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Suppl. Table 1. Rice samples used this study and their characteristics. Note that the same Rice IDs were used in Figure 2a and 3a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Rice ID | Rice type | Description | Grain size classification | Rice culture |
| 1 | Wild | Wild | Long grain | Organic |
| 2 | Wild | Wild | Long grain | Organic |
| 3 | Wild | Wild | Long grain | Organic |
| 4 | Wild | Wild | Long grain | Conventional |
| 5 | Wild | Wild | Long grain | Conventional |
| 6 | Wild | Wild | Long grain | Conventional |
| 7 | Brown | Basmati | Long grain | Organic |
| 8 | Brown | Short grain | Short grain | Organic |
| 9 | Brown | Basmati | Long grain | Conventional |
| 10 | Brown | Long grain | Long grain | Organic |
| 11 | Brown | Basmati | Long grain | Conventional |
| 12 | Brown | Thai | Long grain | Conventional |
| 13 | Brown | Easy cook | Long grain | Conventional |
| 14 | Brown | Long grain | Long grain | Organic |
| 15 | Brown | Short grain | Short grain | Organic |
| 16 | Brown | Basmati | Long grain | Organic |
| 17 | Brown | Long grain | Long grain | Conventional |
| 18 | White | Basmati | Long grain | Organic |
| 19 | White | Thai | Long grain | Organic |
| 20 | White | Arborio | Medium grain | Organic |
| 21 | White | Basmati | Long grain | Organic |
| 22 | White | Arborio | Medium grain | Organic |
| 23 | White | Arborio | Medium grain | Conventional |
| 24 | White | Thai jasmine | Long grain | Conventional |
| 25 | White | Thai sticky | Long grain | Conventional |
| 26 | White | Basmati | Long grain | Conventional |
| 27 | White | Basmati | Long grain | Conventional |
| 28 | White | Long grain | Long grain | Conventional |
| 29 | White | Basmati | Long grain | Organic |
| 30 | White | Arborio | Medium grain | Conventional |
| 31 | White | Easy cook  | Long grain | Conventional |
| 32 | White | Basmati | Long grain | Conventional |
| 33 | White | Everyday value | Long grain | Conventional |
| 34 | White | Basmati | Long grain | Organic |
| 35 | White | Basmati | Long grain | Conventional |
| 36 | White | Arborio | Medium grain | Conventional |
| 37 | White | Arborio | Medium grain | Conventional |
| 38 | White | Pudding rice | Short grain | Conventional |
| 39 | White | Pudding rice | Short grain | Conventional |
| 40 | White | Pudding rice | Short grain | Conventional |
| 41 | White | Pudding rice | Short grain | Conventional |
| 42 | White | Pudding rice | Short grain | Conventional |
| 43 | White | Sushi rice | Short grain | Conventional |
| 44 | White | Sushi rice | Short grain | Conventional |
| 45 | White | Sushi rice | Short grain | Conventional |
| 46 | White | Sushi rice | Short grain | Conventional |
| 47 | White | Sushi rice | Short grain | Conventional |
| 48 | White | Pudding rice | Short grain | Conventional |
| 49 | White | Sushi rice | Short grain | Conventional |
| 50 | White | Sushi rice | Short grain | Conventional |
| 51 | White | Sushi rice | Short grain | Conventional |
| 52 | White | Parboiled | Long grain | Conventional |
| 53 | White | Arborio | Medium grain | Conventional |
