないため、こうした成分は、玩具に付着する汚れやほこりなど他のものに由来している可能性が考えられた。また、TPHP は、材質試験における検出率が 15% と低く、溶出試験の結果には、玩具以外の要因も影響している可能性が高いと考えられた。また、これらリン系難燃剤が検出された製品の中には、「指定おもちゃ」に該当する可能性のある 6 歳未満を対象とした人形やミニカーも含まれていた。

(注意) 本研究は材質の確認や分析法において、様々な制限がある

#### **D. 結論**

本実験結果より、可塑剤・難燃剤を初めとする多種類の成分が「指定おもちゃ」を含む玩具を介して乳幼児に曝露される可能性が示された。また、口腔内へ溶出する成分は、必ずしも製品中で含有量が多いものだけでなく、低濃度のものであっても水溶性などの物性の違いや他の製品との接触や日常における使用状況など、なんらかの要因で製品の表面に付着した成分が影響している可能性も考えられた。

#### **E. 参考文献**

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#### **F. 研究発表**

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- 2) 戸次加奈江、稲葉洋平. 乳幼児用玩具を介した有害性化合物の曝露評価に関する研究. 全国衛生化学技術協議会年会; 2021.11.25-26; 名古屋. 同講演集. p. 88-89.
- 3) 戸次加奈江、稲葉洋平. 乳幼児用玩具を介した可塑剤・難燃剤の曝露評価に関する研究. 第 80 回公衆衛生学会総会; 2021.12.21-23; 東京. 同講演集. p. 481
- 4) 戸次加奈江、稲葉洋平. 乳幼児用玩具を介したフタル酸エステル類の曝露評価に関する研究. 第 92 回日本衛生学会; 2022.3.21-23; 兵庫. 同講演集.

