

Supplementary Material

Table S1. Inductively Coupled Plasma-Mass Spectrometry operating conditions

| Operating conditions for ICP-MS | |
|---|--|
| Isotopes monitored and respective limit of detection ($\mu\text{g L}^{-1}$) | $^{27}\text{Al}(3.41)$, $^{52}\text{Cr}(0.047)$, $^{59}\text{Co}(0.013)$, $^{60}\text{Ni}(0.432)$, $^{63}\text{Cu}(2.92)$, $^{75}\text{As}(0.034)$, $^{88}\text{Sr}(0.049)$, $^{111}\text{Cd}(0.006)$, $^{120}\text{Sn}(0.063)$, $^{121}\text{Sb}(0.013)$, $^{137}\text{Ba}(0.074)$, $^{208}\text{Pb}(0.045)$. |
| Internal Standards | Ge ⁷² (used for Al, Cr, Co, Ni and Cu) Y ⁸⁹ (used for As, Sr, Cd, Sn and Sb) Ir ¹⁹³ (used for Ba and Pb) Purchased from Inorganic Ventures (USA). Prepared at 10 $\mu\text{g L}^{-1}$ and injected online by splitting. |
| Radio Frequency Power | 1550 W |
| Torch sample depth | 8 mm |
| Argon Flow Rate | 15 L min ⁻¹ |
| Nebulizer Gas Flow Rate | 0.9 L min ⁻¹ |
| Nebulizer | Micro Mist TM |
| Peristaltic Pump tuning | Internal diameter: 1.02mm; wall 0.86mm |
| Sample uptake | 0.45 rps |
| Sample introduction | 1 ml/min (0.3 rps) |
| Carrier Nebulizer Gas Flow rate | 1.03 L min ⁻¹ |
| Stabilization time | 5 s |
| Collision Cell | Helium (purity >99.99%) |
| Nebulizer Chamber | Scott (double pass) |
| Interface | Platinum cones |
| Sampling Cone | 1 mm |
| Skimmer | 0.9 mm |

Table S2. Element recoveries in percentage (%) compared to the certified value. Values are expressed as a median \pm standard deviation of analyzed CRMs, n=3.

| Element | CRM | Recovery % (median \pm SD) |
|---------|-----------|------------------------------|
| Al | NIST 2709 | 76 \pm 7 |
| Cr | NIST 2709 | 111 \pm 2 |
| Co | NIST 2709 | 88 \pm 2 |
| Ni | NIST 2709 | 82 \pm 2 |
| Cu | NIST 1573 | 88 \pm 1 |
| As | C1003a | 106 \pm 2 |
| Sr | C1003a | 88 \pm 2 |
| Cd | CC141 | 94 \pm 1 |
| Sn | NI | - |
| Sb | NIST 1573 | 92 \pm 7 |
| Ba | NIST 2709 | 84 \pm 6 |
| Pb | CC141 | 90 \pm 1 |

NI: not informed

Table S3. Non-cancer risk or hazard quotient (HQ) for all Potentially Toxic Elements (PTEs) determined in face paints and pancakes, results for dermal and ingestion exposures for both sexes in children and adults.

