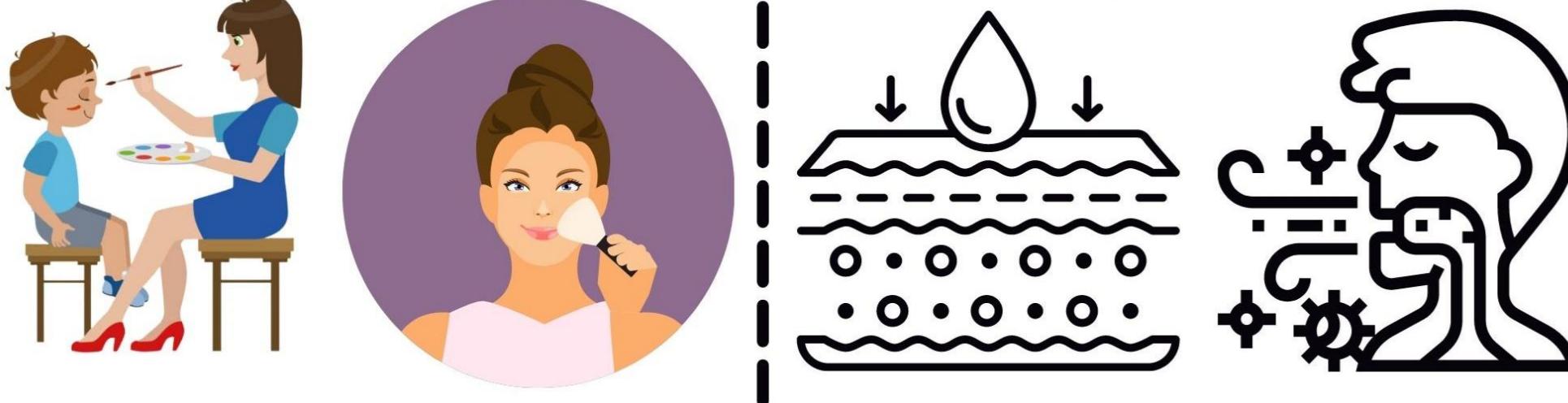


Introduction:



Objective:

To estimate cancer and non-cancer risks for potentially toxic elements concentrations in face paints and pancakes. (PTEs: Al, As, Ba, Cd, Co, Cr, Cu, Ni, Pb, Sb, Sn, and Sr) considering dermal and oral exposure scenarios for children and adults.

Methods:

Face paints and pancakes samples
(n= 95; different brands, textures, and colors).



Purchased at the largest popular trade center in the city of São Paulo, Brazil.



HNO₃ overnight



Digester Block



ICP-MS

Results:

Table 1. Number of samples, geometric mean (GM), minimum and maximum values and 95th percentile for each potentially toxic element (PTE) determined in face paints and pancakes

PTEs mg/kg	Face paints				Pancakes			
	n	mean	min- max	95 th Percentile	n	mean	min- max	95 th Percentile
Al	80	1420.71	5.91 - 19325.04	9703.04	5	5082.81	490.49 - 20717.28	20717.28
As	87	0.19	0.01 - 1.69	0.76	5	0.43	0.08 - 1.24	1.24
Ba	88	173.42	0.70 - 33700.51	1074.37	5	27.57	3.42 - 72.97	0.21
Cd	67	0.03	0.000004 - 0.25	0.12	4	0.21	0.01 - 0.40	0.40
Co	89	0.02	0.002 - 0.15	0.05	5	0.46	0.04 - 1.01	1.01
Cr	90	0.64	0.09 - 5.32	2.58	5	12.15	1.04 - 22.63	22.63
Cu	63	67.77	0.002 - 946.71	646.73	5	4.78	0.10 - 9.92	9.92
Ni	89	0.28	0.45 - 1.24	0.79	5	3.03	0.27 - 8.27	8.27
Pb	87	0.43	0.011 - 2.99	1.65	5	4.05	0.52 - 11.69	72.97
Sb	72	0.07	0.0002 - 2.65	0.24	4	0.02	0.0007 - 0.06	0.06
Sn	69	0.12	0.00004 - 1.11	0.38	5	0.26	0.003 - 0.95	0.95
Sr	87	81.93	0.11 - 328.64	258.19	5	4.28	0.50 - 11.21	11.21

Pancakes exposure scenarios showed higher risks values than face paint.

The highest contributions to the total risk was from As and Cr.

Children:

- The cancer risk ranged between 10^{-6} to 10^{-4} .
- 1×10^{-6} = target value for U.S. Environmental Protection Agency.
- High values regarding the risk per ingestion.

Adults:

- Cancer risks ranged between 10^{-2} and 10^{-4} .
- 1×10^{-4} = maximum value for National Institute for Occupational Safety and Health of U.S.
- Highest values from dermal exposure.
- Non-cancer risks > 1 for dermal exposure considering cardiovascular and dermal effects.

Conclusions:

Results suggest that the content of PTEs in cosmetics needs to be regulated to protect human health, especially considering products for children's use and continuous use for professional consumption.

The frequent use of these cosmetics, chronic exposure, and the lack of legislation are a concern.