# Phthalate esters in tap water: daily exposure and cumulative health risk assessment in children, lactating mothers, pregnant and nonpregnant women

## SUPPLIMENTARY INFORMATION

**Table S1.** values of reference dose (RfDs) sources.

| Reference sources | DBP | DEHP | DiNP |
|---|---|---|---|
| | µg/kg/bw/d | µg/kg/bw/d | µg/kg/bw/d |
| EFSA TDI | 10 | 50 | 150 |
| US EPA RfDs | 100 | 20 | 115 |
| RfDAA | 150 | 30 | 1500 |
| NEW RfD AA | 6.7 | 10 | 59 |

Source EFSA (2005a, 2005b, 2005c); USEPA (2012) Kortenkamp and Faust (2010) and Kortenkamp and Koch (2020).

**Table S2.** body weight values and daily water consumption use for model input.

| Group | Body weight (kg) | Amount of water consumption (liter) |
|---|---|---|
| Infant | 5 | 0.75 |
| Pregnant women | 66.3 | 3.0 |
| Lactating mother | 60 | 3.8 |
| Nonpregnant woman | 58 | 2 |

Source: Exposure Factors Handbook (EFH) and the Panel on Dietary Reference Intakes for Electrolytes, and Water by Institute of Medicine (US) (U.S.EPA 2011; DRI 2006).

**Table S3.** Spearman correlation matrix of individual PAEs concentration and total PAEs in raw water.

| **Spearman correlation matrix** | | | | |
|---|---|---|---|---|
| **PAEs** | ***DBP*** | ***DEHP*** | ***DiNP*** | ***∑PAEs*** |
| **DBP** | 1 | | | |
| **DEHP** | 0.246 | 1 | | |
| **DiNP** | 0.014 | 0.656* | 1 | |
| **∑PAEs** | 0.518 | 0.869** | 0.804** | 1 |