| PTEs | Sex | Children: age 2 to < 3 years | | | | Children: age 3 to < 6 years | | | | Children: age 6 to < 11 years | | | | Adults: age ≥ 21 years | | | |
|-------|-----|------------------------------|-----------------------|-----------------------|-----------------------|------------------------------|-----------------------|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| | | Face paints | | Pancake | | Face paints | | Pancake | | Face paints | | Pancake | | Face paints | | Pancake | |
| | | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion |
| Al | F | 5.17×10 ⁻⁴ | 3.07×10 ⁻² | 1.85×10 ⁻³ | 1.10×10 ⁻¹ | 4.00×10 ⁻⁴ | 2.37×10 ⁻² | 1.43×10 ⁻³ | 8.48×10 ⁻² | 2.49×10 ⁻⁴ | 1.48×10 ⁻² | 8.90×10 ⁻⁴ | 5.28×10 ⁻² | 1.01×10 ⁻¹ | 8.61×10 ⁻² | 3.63×10 ⁻¹ | 3.08×10 ⁻¹ |
| | M | 5.00×10 ⁻⁴ | 2.96×10 ⁻² | 1.79×10 ⁻³ | 1.06×10 ⁻¹ | 3.93×10 ⁻⁴ | 2.33×10 ⁻² | 1.41×10 ⁻³ | 8.34×10 ⁻² | 2.54×10 ⁻⁴ | 1.50×10 ⁻² | 9.08×10 ⁻⁴ | 5.38×10 ⁻² | 8.77×10 ⁻² | 7.45×10 ⁻² | 3.14×10 ⁻¹ | 2.66×10 ⁻¹ |
| As | F | 7.07×10 ⁻³ | 1.40×10 ⁻² | 1.56×10 ⁻² | 3.09×10 ⁻² | 5.46×10 ⁻³ | 1.08×10 ⁻² | 1.21×10 ⁻² | 2.38×10 ⁻² | 3.40×10 ⁻³ | 6.72×10 ⁻³ | 7.50×10 ⁻³ | 1.48×10 ⁻² | 1.39×10 ⁰ | 3.92×10 ⁻² | 3.06×10 ⁰ | 8.66×10 ⁻² |
| | M | 6.83×10 ⁻³ | 1.35×10 ⁻² | 1.51×10 ⁻² | 2.98×10 ⁻² | 5.37×10 ⁻³ | 1.06×10 ⁻² | 1.19×10 ⁻² | 2.34×10 ⁻² | 3.47×10 ⁻³ | 6.86×10 ⁻³ | 7.65×10 ⁻³ | 1.51×10 ⁻² | 1.20×10 ⁰ | 3.39×10 ⁻² | 2.65×10 ⁰ | 7.49×10 ⁻² |