G 知的財産権の出願・登録状況  
なし

Table 2-1 乳幼児用玩具一覧

| 種類        | 製造国      | 製造年  | 対象年齢   | 材質                               | 新旧   |
|-----------|----------|------|--------|----------------------------------|------|
| 楽器 1      | china    | 2019 | 8 か月   | ABS 樹脂                           | new  |
| 楽器 2      | china    | —    | 12 か月～ | ABS 樹脂                           | new  |
| 楽器 4      | china    | —    | 6 歳～   | PS                               | new  |
| コップ重ね     | china    | 2020 | 6 か月～  | コップ:PP, くま:ABS                   | new  |
| シャボン玉 1   | japan    | —    | 3 歳～   | PE                               | new  |
| シャボン玉 2   | japan    | 2019 | 3 歳～   | 吹き棒:PP/ボトル, ボトルキャップ:PE           | new  |
| スマホケース 1  | china    | —    | —      | シリコンカバー                          | new  |
| スマホケース 2  | china    | —    | —      | シリコンカバー                          | new  |
| スマホケース 3  | china    | —    | —      | シリコンカバー                          | new  |
| チェーンリング 1 | china    | —    | 0 歳～   | PP                               | new  |
| チェーンリング 2 | japan    | 2020 | 3 歳～   | PP                               | new  |
| 鉄道玩具 2    | thailand | 1996 | 3 歳～   | —                                | used |
| 鉄道玩具 3    | thailand | 1996 | 3 歳～   | —                                | used |
| 鉄道玩具 5    | —        | 2004 | —      | —                                | used |
| 人形 1      | china    | 2001 | 3 歳～   | PVC                              | used |
| 人形 2      | china    | 2001 | 3 歳～   | PVC                              | used |
| 人形 3      | china    | 2004 | 3 歳～   | PVC                              | used |
| 人形 5      | china    | —    | 3 か月～  | 天然ゴム                             | new  |
| 人形 6      | france   | —    | 0 歳～   | 天然ゴム                             | new  |
| 人形 7      | china    | —    | 3 歳～   | PVC                              | new  |
| 人形 8      | china    | 2019 | 3 歳～   | カエル:PE/PP, チューブ:PVC, ポンプ:PE、足:ゴム | used |
| 人形 9      | china    | —    | 3 歳～   | PE                               | used |
| はがため 2    | china    | 2018 | 3 か月～  | ABS樹脂, TPE, PP                   | used |
| はがため 3    | korea    | —    | 3 か月～  | TPE                              | new  |
| はがため 4    | china    | —    | 3 か月～  | ABS 樹脂/PP/EVA 樹脂/TPE             | new  |
| はがため 5    | china    | 2020 | 3 か月～  | ABS/MABS/PP/合成ゴム                 | new  |
| はがため 6    | china    | 2018 | 3 か月～  | TPU/ABS/PEs                      | new  |
| はがため 7    | china    | —    | 0 歳～   | シリコーンゴム                          | new  |
| はがため 8    | korea    | 2019 | 3 か月～  | TPE                              | new  |
| はがため 9    | thailand | —    | 6 か月～  | ソフト部:TPE, ハード部:PP, 鈴:PS          | new  |
| パズル       | china    | —    | 6 歳～   | EVA                              | new  |
| ピース 2     | china    | 2007 | 6 歳～   | PE                               | used |
| ブロック 1    | china    | —    | 2 歳～   | PE                               | new  |
| ブロック 2    | china    | —    | 3 歳～   | PP                               | new  |
| ブロック 3    | —        | —    | 1.5 歳～ | ABS 樹脂                           | new  |
| ボール 1     | china    | —    | 0 歳～   | PU/ABS                           | new  |
| ボール 2     | china    | —    | 6 歳～   | PVC                              | new  |
| ボール 3     | china    | —    | 6 歳～   | PVC                              | new  |
| ボール 4     | china    | —    | 1.5 歳～ | PVC                              | new  |
| ままごと 1    | china    | 2018 | 3 歳～   | PS                               | used |
| ままごと 2    | china    | 2018 | 3 歳～   | PS                               | used |
| ままごと 3    | china    | 2018 | 3 歳～   | PS                               | used |
| ままごと 4    | china    | 2018 | 3 歳～   | PS                               | used |
| ままごと 5    | china    | 2018 | 3 歳～   | PS                               | used |
| ままごと 6    | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 7    | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 8    | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 9    | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 10   | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 11   | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 13   | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |
| ままごと 15   | denmark  | —    | 2 歳～   | PE/PP/SBC                        | new  |

Table 2-1 乳幼児用玩具一覧

| 種類      | 製造国     | 製造年  | 対象年齢 | 材質                                    | 新旧   |
|---------|---------|------|------|---------------------------------------|------|
| ままごと 16 | denmark | —    | 4歳～  | PE/PP/SBC                             | new  |
| ままごと 17 | china   | 2018 | 3歳～  | PS                                    | new  |
| ままごと 19 | china   | 2018 | 3歳～  | PS                                    | new  |
| ままごと 20 | china   | 2018 | 3歳～  | PS                                    | new  |
| ままごと 23 | china   | 2018 | 3歳～  | PS                                    | new  |
| ミニカー1   | china   | 1991 | 3歳～  | カーウォッシャー本体:PS,POM,PU、ベース:PS、ガードレール:PP | used |
| ミニカー6   | china   | —    | 3歳～  | ABS樹脂                                 | used |
| ミニカー7   | china   | —    | 3歳～  | ABS樹脂                                 | used |
| ミニカー8   | china   | 2004 | 3歳～  | ABS樹脂                                 | used |
| ミニカー9   | —       | —    | 3歳～  | ABS樹脂                                 | used |
| ミニカー10  | china   | 2008 | 3歳～  | ABS樹脂                                 | used |
| 指人形 1   | china   | —    | 3歳～  | PET                                   | used |
| 指人形 2   | china   | 1996 | 3歳～  | PET                                   | used |
| 指人形 3   | china   | —    | 3歳～  | PET                                   | used |
| 指人形 4   | china   | 2000 | 3歳～  | PET                                   | used |
| 指人形 5   | china   | 1998 | 3歳～  | PET                                   | used |
| 指人形 6   | china   | 1994 | 3歳～  | PET                                   | used |
| 指人形 7   | china   | 2000 | 3歳～  | PET                                   | used |
| 指人形 8   | china   | —    | 3歳～  | PET                                   | used |
| 指人形 9   | china   | 1996 | 3歳～  | PET                                   | used |
| 指人形 10  | china   | 1997 | 3歳～  | PET                                   | used |
| 指人形 11  | china   | 1999 | 3歳～  | PET                                   | used |
| 指人形 12  | china   | 2000 | 3歳～  | PET                                   | used |