*** Correlation is significant at the 0.05 level *(2-tailed)*.**

**** Correlation is significant at the 0.01 level *(2-tailed)*.**

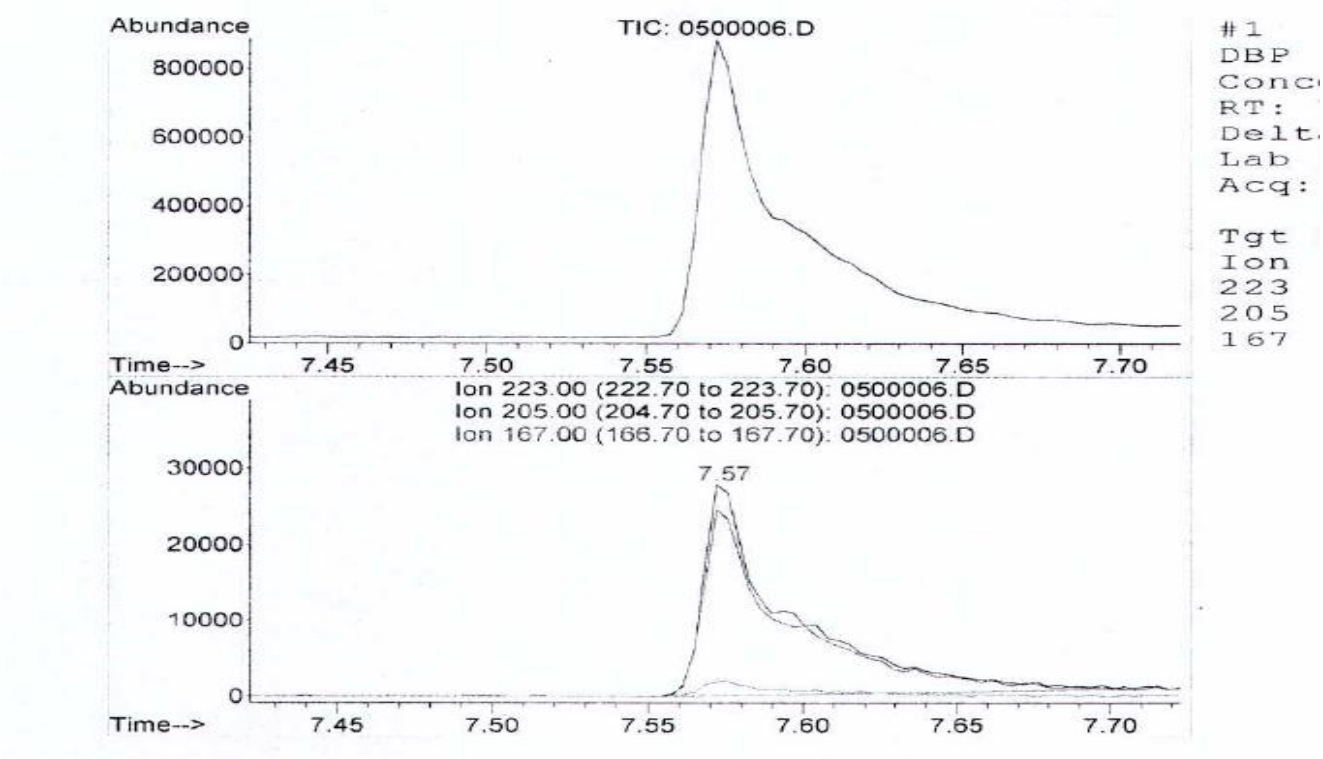



**Figure S1.** Chromatograph of DBP in water samples.

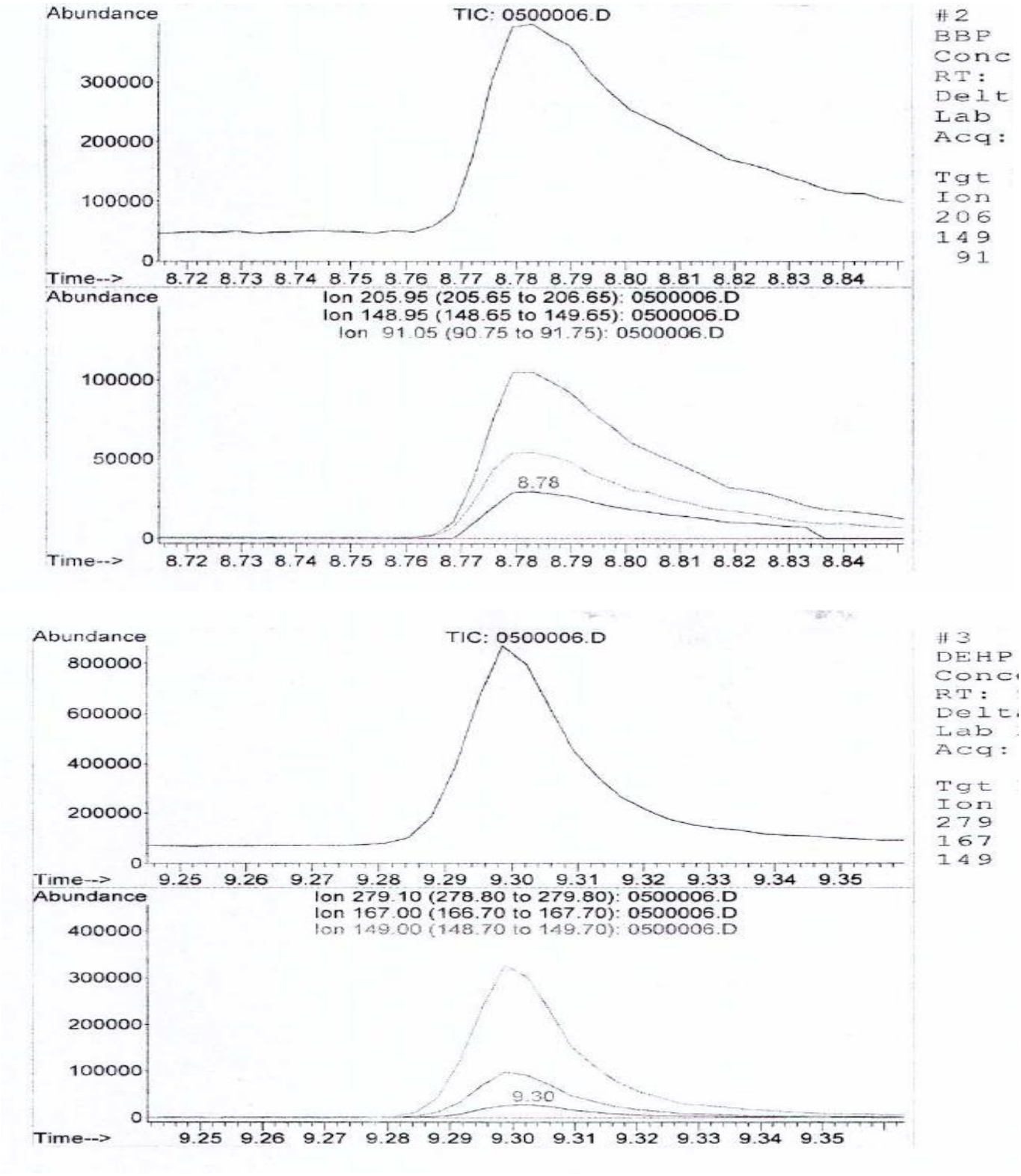



**Figure S2.** Chromatrograph of BBP and DEHPin water samples.

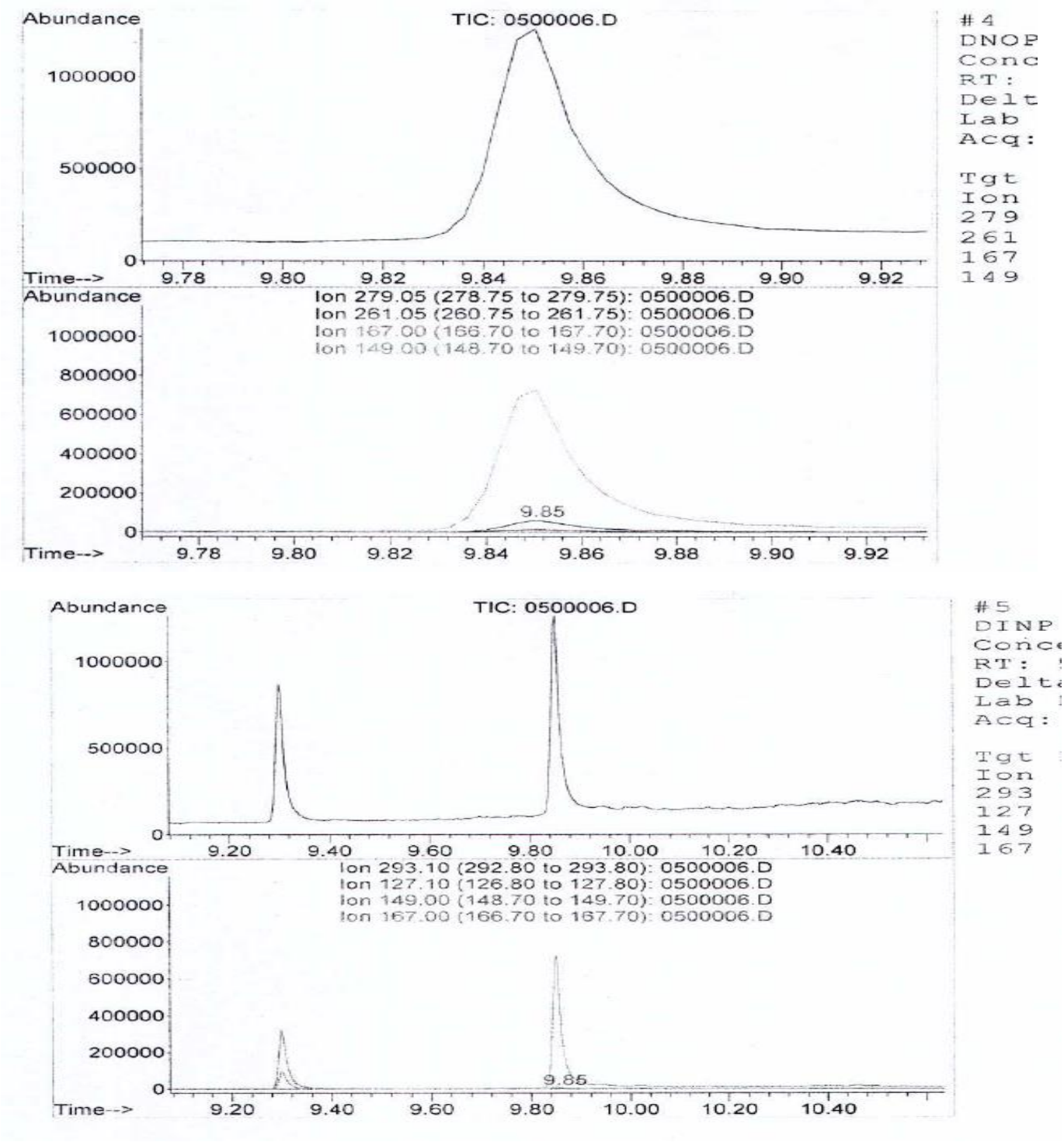



**Figure S3.** Chromatograph of DnOP and DiNP in water samples.

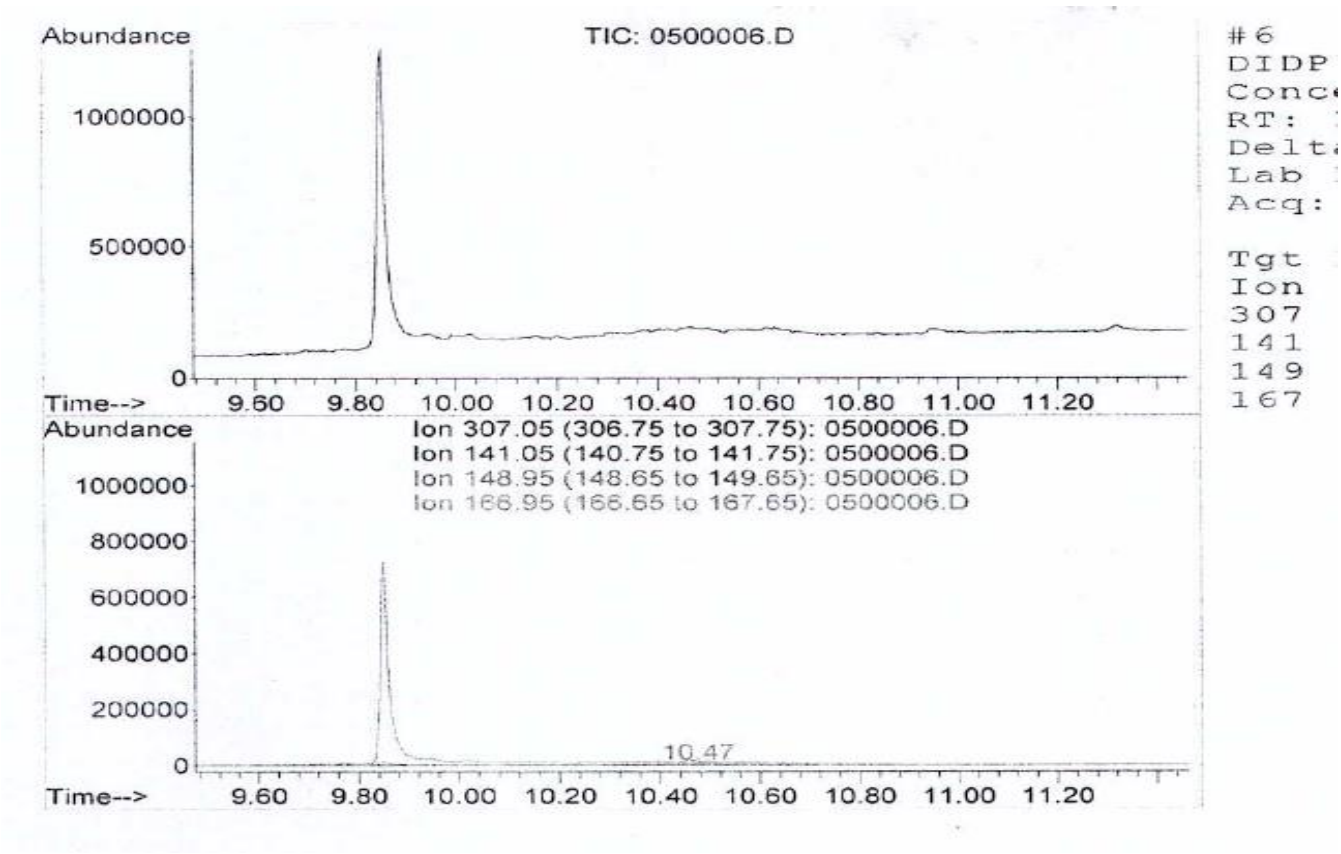



