

CORRECTION

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Correction: Determination of metal ion content of beverages and estimation of target hazard quotients: a comparative study

Theresa Hague¹, Andrea Petroczi¹, Paul LR Andrews², James Barker³, Declan P Naughton^{1*}**Abstract**

This is a correction to the following paper: Hague T, Petroczi A, Andrews PR, Barker J, Naughton DP: Determination of metal ion content of beverages and estimation of target hazard quotients: a comparative study. *Chem Central J* 2008, 2:13.

Correction

During preparation of a subsequent paper, we observed a computational error in the Target Hazard Quotients (THQ) listed in this work which have been inadvertently overestimated [1]. The overall results and conclusion of our paper with the corrected figures have remained valid. Corrections for Figures three, four and five; and Additional file three are given below in tabular form. The correct values with EFr = 365 days, $ED_{\text{tot-male}} = 63.9$ years and $ED_{\text{tot-female}} = 66.7$ years; $BW_{\text{male}} = 83.11$ kg, $BW_{\text{female}} = 69.81$ kg, AT = 6 years and 30 years (non-carcinogenic) are shown in Tables 3 and 4. In keeping with the conclusion published, THQ values of apple juice and stout have remained below 1 (Tables 1 and 2), whereas the combined THQ values for red wine

(both intact and ultrafiltered) have exceeded the cutoff value of 1, mainly owing to high V values (Tables 3 and 4). Although in keeping with the literature, THQ values were calculated for AT = 30 years, given the effect metals are assumed to have on health and delayed onset, AT is likely to be below 30 years.

As noted in the paper, the THQ values calculated are concerning in that they are mainly above the safe level of $THQ \leq 1$, which premise holds for the wine with the adjusted THQ values. It must be emphasized that the THQ value is to be judged as either below or above 1, where any value above 1 is a cause for health concern. It is notable that i) choices in value input into averaging time (AT), ii) uncertainty factor regarding the oral reference dose (RfD) and iii) bioavailability can have signifi-

Table 1 Corrected THQ values for apple juice and stout (AT = 6 years)

| Metal | THQ apple juice (male) | THQ apple juice (female) | THQ stout (male) | THQ Stout (female) |
|----------|------------------------|--------------------------|------------------|--------------------|
| V | 0.0092 | 0.0114 | 0.0365 | 0.0434 |
| Cr * | 0.0046 | 0.0057 | 0.0039 | 0.0046 |
| Mn * | 0.0690 | 0.0858 | 0.0278 | 0.0331 |
| Ni | 0.0103 | 0.0128 | 0.0006 | 0.0007 |
| Cu | 0.0313 | 0.0389 | 0.0089 | 0.0106 |
| Zn | 0.0111 | 0.0138 | 0.0025 | 0.0030 |
| Pb | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Σ | 0.1355 | 0.1684 | 0.0802 | 0.0955 |

* above working range

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Table 2 Corrected THQ values for apple juice and stout (AT = 30 years)

| Metal | THQ apple juice (male) | THQ apple juice (female) | THQ stout (male) | THQ Stout (female) |
|-------|------------------------|--------------------------|------------------|--------------------|
| V | 0.0018 | 0.0023 | 0.0073 | 0.0087 |
| Cr * | 0.0009 | 0.0011 | 0.0008 | 0.0009 |
| Mn * | 0.0138 | 0.0172 | 0.0056 | 0.0066 |
| Ni | 0.0021 | 0.0026 | 0.0001 | 0.0001 |
| Cu | 0.0063 | 0.0078 | 0.0018 | 0.0021 |
| Zn | 0.0022 | 0.0028 | 0.0005 | 0.0006 |
| Pb | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Σ | 0.0271 | 0.0337 | 0.0160 | 0.0191 |

Table 3 Corrected THQ values for intact and ultrafiltered red wine (AT = 6 years)

| Metal | THQ intact (male) | THQ Intact (female) | THQ ultrafiltered (male) | THQ ultrafiltered (female) |
|-------|-------------------|---------------------|--------------------------|----------------------------|
| V | 4.5114 | 5.6063 | 4.0552 | 5.0393 |
| Cr * | 0.0213 | 0.0265 | 0.0241 | 0.0300 |
| Mn * | 0.5620 | 0.6984 | 0.5454 | 0.6778 |
| Ni | 0.0496 | 0.0617 | 0.0422 | 0.0525 |
| Cu | 0.2429 | 0.3018 | 0.0189 | 0.0234 |
| Zn | 0.1250 | 0.1553 | 0.1258 | 0.1564 |
| Pb | 0.0001 | 0.0002 | 0.0000 | 0.0000 |
| Σ | 5.5125 | 6.8502 | 4.8117 | 5.9794 |

Table 4 Corrected THQ values for intact and ultrafiltered red wine (AT = 30 years)

| Metal | THQ intact (male) | THQ Intact (female) | THQ ultrafiltered (male) | THQ ultrafiltered (female) |
|-------|-------------------|---------------------|--------------------------|----------------------------|
| V | 0.9023 | 1.1213 | 0.8110 | 1.0079 |
| Cr * | 0.0043 | 0.0053 | 0.0048 | 0.0060 |
| Mn * | 0.1124 | 0.1397 | 0.1091 | 0.1356 |
| Ni | 0.0099 | 0.0123 | 0.0084 | 0.0105 |
| Cu | 0.0486 | 0.0604 | 0.0038 | 0.0047 |
| Zn | 0.0250 | 0.0311 | 0.0252 | 0.0313 |
| Pb | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Σ | 1.1025 | 1.3700 | 0.9623 | 1.1959 |

* above working range

cant effect on the THQ value. The THQ is designed to be a conservative estimate. However, further research is required in order to provide guidance on appropriate value choices.

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Competing interests

The authors declare that they have no competing interests.

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1. Hague T, Petroczi A, Andrews PR, Barker J, Naughton DP: Determination of metal ion content of beverages and estimation of target hazard quotients: a comparative study. *Chem Central J* 2008, **2**:13.

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