PS:ポリスチレン, PE:ポリエチレン, PP:ポリプロピレン, PEs:ポリエステル, PU:ポリウレタン, PET:ポリエチレンテレフタレート, TPE:熱可塑性エラストマー, PVC:塩化ビニル樹脂, ABS:アクリロニトリル/ブタジエン/スチレンの共重合による熱可塑性樹脂, MABS:透明なABS樹脂, EVA:エチレン酢酸ビニル, POM:ポリアセタール

※1:本研究で対象とする製品中には、パッケージや販売元が不明な中古製品等も含まれており、材質や製造年代、対象年齢などの確認には限界があったため、製品表示上で不明のものについては“—”と表示した。また、材質については製品表示上の材質を記載しており、各製品の規制対象部分に実際に使われている樹脂が網羅されているかは明確ではない。

**Table 2-3** Analytical condition of phthalic esters by LC-MS/MS

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Instrument: LC-MS/MS (Xevo TQ-S, Waters)

Mobile phase: A) Water containing 10 mM Ammonium formate

B) Methanol

Gradient: hold at 60% B for 0.5 min, 60% to 70% in 3 min, 70% to 95% B in 7.5 min, hold for 3 min, 95% to 60% in 0.5 min

Flow rate: 0.3 ml/min

Column: Raptor Fluoro Phenyl, 500 mm x 2.1 mm, 1.8  $\mu$ m (RESTEK)

Column temperature: 40°C

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**Table 2-4** Analytical condition of phosphorelated flame retardants by LC-MS/MS

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Instrument: LC-MS/MS (Xevo TQ-S, Waters)

Mobile phase: A) Water containing 10 mM Ammonium acetate

B) Methanol containing 10 mM Ammonium acetate

Gradient: hold at 60% B for 1 min, 60% to 70% in 1 min, 70% to 95% B in 6 min, 95% to 50% in 4 min, hold for 3 min

Flow rate: 0.3 ml/min

Column: Kinetex C18, 50 mm x 2.1 mm, 1.3  $\mu$ m (Phenomenex)

Column temperature: 50°C

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**Table 2-5** Analytical condition of DEHP by LC-MS/MS

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Instrument: LC-MS/MS (Xevo TQ-S, Waters)

Mobile phase: A) Water containing 10 mM Ammonium formate

B) Methanol

Gradient: 80% B to 95% in 25 min

Flow rate: 0.25 ml/min

Column: Titan, 100 mm x 2.1 mm, 1.8  $\mu$ m (Spelco)

Column temperature: 40°C

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Table 2-6 玩具から溶出したフタル酸エステル類と代替成分の濃度