**Figure S4.** Chromatograph of DIDP in water samples.

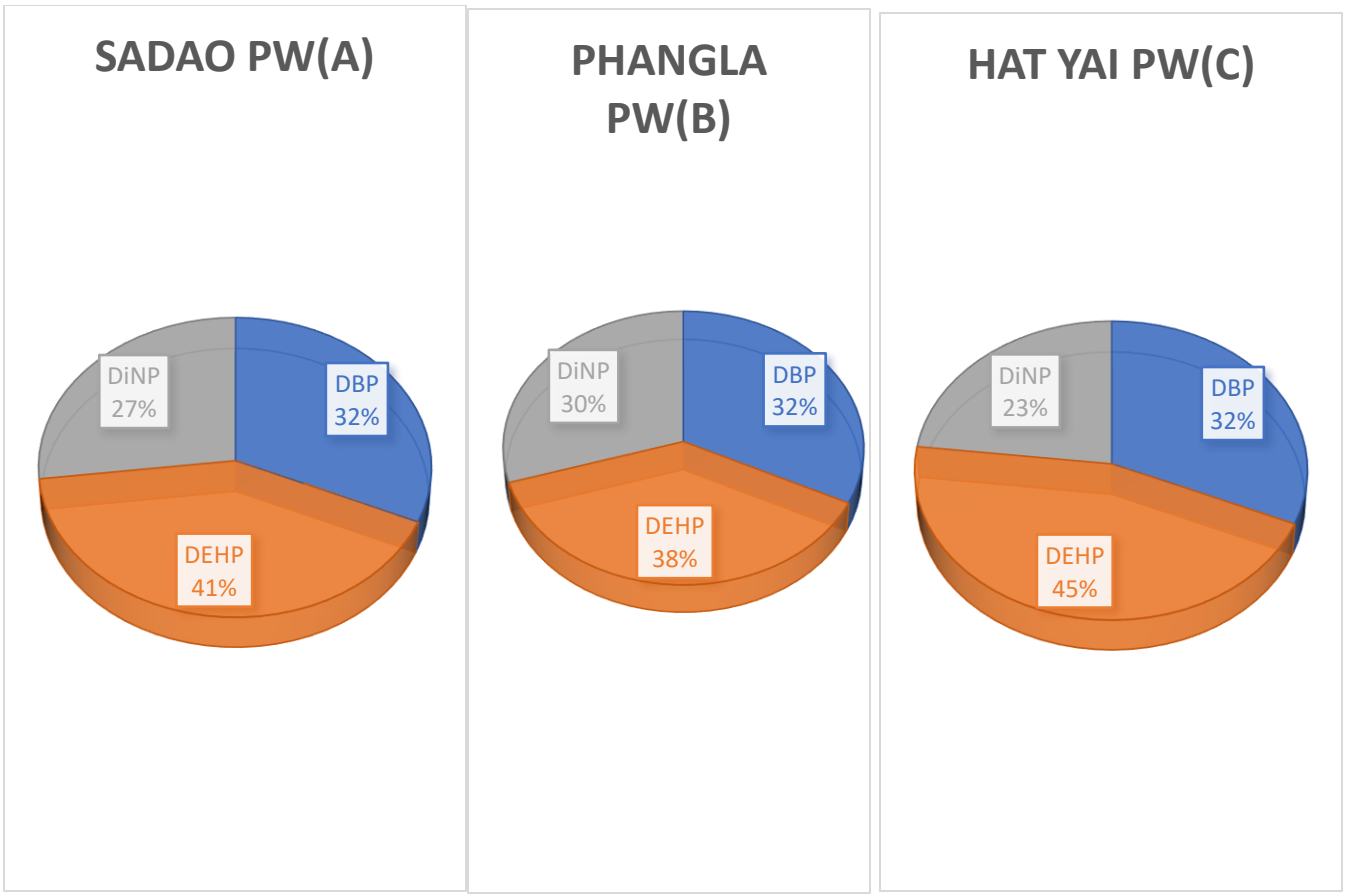



**Figure S5.** (**A–C**) PAEs composition of the raw water samples in investigated provincial waterworks.

**Table S4.** Removal efficiency of PAEs in conventional water treatment plants (μg/L).

| PAEs | SADAO PW | PHANGLA PW | HAT YAI PW |
|---|---|---|---|
| DBP | 1.26 (61.8%) | 1.14(62.6%) | 2.29(68.2%) |
| DEHP | 1.70(63.4%) | 1.29(60.3%) | 3.24(66.9%) |
| DiNP | 1.10 (63.2%) | 1.16(69.1%) | 1.48(59.9%) |