| Ba | F | 4.51×10 ⁻⁵ | 1.87×10 ⁻² | 7.17×10 ⁻⁶ | 2.98×10 ⁻³ | 3.48×10 ⁻⁵ | 1.45×10 ⁻² | 5.54×10 ⁻⁶ | 2.30×10 ⁻³ | 2.17×10 ⁻⁵ | 9.00×10 ⁻³ | 3.45×10 ⁻⁶ | 1.43×10 ⁻³ | 8.84×10 ⁻³ | 5.26×10 ⁻² | 1.41×10 ⁻³ | 8.36×10 ⁻³ |
| | M | 4.36×10 ⁻⁵ | 1.81×10 ⁻² | 6.93×10 ⁻⁶ | 2.88×10 ⁻³ | 3.43×10 ⁻⁵ | 1.42×10 ⁻² | 5.45×10 ⁻⁶ | 2.26×10 ⁻³ | 2.21×10 ⁻⁵ | 9.18×10 ⁻³ | 3.52×10 ⁻⁶ | 1.46×10 ⁻³ | 7.64×10 ⁻³ | 4.55×10 ⁻² | 1.22×10 ⁻³ | 7.23×10 ⁻³ |
| Cd | F | 1.96×10 ⁻⁶ | 5.82×10 ⁻⁴ | 1.51×10 ⁻⁵ | 4.48×10 ⁻³ | 1.52×10 ⁻⁶ | 4.50×10 ⁻⁴ | 1.17×10 ⁻⁵ | 3.46×10 ⁻³ | 9.44×10 ⁻⁷ | 2.80×10 ⁻⁴ | 7.26×10 ⁻⁶ | 2.15×10 ⁻³ | 3.85×10 ⁻⁴ | 1.63×10 ⁻³ | 2.96×10 ⁻³ | 1.26×10 ⁻² |
| | M | 1.90×10 ⁻⁶ | 5.63×10 ⁻⁴ | 1.46×10 ⁻⁵ | 4.33×10 ⁻³ | 1.49×10 ⁻⁶ | 4.42×10 ⁻⁴ | 1.15×10 ⁻⁵ | 3.40×10 ⁻³ | 9.63×10 ⁻⁷ | 2.86×10 ⁻⁴ | 7.41×10 ⁻⁶ | 2.20×10 ⁻³ | 3.33×10 ⁻⁴ | 1.41×10 ⁻³ | 2.56×10 ⁻³ | 1.09×10 ⁻² |
| Co | F | 6.83×10 ⁻⁷ | 4.05×10 ⁻⁵ | 1.68×10 ⁻⁵ | 9.94×10 ⁻⁴ | 5.28×10 ⁻⁷ | 3.13×10 ⁻⁵ | 1.30×10 ⁻⁵ | 7.68×10 ⁻⁴ | 3.28×10 ⁻⁷ | 1.95×10 ⁻⁵ | 8.06×10 ⁻⁶ | 4.78×10 ⁻⁴ | 1.34×10 ⁻⁴ | 1.14×10 ⁻⁴ | 3.29×10 ⁻³ | 2.79×10 ⁻³ |
| | M | 6.60×10 ⁻⁷ | 3.91×10 ⁻⁵ | 1.62×10 ⁻⁵ | 9.61×10 ⁻⁴ | 5.19×10 ⁻⁷ | 3.08×10 ⁻⁵ | 1.27×10 ⁻⁵ | 7.55×10 ⁻⁴ | 3.35×10 ⁻⁷ | 1.99×10 ⁻⁵ | 8.22×10 ⁻⁶ | 4.88×10 ⁻⁴ | 1.16×10 ⁻⁴ | 9.83×10 ⁻⁵ | 2.84×10 ⁻³ | 2.41×10 ⁻³ |
| CrIII | F | 1.79×10 ⁻⁷ | 1.38×10 ⁻⁵ | 3.40×10 ⁻⁶ | 2.62×10 ⁻⁴ | 1.38×10 ⁻⁷ | 1.06×10 ⁻⁵ | 2.63×10 ⁻⁶ | 2.03×10 ⁻⁴ | 8.59×10 ⁻⁸ | 6.62×10 ⁻⁶ | 1.64×10 ⁻⁶ | 1.26×10 ⁻⁴ | 3.50×10 ⁻⁵ | 3.87×10 ⁻⁵ | 6.67×10 ⁻⁴ | 7.36×10 ⁻⁴ |