| ng/10 cm <sup>2</sup> /hr |      |       |      |      |      |      |      |       |      |      |      |      |      |       |       |      |      |
|---------------------------|------|-------|------|------|------|------|------|-------|------|------|------|------|------|-------|-------|------|------|
| 分類                        | 対象年齢 | DBP   | BBP  | DEHP | DNOP | DINP | DIDP | DIBP  | DMP  | DEP  | DCHP | DEHA | DINA | ATBC  | DINCH | DBSb | TOTM |
| 楽器 1                      | 8    | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 32   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| 楽器 2                      | 12   | n.d.  | n.d. | 1600 | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 58   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| 楽器 4                      | 72   | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 34   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| コップ重ね                     | 6    | n.d.  | 25   | n.d. | 69   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 86   |
| シャボン玉 1                   | 36   | n.d.  | 22   | n.d. | 58   | n.d. | 270  | n.d.  | n.d. | n.d. | 59   | n.d. | 180  | n.d.  | 52    | 66   | 120  |
| シャボン玉 2                   | 36   | n.d.  | 28   | n.d. | 85   | n.d. | 800  | n.d.  | n.d. | n.d. | 78   | 150  | 1000 | 670   | 67    | 84   | 230  |
| スマホケース 1                  | —    | n.d.  | 25   | 1000 | 66   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 60    | 73   | 93   |
| スマホケース 2                  | —    | n.d.  | 26   | 940  | 65   | n.d. | 710  | n.d.  | n.d. | n.d. | 68   | 110  | 500  | n.d.  | 64    | 72   | 200  |
| スマホケース 3                  | —    | n.d.  | 25   | 1000 | 66   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 83   |
| チェーンリング 1                 | 0    | n.d.  | 29   | 950  | 77   | n.d. | 550  | n.d.  | n.d. | n.d. | 76   | n.d. | 360  | n.d.  | 68    | 81   | 190  |
| チェーンリング 2                 | 36   | n.d.  | 24   | n.d. | 65   | n.d. | 800  | n.d.  | n.d. | n.d. | 63   | 130  | 950  | n.d.  | 57    | 69   | 220  |
| 鉄道玩具 2                    | 36   | n.d.  | n.d. | 710  | 42   | n.d. | n.d. | n.d.  | n.d. | n.d. | 26   | n.d. | n.d. | n.d.  | n.d.  | 14   | n.d. |
| 鉄道玩具 3                    | 36   | n.d.  | n.d. | 1700 | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 31   | n.d. | n.d. | n.d.  | n.d.  | 16   | n.d. |
| 鉄道玩具 5                    | —    | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 460   | 77   | n.d. |
| 人形 1                      | 36   | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 31   | n.d. | 1000 | 21000 | n.d.  | n.d. | n.d. |
| 人形 2                      | 36   | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 85   | n.d. | 2300 | 53000 | n.d.  | n.d. | n.d. |
| 人形 3                      | 36   | n.d.  | n.d. | 1000 | n.d. | 1300 | 1000 | n.d.  | n.d. | 210  | 30   | 180  | 4900 | 35000 | 31    | 59   | 170  |
| 人形 5                      | 3    | n.d.  | n.d. | 740  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 34   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| 人形 6                      | 0    | n.d.  | 29   | 2500 | 71   | n.d. | 770  | n.d.  | n.d. | n.d. | 68   | 170  | 930  | 610   | 68    | 75   | 220  |
| 人形 7                      | 36   | 250   | 24   | 890  | 59   | n.d. | 520  | n.d.  | n.d. | n.d. | 60   | 86   | 360  | n.d.  | 56    | 67   | 160  |
| 人形 8                      | 36   | n.d.  | 23   | n.d. | 63   | n.d. | n.d. | n.d.  | n.d. | n.d. | 62   | n.d. | n.d. | n.d.  | 56    | 70   | 78   |
| 人形 9                      | 36   | n.d.  | 28   | 690  | 75   | n.d. | 520  | n.d.  | n.d. | n.d. | 75   | n.d. | 630  | n.d.  | 68    | 82   | 180  |
| はがため 2                    | 3    | n.d.  | n.d. | 1100 | 66   | n.d. | n.d. | n.d.  | n.d. | n.d. | 36   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| はがため 3                    | 3    | n.d.  | n.d. | 3000 | n.d. | n.d. | 570  | n.d.  | n.d. | n.d. | n.d. | n.d. | 370  | n.d.  | n.d.  | 58   | 91   |