| BBP | ND | ND | ND |
| DnOP | ND | ND | ND |
| DIDP | ND | ND | ND |

PW: Provincial waterworks; ND: non-detectable.

**Table S5.** PAEs concentrations in tap water.

| PAEs | SADAO PW (µg/L) | | | PANGLA PW (µg/L) | | | HAT YAI PW (µg/L) | | |
|---|---|---|---|---|---|---|---|---|---|
| | min | max | mean±SD | min | max | mean±SD | mini | max | mean±SD |
| DBP | ND | 0.78 | 0.63±0.14 | ND | 0.68 | 0.54±0.12 | ND | 1.07 | 0.75±0.21 |
| DEHP | 0.59 | 0.98 | 0.81±0.17 | 0.53 | 0.85 | 0.69±0.16 | 1.02 | 1.24 | 1.12±0.09 |
| DiNP | ND | 0.64 | 0.58±0.08 | ND | 0.52 | 0.48±0.08 | ND | 0.99 | 0.79±0.18 |
| BBP | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DnOP | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIDP | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ∑PAEs | 0.59 | 2.40 | 1.98±0.39 | 0.53 | 2.05 | 1.71±0.36 | 1.02 | 3.30 | 2.62±0.48 |

PW: Provincial waterworks; ND: non-detectable.

## References


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