Table S1: Calculation of inorganic Arsenic (i-As) from total As in polished and husked rice.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl.No.** | **Author and year of publication** | **Location** | **Sample Size** | **i-As (%)** |
| **Polished Rice** |
| 1. | Mondal et al.,2021 | India | 29 | 98.4 |
| 2. | Williams et al.,2006 | Bangladesh (different varities) | 3 | 71 |
| 3 | 66 |
| 3 | 60 |
| 3 | 83 |
| 3 | 82 |
| 3 | 81 |
| 3 | 72 |
| 3. | Williams et al.,2005 | India | 15 | 81 |
| Thailand | 12 | 74 |
| Taiwan | 3 | 67 |
| 4. | Rahman et al.,2014 | India | 1 | 98 |
| Pakistan | 1 | 96 |
| 5. | Torres-Escribano et al., 2008 | Thailand | 3 | 68 |
| 6. | Nookabkaew et al., 2013 | Thailand (different locations) | 29 | 61.45 |
| 18 | 60 |
| 22 | 63.25 |
| 8 | 60.48 |
| 7. | Pal et al.,2009 | India | 1 | 95 |
| 8. | Islam et al.,2017 | Bangladesh | 10 | 92 |
| 9. | Roychowdhury, 2008a | India (different locations) | 34 | 88.1 |
| 38 | 90.4 |
| 10. | Roychowdhury et al.,2008b | India | 18 | 90.3 |
| 11. | Chen et al.,2016 | Taiwan (different locations) | 15 | 87.8 |
| 12 | 88.2 |
| 4 | 82.8 |
| 7 | 76.9 |
| 12. | Schoof et al.,1998 | India | 2 | 58 |
| 13. | Meharg et al., 2009 | Bangladesh | 15 | 61.53 |
|  **Weighted Average ± SD** | **80.0 ± 13.13** |
| **Husked Rice** |
| 1. | Schoof et al., 1998 | Taiwan | 1 | 67 |
| 2. | Nookabkaew et al., 2013 | Thailand (different locations) | 19 | 57.54 |
| 5 | 58 |
| 9 | 52.8 |
| 3 | 63.93 |
| 3. | Reid et al., 2021 | Vietnam | 45 | 84 |
| 4. | Sinha and Bhattachryya,2014 | India | 4 | 85 |
| 5. | Chen et al.,2016 | India (different locations) | 2 | 96.5 |
| 4 | 93 |
| 7 | 81 |
|  **Weighted Average ± SD** | **75±13.71** |

Table S2. Extraction methodologies and instrumenttion used for the analysis of soil and rice grain As