| はがため 4                    | 3    | n.d.  | n.d. | 3500 | n.d. | n.d. | 250  | n.d.  | n.d. | n.d. | 57   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| はがため 5                    | 3    | n.d.  | n.d. | 570  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 32   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| はがため 6                    | 3    | n.d.  | n.d. | 1000 | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 36   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| はがため 7                    | 0    | n.d.  | 25   | n.d. | 66   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 81   |
| はがため 8                    | 3    | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 54   | n.d. |
| はがため 9                    | 6    | n.d.  | 31   | 2600 | 82   | n.d. | 420  | n.d.  | n.d. | n.d. | 82   | n.d. | 450  | n.d.  | 72    | 91   | 180  |
| パズル                       | 72   | n.d.  | 25   | 600  | 68   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 59    | 73   | 81   |
| ビーズ 2                     | 72   | n.d.  | 24   | 720  | 61   | n.d. | 690  | n.d.  | n.d. | n.d. | 64   | 110  | 850  | n.d.  | 62    | 68   | 190  |
| ブロック 1                    | 24   | n.d.  | 23   | n.d. | 59   | n.d. | 660  | n.d.  | n.d. | n.d. | 60   | 85   | 510  | n.d.  | 54    | 67   | 190  |
| ブロック 2                    | 36   | n.d.  | 24   | n.d. | 68   | n.d. | n.d. | n.d.  | n.d. | n.d. | 63   | n.d. | n.d. | n.d.  | 55    | 70   | 86   |
| ブロック 3                    | 17   | n.d.  | 25   | 610  | 63   | n.d. | n.d. | 310   | n.d. | n.d. | 60   | n.d. | n.d. | n.d.  | 54    | 67   | 76   |
| ボール 1                     | 0    | n.d.  | n.d. | 980  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 51   | n.d. |
| ボール 2                     | 72   | 47000 | 27   | n.d. | 69   | n.d. | n.d. | 34000 | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 72   | 83   |
| ボール 3                     | 72   | 43000 | 29   | 810  | 68   | n.d. | n.d. | 31000 | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 81   |
| ボール 4                     | 17   | n.d.  | 30   | 630  | 67   | n.d. | 330  | n.d.  | n.d. | n.d. | 66   | n.d. | 430  | n.d.  | 61    | 73   | 140  |
| ままごと 1                    | 36   | n.d.  | n.d. | 900  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 29   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 2                    | 36   | n.d.  | n.d. | 920  | n.d. | n.d. | 180  | n.d.  | n.d. | n.d. | 34   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 3                    | 36   | n.d.  | n.d. | 770  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 31   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 4                    | 36   | n.d.  | n.d. | 910  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 32   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 5                    | 36   | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 36   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 6                    | 24   | n.d.  | n.d. | 620  | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | 30   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 7                    | 24   | n.d.  | n.d. | 850  | n.d. | n.d. | 1900 | n.d.  | n.d. | n.d. | 41   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ままごと 8                    | 24   | n.d.  | 26   | 760  | 65   | n.d. | n.d. | n.d.  | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 84   |
| ままごと 9                    | 24   | n.d.  | 23   | 960  | 59   | n.d. | 81   | n.d.  | n.d. | n.d. | 59   | n.d. | n.d. | n.d.  | 52    | 66   | 92   |
| ままごと 10                   | 24   | n.d.  | n.d. | 1100 | n.d. | n.d. | n.d. | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 35   | n.d. |
| ままごと 11                   | 24   | n.d.  | n.d. | 1100 | n.d. | n.d. | 120  | n.d.  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 35   | n.d. |