| | M | 1.73×10 ⁻⁷ | 1.33×10 ⁻⁵ | 3.29×10 ⁻⁶ | 2.54×10 ⁻⁴ | 1.36×10 ⁻⁷ | 1.05×10 ⁻⁵ | 2.58×10 ⁻⁶ | 1.99×10 ⁻⁴ | 8.76×10 ⁻⁸ | 6.76×10 ⁻⁶ | 1.67×10 ⁻⁶ | 1.29×10 ⁻⁴ | 3.03×10 ⁻⁵ | 3.34×10 ⁻⁵ | 5.77×10 ⁻⁴ | 6.37×10 ⁻⁴ |
| CrVI | F | 1.24×10 ⁻³ | 4.59×10 ⁻³ | 2.36×10 ⁻² | 8.74×10 ⁻² | 9.57×10 ⁻⁴ | 3.55×10 ⁻³ | 1.82×10 ⁻² | 6.76×10 ⁻² | 5.95×10 ⁻⁴ | 2.21×10 ⁻³ | 1.13×10 ⁻² | 4.20×10 ⁻² | 2.43×10 ⁻¹ | 1.29×10 ⁻² | 4.62×10 ⁰ | 2.45×10 ⁻¹ |
| | M | 1.20×10 ⁻³ | 4.44×10 ⁻³ | 2.28×10 ⁻² | 8.45×10 ⁻² | 9.41×10 ⁻⁴ | 3.49×10 ⁻³ | 1.79×10 ⁻² | 6.64×10 ⁻² | 6.07×10 ⁻⁴ | 2.25×10 ⁻³ | 1.16×10 ⁻² | 4.29×10 ⁻² | 2.10×10 ⁻¹ | 1.11×10 ⁻² | 4.00×10 ⁰ | 2.12×10 ⁻¹ |
| Cu | F | 1.23×10 ⁻³ | 7.00×10 ⁻² | 8.70×10 ⁻⁵ | 5.16×10 ⁻³ | 9.53×10 ⁻⁴ | 5.41×10 ⁻² | 6.72×10 ⁻⁵ | 3.99×10 ⁻³ | 5.93×10 ⁻⁴ | 3.37×10 ⁻² | 4.18×10 ⁻⁵ | 2.48×10 ⁻³ | 2.09×10 ⁻¹ | 1.70×10 ⁻¹ | 2.42×10 ⁻¹ | 1.97×10 ⁻¹ |
| | M | 1.19×10 ⁻³ | 6.77×10 ⁻² | 8.41×10 ⁻⁵ | 4.99×10 ⁻³ | 9.37×10 ⁻⁴ | 5.32×10 ⁻² | 6.61×10 ⁻⁵ | 3.92×10 ⁻³ | 6.05×10 ⁻⁴ | 3.44×10 ⁻² | 4.27×10 ⁻⁵ | 2.53×10 ⁻³ | 1.47×10 ⁻² | 1.25×10 ⁻² | 1.71×10 ⁻² | 1.45×10 ⁻² |
| Ni | F | 1.29×10 ⁻⁶ | 3.06×10 ⁻⁴ | 1.38×10 ⁻⁵ | 3.27×10 ⁻³ | 9.96×10 ⁻⁷ | 2.36×10 ⁻⁴ | 1.07×10 ⁻⁵ | 2.53×10 ⁻³ | 6.20×10 ⁻⁷ | 1.47×10 ⁻⁴ | 6.63×10 ⁻⁶ | 1.57×10 ⁻³ | 2.53×10 ⁻⁴ | 8.58×10 ⁻⁴ | 2.70×10 ⁻³ | 9.18×10 ⁻³ |
| | M | 1.25×10 ⁻⁶ | 2.96×10 ⁻⁴ | 1.33×10 ⁻⁵ | 3.16×10 ⁻³ | 9.79×10 ⁻⁷ | 2.32×10 ⁻⁴ | 1.05×10 ⁻⁵ | 2.48×10 ⁻³ | 6.32×10 ⁻⁷ | 1.50×10 ⁻⁴ | 6.76×10 ⁻⁶ | 1.60×10 ⁻³ | 2.18×10 ⁻⁴ | 7.42×10 ⁻⁴ | 2.34×10 ⁻³ | 7.94×10 ⁻³ |