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl.No** | **Author and Year** | **Study Site** | **Extraction procedure for soil As** | **Extraction procedure for grain As** | **Instrument used** |
| 1 | Roychowdhury, 2008a | India | Microwave digestion system | Microwave digestion system | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 2 | Roychowdhury et.al,2008b | India | Microwave digestion system | Microwave digestion system | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 3 | Chowdhury et.al.,2018 | India | Digestion with concentrated HNO3-30% H2O2mixture | Digestion with concentrated HNO3-30% H2O2mixture | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 4 | Chowdhury et.al.,2020 | India | Digestion with HNO3 and H2O2(2:1). | Digestion with HNO3 and H2O2(2:1). | Hydride generation atomic absorption spectrophotometer HG-AAS coupled with Vapour Generation Accessory |
| 5 | Biswas et.al.,2018 | India | Heating block digestion procedure | Heating block digestion procedure | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 6 | Bhattacharya et.al.,2010a | India | Tri-acid digestion (HNO3, H2SO4 and HClO4) | Tri-acid digestion (HNO3, H2SO4 and HClO4) | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 7 | Bhattacharya et.al.,2010b | India | Heating block digestion procedure | Heating block digestion procedure | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 8 | Biswas et.al.,2014 | India | Heating block digestion procedure | Heating block digestion procedure | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 9 | Golui et.al.,2017 | India | Aqua-regia as well as extraction with 0.5 M NaHCO3 | Heating block digestion procedure | Atomic Absorption Spectrophotometer with FIAS-400 hydridegeneration system |
| 10 | Mukherjee et.al.,2017 | India | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Atomic Absorption Spectrophotometer with FIAS-400 hydridegeneration system |
| 11 | Rahaman and Sinha,2013 | India | Extraction with 0.5 M NaHCO3 | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Atomic Absorption Spectrophotometer with hydridegeneration system |
| 12 | Sarkar et.al.,2012 | India | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Atomic Absorption Spectrophotometer with FIAS-400 hydridegeneration system |
| 13 | Sinha and Bhattacharyya, 2014 | India | Microwave digestion system | Microwave digestion system | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 14 | Srivastava et.al.,2015 | India | HNO3:30%H2O2:HF (5:1:1) andmicrowave digestion procedure | HNO3:30%H2O2 (5:1) and microwave digestion procedure | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 15 | \*\*Talukder et.al., 2011 | Bangladesh | Heating block digestion procedure | Heating block digestion procedure | Flow injection hydride generationatomic absorption spectrophotometer (FI-HG-AAS) |
| 16 | Dahal et.al., 2008 | Nepal | Nitric acid (65%) followed by hydrogen peroxide (30%) | Nitric acid (65%) followed by perchloric acid (70%), and hydrogenperoxide (30%) | Atomic Absorption Spectrophotometer with FIAS-400 hydridegeneration system |
| 17 | Hsu et.al.,2012 | Taiwan | Digested with aqua regia | Digested using HNO3–H2O2 | Flame atomic absorption spectrophotometer (FAAS) equipped with a flow-injection hydride generator(HG) |
| 18 | \*Rahman et.al.,2014 | Bangladesh | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Atomic Absorption Spectrophotometer with hydride generation system |
| 19 | Rahman et.al.,2007 | Bangladesh | Acid digestion following the heating block digestion procedure | Acid digestion following the heating block digestion procedure | Hydride generation atomic absorption spectrophotometer (HG-AAS) |
| 20 | \*Rahman et.al.,2010 | Bangladesh | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Tri-acid digestion HNO3, HClO4 and H2SO4 in10:4:1(v/v) | Atomic Absorption Spectrophotometer with hydride generation system |
| 21 | van Geen et.al.,2006 | Bangladesh | 1:50 dilution in 2% HNO3 | Heating block digestion procedure | High resolution inductively coupled plasma mass spectrometry (HR ICP-MS) |
| 22 | Islam et.al.,2017 | Bangladesh | Temperature controlled digestionblock procedure | Temperature controlled digestionblock procedure | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 23 | Ahmed et al.,2011 | Bangladesh | Ammonium oxalate extractable As | Digestion with concentrated HNO3-30% H2O2mixture | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 24. | Sharma et al.,2017 | India | Digested with aqua regia | Tri-acid digestion HNO3, HClO4 and H2SO4 in 5:1:1(v/v) | Atomic Absorption Spectrophotometer with vapour generation system |
| 25. | Reid et al., 2021 | Vietnam | X-ray fluorescence | 1% HNO3 extraction followed by heating in water bath | Inductively coupled plasma mass spectrometry (ICP-MS) |
| 26. | Wang et al., 2019 | China | Acid digestion with water, HNO3, HCl in 4:1:3 (v/v) | Microwave digestion with 10 mL of 1% HNO3 | Inductively coupled plasma mass spectrometry (ICP-MS) with HPLC |

\*Reported the use of reagent blank in duplicate

\*\*Followed the method as outlined by Loeppert and Biswas,2002

Table S3. Sub-group analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Generalized Linear Models (n=35)** | AIC | Res-Dev | Null-Dev | Mult-R2 | Adj-R2 |
| GrainAs=258.05+0.38 IrriAs\* -0.29pH -0.32OC +19.43SoilAs\*\*\* | 420.47 | 328551 | 773340 | 0.57 | 0.51 |
| SoilAs=1.30+ 0.003IrriAs +1.03pH-0.01OC | 210.37 | 721.70 | 741.09 | 0.020 | -- |
| **Logistic Regression (n=35)** |
| GrainAs= -1.811+0.003 IrriAs -0.62pH -0.01OC +0.28SoilAs\* | 46.50 | 36.509 | 47.016 | 0.22 | 0.11 |

AIC: Akaike information criterion, Res-Dev: Residual Deviance, Null-Dev: Null Deviance, Multi-R2: Multiple R2, Adj-R2: Adjusted R2

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