

**Underestimated bisphenol exposures: Letter to the editor on “Monitoring of
bisphenol A and bisphenol S in thermal paper receipts from the Italian market and
estimated transdermal human intake: A pilot study”**

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We read an article by Russo et al. (2017) published in this journal. The authors analyzed bisphenol A (BPA) and bisphenol S (BPS) in thermal paper receipts from Italian market. We think the chemical analysis was appropriately conducted while the exposure assessment may have errors.

Russo et al. used estimate daily intake (EDI) formula proposed by Liao and Kannan (2012) as:

$$EDI \text{ (ng/day/70kg)} = \frac{k \cdot C \cdot HF \cdot HT \cdot AF}{10^6}$$

where k is paper-to-skin transfer coefficient (21,522.4 ng/s); C is the bisphenol concentration (µg/g) in receipts; HF is handling frequency (150 times/day for occupational exposure); HT is the receipt-handling time (5 s); AF is the absorption fraction by skin (27%).

In the Table 2 of the article (Russo et al., 2017), the EDIs were shown. For example, sample no. 1 had BPA concentration at 0.274 µg/100 mg receipt and the EDI was described at 1.19 ng/day/70 kg. However, we recalculated it as followed:

$$EDI \text{ (ng/day/70kg)} = \frac{21522.4 \cdot 2.74 \cdot 150 \cdot 5 \cdot 0.27}{10^6} = 11.9$$

We recalculated EDIs of BPA for all samples (Table 1) and found that all the EDIs were 10-fold high compared with the values shown in the original article. Similar results are also found for BPS. We suspect that the authors erroneously calculated EDIs by using the BP concentrations in “µg/100 mg”. This caused an underestimation of exposure to BPs. We recommend that authors of the article will review the data and take corrective actions.

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Competing interests

The authors declare no conflict of interest. The funders had no role in the writing of the manuscript.

Author contributions

Conceptualization, T.F. and K.H.H.; formal analysis, T.F.; writing—original draft preparation, T.F.; writing—review and editing, K.H.H.; funding acquisition, K.H.H. All authors have read and agreed to the published version of the manuscript.

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61 Table 1

62 Comparison of estimated BPA daily intake (EDI) for the occupationally exposed

63 individuals between our calculations and those by Russo et al. (2017)

Sample no.	BPA EDI (ng/day)	
	Our result	Russo et al. (2017)
1	11.9	1.19
2	n.d.	n.d.
3	5.93	0.593
4	4.84	0.484
5	n.d.	n.d.
6	n.d.	n.d.
7	n.d.	n.d.
8	n.d.	n.d.
9	n.d.	n.d.
10	n.d.	n.d.
11	17.2	1.72
12	n.d.	n.d.
13	n.d.	n.d.
14	n.d.	n.d.
15	n.d.	n.d.
16	n.d.	n.d.
17	24.8	2.48
18	9.02	0.902
19	n.d.	n.d.
20	40.6	4.06
21	n.d.	n.d.
22	n.d.	n.d.
23	8.37	0.837
24	11.2	1.12
25	n.d.	n.d.
26	1.67	0.167
27	1.38	0.138
28	13700	1370

29	1290	128
30	1360	136
31	2030	203
32	1830	183
33	42.1	4.21
34	2.79	0.279
35	1160	116
36	119	11.9
37	19.1	1.91
38	937	93.7
39	342	34.2
40	n.d.	n.d.
41	n.d.	n.d.
42	9.11	0.911
43	14.5	1.45
44	n.d.	n.d.
45	22000	2200
46	23900	2390
47	n.d.	n.d.
48	n.d.	n.d.
49	43.3	4.33
50	66800	6680

n.d.: not determined