ng/10 cm<sup>2</sup>/hr

| 分類      | 対象年齢 | DBP  | BBP  | DEHP | DNOP | DINP | DIDP | DIBP | DMP  | DEP  | DCHP | DEHA | DINA | ATBC  | DINCH | DBSb | TOTM |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|
| ままごと 13 | 24   | n.d. | n.d. | 1600 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 29   | n.d. |
| ままごと 15 | 24   | n.d. | 26   | 800  | 70   | n.d. | n.d. | n.d. | n.d. | n.d. | 66   | n.d. | n.d. | n.d.  | 58    | 73   | 86   |
| ままごと 16 | 48   | n.d. | 24   | 830  | 61   | n.d. | 210  | n.d. | n.d. | n.d. | 61   | n.d. | n.d. | n.d.  | 53    | 66   | 110  |
| ままごと 17 | 36   | n.d. | 24   | 890  | 63   | n.d. | 540  | n.d. | n.d. | n.d. | 59   | 86   | 270  | n.d.  | 60    | 65   | 170  |
| ままごと 19 | 36   | n.d. | 29   | 810  | 83   | n.d. | n.d. | n.d. | n.d. | n.d. | 74   | n.d. | n.d. | n.d.  | 65    | 82   | 95   |
| ままごと 20 | 36   | n.d. | 18   | 720  | 49   | n.d. | n.d. | n.d. | 190  | n.d. | 46   | n.d. | n.d. | n.d.  | 41    | 51   | 61   |
| ままごと 23 | 36   | n.d. | 22   | 660  | 59   | n.d. | n.d. | n.d. | n.d. | n.d. | 58   | n.d. | n.d. | n.d.  | 51    | 64   | 86   |
| ミニカー1   | 36   | n.d. | n.d. | 1700 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 34   | n.d. | n.d. | n.d.  | n.d.  | n.d. | n.d. |
| ミニカー6   | 36   | n.d. | 30   | 1700 | 80   | n.d. | n.d. | n.d. | n.d. | n.d. | 79   | n.d. | n.d. | n.d.  | 70    | 87   | 100  |
| ミニカー7   | 36   | n.d. | 39   | 1400 | 100  | n.d. | n.d. | n.d. | n.d. | n.d. | 99   | n.d. | n.d. | n.d.  | 87    | 100  | 120  |
| ミニカー8   | 36   | n.d. | n.d. | 1500 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 3600  | n.d.  | 58   | n.d. |
| ミニカー9   | 36   | n.d. | 33   | n.d. | 93   | n.d. | n.d. | n.d. | n.d. | n.d. | 87   | n.d. | n.d. | n.d.  | 81    | 96   | 110  |
| ミニカー10  | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | 240  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 66   | n.d. |
| 指人形 1   | 36   | n.d. | n.d. | 1100 | n.d. | 1000 | 1000 | n.d. | n.d. | n.d. | 25   | n.d. | 4300 | 38000 | n.d.  | 52   | 160  |
| 指人形 2   | 36   | n.d. | n.d. | 810  | n.d. | n.d. | n.d. | n.d. | 420  | n.d. | n.d. | n.d. | 1900 | 30000 | n.d.  | 38   | n.d. |
| 指人形 3   | 36   | n.d. | n.d. | 5200 | n.d. | 1100 | 1000 | n.d. | n.d. | n.d. | 26   | n.d. | 1100 | 5300  | n.d.  | 73   | 150  |
| 指人形 4   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | 1100 | 31000 | n.d.  | 46   | n.d. |
| 指人形 5   | 36   | n.d. | n.d. | 1600 | n.d. | 1600 | 530  | n.d. | n.d. | n.d. | n.d. | n.d. | 490  | 1800  | n.d.  | 66   | 70   |
| 指人形 6   | 36   | n.d. | 38   | n.d. | 100  | n.d. | n.d. | n.d. | n.d. | n.d. | 100  | n.d. | n.d. | n.d.  | 100   | 110  | 130  |
| 指人形 7   | 36   | n.d. | 28   | n.d. | 80   | n.d. | n.d. | n.d. | n.d. | n.d. | 74   | n.d. | 1500 | 16000 | 65    | 82   | 92   |
| 指人形 8   | 36   | n.d. | n.d. | n.d. | n.d. | 790  | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 43   | n.d. |
| 指人形 9   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 56   | n.d. |
| 指人形 10  | 36   | n.d. | n.d. | 6000 | n.d. | 3200 | 750  | n.d. | n.d. | n.d. | n.d. | n.d. | 550  | n.d.  | n.d.  | 82   | 110  |
| 指人形 11  | 36   | n.d. | n.d. | 2600 | n.d. | 2400 | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | n.d.  | 39   | n.d. |
| 指人形 12  | 36   | n.d. | n.d. | 2800 | n.d. | n.d. | 350  | n.d. | n.d. | n.d. | n.d. | n.d. | 2200 | 55000 | n.d.  | 81   | n.d. |