| 54 | Brown | Parboiled | Long grain | Conventional |
| 55 | Brown | Basmati | Long grain | Conventional |

Suppl. Table 2. The limit of detection (LoD), the limit of quantification (LoQ) of the ICP-MS and correction factors (CF) used for various nutrients, along with proportion (%) of samples where CF was applied with the actual number of samples in brackets. Please note that the total number of samples analysed for white, brown and wild were 108, 39 and 18. The average recovery of different elements is given in the last column based on the standard reference material (NIST 1586b rice flour).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Nutrient | LoD (mg kg-1) | LoQ  (mg kg-1) | CF(mg kg-1) | Proportion (%) of samples with CF  | The average recovery of elements (%) |
| White | Brown | Wild |
| Ca | 10.3824 | 34.608 | 5.1912 | 43.52 (47) | 2.78 (1) | 50 (9) | 82.28 |
| P | 2.7722 | 9.2241 | 1.3861 |  |  |  | 113.26 |
| Na | 3.2688 | 10.896 | 1.6344 | 40.74 (44) | 2.78 (1) |  | 140.28 |
| Mg | 0.8575 | 2.858 | 0.4288 |  |  |  | 110.49 |
| K | 9.9686 | 33.229 | 4.9843 |  |  |  | 123.97 |
| Zn | 0.2094 | 0.698 | 0.1047 |  |  |  | 97.91 |
| Fe | 0.3209 | 1.070 | 0.1605 | 0.93 (1) |  |  | 90.04 |
| Mn | 0.1019 | 0.340 | 0.0510 |  |  |  | 106.97 |
| Cr | 0.0138 | 0.046 | 0.0069 | 56.48 (61) | 2.78 (1) |  | - |
| Mo | 0.0034 | 0.011 | 0.0017 |  |  |  | 96.90 |
| Se | 0.0005 | 0.002 | 0.0002 |  |  |  |  98.60 |

Suppl. Table 3. Descriptive statistics of the NE determined in different rice types in this study.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Rice type | White | Brown | Wild |  | White | Brown | Wild |
| No of values | 108 | 39 | 18 |  | 108 | 39 | 18 |
|  |  |  |  |  |  |  |  |
| **P (mg kg-1)** | **K (mg kg-1)** |
| Minimum | 180.4 | 410.1 | 4074 | Minimum | 264.3 | 299.7 | 3238 |
| Maximum | 2071 | 4551 | 5086 | Maximum | 2675 | 3706 | 4052 |
| Range | 1890 | 4141 | 1012 | Range | 2411 | 3406 | 813.9 |
| Mean | 1264 | 3767 | 4492 | Mean | 1270 | 3001 | 3669 |
| SD | 353.2 | 606.9 | 217.6 | SD | 440.2 | 512.6 | 257.7 |
| SE | 33.99 | 97.18 | 51.29 | SE | 42.36 | 82.08 | 60.73 |
|  |  |  |  |  |  |  |  |
| **Mg (mg kg-1)** | **Ca (mg kg-1)** |
| Minimum | 38.56 | 172.6 | 1385 | Minimum | 5.191 | 5.191 | 5.191 |
| Maximum | 632.8 | 1989 | 2021 | Maximum | 370.6 | 174.2 | 90.98 |
| Range | 594.2 | 1816 | 636.7 | Range | 365.4 | 169.0 | 85.78 |
| Mean | 321.8 | 1628 | 1630 | Mean | 57.75 | 72.16 | 23.26 |
| SD | 130.3 | 290.1 | 180.3 | SD | 78.73 | 44.68 | 28.01 |
| SE | 12.54 | 46.46 | 42.50 | SE | 7.576 | 7.155 | 6.602 |
|  |  |  |  |  |  |  |  |
| **Na (mg kg-1)** | **Fe (mg kg-1)** |
| Minimum | 1.634 | 1.634 | 15.90 | Minimum | 0.2788 | 1.082 | 12.24 |
| Maximum | 30.02 | 51.20 | 64.01 | Maximum | 13.08 | 33.50 | 18.62 |
| Range | 28.39 | 49.56 | 48.11 | Range | 12.80 | 32.42 | 6.383 |
| Mean | 6.592 | 23.24 | 29.94 | Mean | 3.670 | 16.27 | 15.43 |
| SD | 6.339 | 15.86 | 15.92 | SD | 2.841 | 6.375 | 1.792 |
| SE | 0.6100 | 2.540 | 3.751 | SE | 0.2734 | 1.021 | 0.4224 |
|  |  |  |  |  |  |  |  |
| **Zn (mg kg-1)** | **Mn (mg kg-1)** |