| Sb | F | 4.31×10 ⁻⁶ | 3.84×10 ⁻³ | 1.11×10 ⁻⁶ | 9.83×10 ⁻⁴ | 3.33×10 ⁻⁶ | 2.97×10 ⁻³ | 8.54×10 ⁻⁷ | 7.60×10 ⁻⁴ | 2.07×10 ⁻⁶ | 1.85×10 ⁻³ | 5.31×10 ⁻⁷ | 4.73×10 ⁻⁴ | 8.46×10 ⁻⁴ | 1.08×10 ⁻² | 2.17×10 ⁻⁴ | 2.76×10 ⁻³ |
| | M | 4.17×10 ⁻⁶ | 3.71×10 ⁻³ | 1.07×10 ⁻⁶ | 9.50×10 ⁻⁴ | 3.28×10 ⁻⁶ | 2.92×10 ⁻³ | 8.39×10 ⁻⁷ | 7.47×10 ⁻⁴ | 2.12×10 ⁻⁶ | 1.88×10 ⁻³ | 5.42×10 ⁻⁷ | 4.82×10 ⁻⁴ | 7.31×10 ⁻⁴ | 9.32×10 ⁻³ | 1.87×10 ⁻⁴ | 2.39×10 ⁻³ |
| Sn | F | 1.40×10 ⁻⁷ | 8.30×10 ⁻⁶ | 3.14×10 ⁻⁷ | 1.86×10 ⁻⁵ | 1.08×10 ⁻⁷ | 6.42×10 ⁻⁶ | 2.43×10 ⁻⁷ | 1.44×10 ⁻⁵ | 6.73×10 ⁻⁸ | 3.99×10 ⁻⁶ | 1.51×10 ⁻⁷ | 8.96×10 ⁻⁶ | 2.74×10 ⁻⁵ | 2.33×10 ⁻⁵ | 6.16×10 ⁻⁵ | 5.23×10 ⁻⁵ |
| | M | 1.35×10 ⁻⁷ | 8.03×10 ⁻⁶ | 3.04×10 ⁻⁷ | 1.80×10 ⁻⁵ | 1.06×10 ⁻⁷ | 6.31×10 ⁻⁶ | 2.39×10 ⁻⁷ | 1.41×10 ⁻⁵ | 6.87×10 ⁻⁸ | 4.07×10 ⁻⁶ | 1.54×10 ⁻⁷ | 9.14×10 ⁻⁶ | 2.37×10 ⁻⁵ | 2.02×10 ⁻⁵ | 5.32×10 ⁻⁵ | 4.52×10 ⁻⁵ |
| Sr | F | 4.97×10 ⁻⁵ | 2.95×10 ⁻³ | 2.60×10 ⁻⁶ | 1.54×10 ⁻⁴ | 3.84×10 ⁻⁵ | 2.28×10 ⁻³ | 2.01×10 ⁻⁶ | 1.19×10 ⁻⁴ | 2.39×10 ⁻⁵ | 1.42×10 ⁻³ | 1.25×10 ⁻⁶ | 7.41×10 ⁻⁵ | 9.74×10 ⁻³ | 8.28×10 ⁻³ | 5.09×10 ⁻⁴ | 4.33×10 ⁻⁴ |
| | M | 4.80×10 ⁻⁵ | 2.85×10 ⁻³ | 2.51×10 ⁻⁶ | 1.49×10 ⁻⁴ | 3.78×10 ⁻⁵ | 2.24×10 ⁻³ | 1.97×10 ⁻⁶ | 1.17×10 ⁻⁴ | 2.44×10 ⁻⁵ | 1.45×10 ⁻³ | 1.27×10 ⁻⁶ | 7.56×10 ⁻⁵ | 8.43×10 ⁻³ | 7.16×10 ⁻³ | 4.41×10 ⁻⁴ | 3.74×10 ⁻⁴ |

Table S4. Cancer risk (CR) for all Potentially Toxic Elements (PTEs) determined in face paints and pancakes, results for dermal and ingestion exposures for both sexes in children and adults.

