**Supplementary information**

**CHARACTERIZATION AND HEALTH RISK ASSESSMENT OF INDOOR DUST IN BIOMASS AND LPG BASED HOUSEHOLDS OF RURAL TELANGANA, INDIA**

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**Contents**

**Table S1**: Comparison of data collected through Census (2011) and questionnaire survey (2016) on fuel usage for cooking and heating activities in study area

**Table S2**: Wavelengths (ʎ), background equilibrium concentrations (BEC), detection limits (DL) and recovery rate for elements analysed using ICP-OES

**Table S3**: Results of ANOVA comparing the fuel-types

**Supplementary text S2:** Calibration methodology and detection limits of elements in indoor dust

**Table S1**: Comparison of data collected through Census (2011) and questionnaire survey (2016) on fuel usage for cooking and heating activities in study area

|  |  |  |
| --- | --- | --- |
| **Fuel** | **Census (2011)** | **Questionnaire survey (2016)** |
| Fire-wood | 80.5 | 59 |
| Crop residue | 0.7 | 10 |
| Cow dung cake | 0.2 | 0.2 |
| Kerosene | 0.3 | 0 |
| LPG/PNG | 17.7 | 30 |
| Electricity | 0 | 0 |
| Biogas | 0 | 0 |

**Supplementary text S2:** Calibration methodology, detection limits and recovery rate of elements in indoor dust

Standards for ICP-OES were prepared from E.merck multi element stock solutions for the elements listed in table 1. Standards of each elements were aspirated in the argon plasma in an ascending order of their concentration and the calibration graphs were constructed. Calibration graph is the plot between intensity of emission and the standard concentration. The unknown samples were also spiked in argon plasma and the corresponding intensity of emission were interpolated to the concentration axis via the calibration graph to obtain the exact sample concentration. The wavelengths selected for the analysed elements along with background equilibrium concentration (BEC) and detection limit (DL) are listed in table S2. Any deviation in the instrument was checked in the beginning and end of each measured element.

**Table S2 (a):** Wavelengths (ʎ), background equilibrium concentrations (BEC), detection limits (DL) for elements analysed using ICP-OES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element | Wavelength ʎ(nm) | BEC(µg/ml) | DL( µg/ml) | Recovery Rate (%) |
| Al | 396.153 | 0.95 | 0.028 | 86-120 |
| Co | 228.802 | 0.09 | 0.0027 | 79-107 |
| Cr | 267.716 | 0.24 | 0.0071 | 89-109 |
| Fe | 238.204 | 0.15 | 0.0046 | 85-115 |
| Mn | 257.61 | 0.05 | 0.0014 | 80-112 |
| Ni | 231.604 | 0.53 | 0.015 | 88-110 |
| Pb | 220.353 | 1.43 | 0.042 | 86-110 |
| Zn | 206.2 | 0.2 | 0.0059 | 83-121 |

The recovery rate of elements were not analysed for the indoor dust samples of the study. Thus, to confirm the data we have analysed with known concentrations. The recovery rates was confirmed by performing selected high concentration elements in our study such as Al, Fe and Mn, maintaining same method and conditions. We observed satisfying results and the recovery rate of known concentrations in the table S2 (b). From this it can concluded that maximum recovery rates were expected for the reported data. However, the difference in recovery rate was expected to be due to extraction errors. Senila et al. (2014) also reported similar recovery rates.

**Table S2 (b):** Recovery rate of elements

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | Initial Concentration (mg/l) | Recovery percentage (%) | Standard Recovery percentage (%) range |
| Al | 5 | 98.6 | 86-120 |
| Fe | 5 | 96.4 | 85-115 |
| Mn | 5 | 95.9 | 80-112 |
| Co | - | - | 79-107 |
| Cr | - | - | 89-109 |
| Ni | - | - | 88-110 |
| Pb | - | - | 86-110 |
| Zn | - | - | 83-121 |

Senila, M., Drolc, A., Pintar, A., Senila, L., & Levei, E. (2014). Validation and measurement uncertainty evaluation of the ICP-OES method for the multi-elemental determination of essential and nonessential elements from medicinal plants and their aqueous extracts. *Journal of Analytical Science and Technology*, *5*(1), 37.

**Table S3:** Results of ANOVA comparing the fuel-types

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Al | Co | Cr | Fe | Mn | Ni | Pb | Zn |
| P-value | 0.0117 | 0.0164 | 0.0045 | 0.000004 | **0.1222** | 0.0013 | **0.0524** | 0.0524 |

Statistically there is significant difference in mean concentrations of the Al, Co, Cr, Fe, Ni and Zn elements based on fuel type at 95% confidence level, except for Mn and Pb.