Table 2-7 玩具から溶出したリン酸エステル類の濃度

| ng/10 cm <sup>2</sup> /hr |      |      |      |      |      |      |       |      |      |      |        |       |      |       |      |
|---------------------------|------|------|------|------|------|------|-------|------|------|------|--------|-------|------|-------|------|
| 分類名                       | 対象年齢 | TMP  | TEP  | TPP  | TCEP | TCPP | TDCPP | TPHP | TIBP | TNBP | CsDPHP | TBOEP | TCsP | EHDPP | TEHP |
| 楽器 1                      | 8    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 楽器 2                      | 12   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 48   | n.d. | n.d. | n.d.   | 17    | n.d. | n.d.  | n.d. |
| 楽器 4                      | 72   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 27   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| コップ重ね                     | 6    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| シャボン玉 1                   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 25   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| シャボン玉 2                   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 32   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| スマホケース 1                  | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 33   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| スマホケース 2                  | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| スマホケース 3                  | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| チェンリング 1                  | 0    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 32   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| チェンリング 2                  | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 27   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 鉄道玩具 2                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 21   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 鉄道玩具 3                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | 8.9   | n.d. | n.d.  | n.d. |
| 鉄道玩具 5                    | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 68   | n.d. | n.d. | n.d.   | 28    | n.d. | n.d.  | n.d. |
| 人形 1                      | 36   | n.d. | n.d. | n.d. | 7.5  | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 2                      | 36   | n.d. | n.d. | n.d. | 22   | n.d. | n.d.  | 68   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 3                      | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 45   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 5                      | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 6                      | 0    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 7                      | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 8                      | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 27   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 人形 9                      | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 32   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 2                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 3                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 54   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 4                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 48   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 5                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 6                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 30   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 7                    | 0    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 8                    | 3    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 47   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| はがため 9                    | 6    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 35   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| バズル                       | 72   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ビーズ 2                     | 72   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ブロック 1                    | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ブロック 2                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ブロック 3                    | 17   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | 10    | n.d. | n.d.  | n.d. |
| ボール 1                     | 0    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 51   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ボール 2                     | 72   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ボール 3                     | 72   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ボール 4                     | 17   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 1                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | 9.2   | n.d. | n.d.  | n.d. |
| ままごと 2                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | 10    | n.d. | n.d.  | n.d. |
| ままごと 3                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | 10    | n.d. | n.d.  | n.d. |
| ままごと 4                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 5                    | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 31   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 6                    | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 25   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 7                    | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 33   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 8                    | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | 11    | n.d. | n.d.  | n.d. |
| ままごと 9                    | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 25   | n.d. | n.d. | n.d.   | 9.1   | n.d. | n.d.  | n.d. |
| ままごと 10                   | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 11                   | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 13                   | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 27   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 15                   | 24   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 29   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 16                   | 48   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 26   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |

ng/10 cm<sup>2</sup>/hr

| 分類名     | 対象年齢 | TMP  | TEP  | TPP  | TCEP | TCPP | TDCPP | TPHP | TIBP | TNBP | CsDHPH | TBOEP | TCsP | EHDPP | TEHP |
|---------|------|------|------|------|------|------|-------|------|------|------|--------|-------|------|-------|------|
| ままごと 17 | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 25   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 19 | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 32   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 20 | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 20   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ままごと 23 | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 25   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ミニカー1   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 28   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ミニカー6   | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 34   | n.d. | n.d. | n.d.   | 15    | n.d. | n.d.  | n.d. |
| ミニカー7   | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 43   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ミニカー8   | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 48   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ミニカー9   | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 38   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| ミニカー10  | —    | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 59   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 1   | 36   | n.d. | n.d. | n.d. | 11   | n.d. | n.d.  | 43   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 2   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 33   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 3   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 46   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 4   | 36   | n.d. | n.d. | n.d. | 22   | n.d. | n.d.  | 42   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 5   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 54   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 6   | 36   | n.d. | n.d. | n.d. | 11   | 25   | n.d.  | 43   | n.d. | n.d. | n.d.   | 19    | n.d. | n.d.  | n.d. |
| 指人形 7   | 36   | n.d. | n.d. | n.d. | 10   | n.d. | n.d.  | 33   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 8   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 38   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 9   | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 50   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 10  | 36   | n.d. | n.d. | n.d. | n.d. | 150  | n.d.  | 73   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 11  | 36   | n.d. | n.d. | n.d. | n.d. | n.d. | n.d.  | 35   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |
| 指人形 12  | 36   | n.d. | n.d. | n.d. | 84   | n.d. | n.d.  | 68   | n.d. | n.d. | n.d.   | n.d.  | n.d. | n.d.  | n.d. |

Table 2-8 溶出試験結果一覧（全玩具対象）

| Compound                              | Min | Med | (25%, 75%)  | Max   | detection (%) |
|---------------------------------------|-----|-----|-------------|-------|---------------|
| Phthalate ester/alternative substance |     |     |             |       |               |
| DBP                                   | 0   | 0   | (-, -)      | 47000 | 4.0           |
| BBP                                   | 0   | 0.0 | (0.0, 25)   | 39    | 46            |
| DEHP                                  | 0   | 810 | (0.0, 1100) | 6000  | 69            |
| DNOP                                  | 0   | 0.0 | (0.0, 66)   | 100   | 49            |
| DINP                                  | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DIDP                                  | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DIBP                                  | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DMP                                   | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DEP                                   | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DCHP                                  | 0   | 46  | (26, 66)    | 100   | 77            |
| DEHA                                  | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DINA                                  | 0   | 0   | (0.0, 450)  | 4900  | 33            |
| ATBC                                  | 0   | 0   | (0.0, 0.0)  | -     | -             |
| DINCH                                 | 0   | 0   | (0.0, 58)   | 460   | 49            |
| DBSb                                  | 0   | 66  | (14, 73)    | 110   | 76            |
| TOTM                                  | 0   | 78  | (0.0, 110)  | 230   | 55            |
| Phosphorelated flame retardant        |     |     |             |       |               |
| TMP                                   | -   | -   | (-, -)      | -     | -             |
| TEP                                   | -   | -   | (-, -)      | -     | -             |
| TPP                                   | -   | -   | (-, -)      | -     | -             |
| TCEP                                  | 7.5 | 11  | (10, 22)    | 84    | 9.3           |
| TCPP                                  | 25  | 91  | (25, 0)     | 150   | 2.6           |
| TDCPP                                 | -   | -   | (-, -)      | -     | -             |
| TPHP                                  | 19  | 28  | (26, 42)    | 72    | 100           |
| TIBP                                  | -   | -   | (-, -)      | -     | -             |
| TNBP                                  | -   | -   | (-, -)      | -     | -             |
| CsDPPH                                | -   | -   | (-, -)      | -     | -             |
| TBOEP                                 | 8.8 | 10  | (9.2, 17)   | 28    | 14            |
| TCsP                                  | -   | -   | (-, -)      | -     | -             |
| EHDPP                                 | -   | -   | (-, -)      | -     | -             |
| TEHP                                  | -   | -   | (-, -)      | -     | -             |