| PTEs | Sex | Children: age 2 to < 3 years | | | | Children: age 3 to < 6 years | | | | Children: age 6 to < 11 years | | | | Adults: age ≥ 21 years | | | |
|-------------|-----|------------------------------|-----------------------|------------------------|-----------------------|------------------------------|-----------------------|------------------------|-----------------------|-------------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| | | <u>Face paints</u> | | <u>Pancake</u> | | <u>Face paints</u> | | <u>Pancake</u> | | <u>Face paints</u> | | <u>Pancake</u> | | <u>Face paints</u> | | <u>Pancake</u> | |
| | | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion | Dermal | Ingestion |
| As | F | 2.88×10 ⁻⁷ | 3.98×10 ⁻⁵ | 6.35×10 ⁻⁷ | 8.79×10 ⁻⁵ | 6.67×10 ⁻⁷ | 3.08×10 ⁻⁵ | 1.47×10 ⁻⁶ | 6.79×10 ⁻⁵ | 6.92×10 ⁻⁷ | 1.92×10 ⁻⁵ | 1.53×10 ⁻⁶ | 4.23×10 ⁻⁵ | 1.97×10 ⁻³ | 1.12×10 ⁻⁴ | 3.77×10 ⁻³ | 2.47×10 ⁻⁴ |
| | M | 2.78×10 ⁻⁷ | 3.85×10 ⁻⁵ | 6.14×10 ⁻⁷ | 8.50×10 ⁻⁵ | 6.56×10 ⁻⁷ | 3.03×10 ⁻⁵ | 1.45×10 ⁻⁶ | 6.68×10 ⁻⁵ | 7.06×10 ⁻⁷ | 1.95×10 ⁻⁵ | 1.56×10 ⁻⁶ | 4.31×10 ⁻⁵ | 1.71×10 ⁻³ | 9.67×10 ⁻⁵ | 4.36×10 ⁻³ | 2.14×10 ⁻⁴ |
| CrVI | F | 2.65×10 ⁻⁸ | 6.89×10 ⁻⁶ | 5.05×10 ⁻⁷ | 1.31×10 ⁻⁴ | 6.15×10 ⁻⁸ | 5.32×10 ⁻⁶ | 1.17×10 ⁻⁶ | 1.01×10 ⁻⁴ | 6.38×10 ⁻⁸ | 3.31×10 ⁻⁶ | 1.22×10 ⁻⁶ | 6.31×10 ⁻⁵ | 4.55×10 ⁻⁴ | 1.93×10 ⁻⁵ | 3.00×10 ⁻³ | 3.68×10 ⁻⁴ |
| | M | 2.56×10 ⁻⁸ | 6.66×10 ⁻⁶ | 4.89×10 ⁻⁷ | 1.27×10 ⁻⁴ | 6.05×10 ⁻⁸ | 5.23×10 ⁻⁶ | 1.15×10 ⁻⁶ | 9.96×10 ⁻⁵ | 6.51×10 ⁻⁸ | 3.38×10 ⁻⁶ | 1.24×10 ⁻⁶ | 6.43×10 ⁻⁵ | 3.94×10 ⁻⁴ | 1.67×10 ⁻⁵ | 8.67×10 ⁻³ | 3.18×10 ⁻⁴ |
| Pb | F | 1.90×10 ⁻¹¹ | 7.88×10 ⁻⁸ | 1.79×10 ⁻¹⁰ | 7.44×10 ⁻⁷ | 4.40×10 ⁻¹¹ | 6.09×10 ⁻⁸ | 4.15×10 ⁻¹⁰ | 5.75×10 ⁻⁷ | 4.56×10 ⁻¹¹ | 3.79×10 ⁻⁸ | 4.31×10 ⁻¹⁰ | 3.58×10 ⁻⁷ | 1.30×10 ⁻⁷ | 2.21×10 ⁻⁷ | 1.06×10 ⁻⁶ | 2.09×10 ⁻⁶ |
| | M | 1.83×10 ⁻¹¹ | 7.62×10 ⁻⁸ | 1.73×10 ⁻¹⁰ | 7.19×10 ⁻⁷ | 4.32×10 ⁻¹¹ | 5.99×10 ⁻⁸ | 4.08×10 ⁻¹⁰ | 5.65×10 ⁻⁷ | 4.65×10 ⁻¹¹ | 3.87×10 ⁻⁸ | 4.40×10 ⁻¹⁰ | 3.65×10 ⁻⁷ | 1.13×10 ⁻⁷ | 1.91×10 ⁻⁷ | 1.23×10 ⁻⁶ | 1.81×10 ⁻⁶ |