| Minimum | 0.8713 | 1.873 | 26.00 | Minimum | 0.5505 | 2.696 | 12.76 |
| Maximum | 28.98 | 21.25 | 68.23 | Maximum | 16.07 | 34.97 | 22.76 |
| Range | 28.11 | 19.37 | 42.23 | Range | 15.52 | 32.27 | 10.00 |
| Mean | 15.60 | 18.77 | 50.60 | Mean | 9.375 | 25.91 | 15.92 |
| SD | 4.195 | 2.964 | 14.57 | SD | 2.831 | 5.274 | 3.000 |
| SE | 0.4037 | 0.4747 | 3.434 | SE | 0.2724 | 0.8445 | 0.7072 |
|  |  |  |  |  |  |  |  |
| **Cr (mg kg-1)** | **Mo (mg kg-1)** |
| Minimum | 0.006896 | 0.006896 | 0.01449 | Minimum | 0.05036 | 0.04828 | 0.1048 |
| Maximum | 0.4309 | 0.2056 | 0.2001 | Maximum | 1.234 | 1.002 | 5.193 |
| Range | 0.4240 | 0.1987 | 0.1856 | Range | 1.183 | 0.9536 | 5.088 |
| Mean | 0.02692 | 0.08195 | 0.05330 | Mean | 0.6203 | 0.6471 | 0.6672 |
| SD | 0.05198 | 0.06047 | 0.06231 | SD | 0.2325 | 0.1946 | 1.213 |
| SE | 0.005002 | 0.009682 | 0.01469 | SE | 0.02237 | 0.03116 | 0.2858 |
|  |  |  |  |  |  |  |  |
| **Se (mg kg-1)** |  |  |  |  |
| Minimum | 0.007135 | 0.001649 | 0.004122 |  |  |  |  |
| Maximum | 0.2009 | 0.1063 | 0.03475 |  |  |  |  |
| Range | 0.1938 | 0.1046 | 0.03063 |  |  |  |  |
| Mean | 0.05207 | 0.05867 | 0.02046 |  |  |  |  |
| SD | 0.04204 | 0.03224 | 0.01170 |  |  |  |  |
| SE | 0.004045 | 0.005162 | 0.002758 |  |  |  |  |

Suppl. Table 4. Comparison of NEs reported in previous studies and this study. Please note that for the McCance and Widdowson’s food data set, the averages of all white or brown rice types used to calculate average and SD and only an averaged value was available for wild rice.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Surendiran *et al*., (2014)** | **Antoine *et al*., (2012)** | **Pinto *et al*., (2016)** | **McCance and Widdowson’s Food dataset (UK) 2019** | **This study** |
|  | **Wild** | **White****(n=16)** | **Brown****(*n* = 9)** | **White****(*n* = 56)** | **Brown****(*n* = 11)** | **Wild****(*n* = 6)** | **White****(*n* = 61)** | **Brown****(*n* = 18)** | **Wild****(*n* = 5)** | **White****(*n* = 36)** | **Brown****(*n* = 13)** | **Wild****(*n* = 6)** |
|  | **Nutrient Element Concentrations (mg kg-1) with mean ± SD** |
| **P** | 23.6 -50.0 | 1203 ± 714 | 3361 ± 1014 | 958 ± 214 | 2929 ± 262 | 2273 ± 379 | 118.29 ± 23 | 320 ± 9.85 | 377 | 1264 ± 353.2 | 3767 ± 606.9 | 4492 ± 217.6 |
| **K**  | 5.50 - 56.0 | 913 ± 393 | 2157 ± 595 | 483 ± 227 | 2292 ± 295 | 1908 ± 103 | 99.14 ± 30.66 | 233.67 ± 8.62 | 326 | 1270 ± 440.2 | 3001 ± 512.6 | 3669 ± 257.7 |
| **Mg** | 8.00 - 16.1 | 371± 127 | 1205 ± 335 | 225 ± 63 | 1064 ± 87 | 561 ± 98 | 24.57 ± 3.69 | 116.67 ± 2.08 | 108 | 321.80 ± 30.3 | 1628 ± 290.1 | 1630 ± 180.3 |
| **Ca**  | 1.10- 2.5 | 127 ± 141 | 104 ± 37.9 | 32 ± 18 | 64 ± 9 | 238 ± 170 | 12.42 ± 8.26 | 10.00± 1.0 | 8.0 | 57.75 ± 78.73 | 72.16 ± 44.68 | 23.26 ± 28.01 |
| **Na** | 0.13 - 0.6 | 6.0 ± 2.95 | 15.10 ± 13.2 | 8.70 ± 4.4 | 9.10 ± 5.0 | 10.10 ± 2.6 | 1.43 ± 0.79 | 1.50 ± 0.71 | 4.0 | 6.59 ± 6.34 | 23.24 ± 15.86 | 29.94 ± 15.92 |
| **Fe**  | 0.12 - 0.51  | 22.30 ±37.9 | 20.1 ± 7.77 | 6.80 ± 1.5 | 14.00 ± 2.1 | 7.80 ± 1.20 | 0.55 ± 0.58 | 1.70 ± 1.15 | 1.27 | 3.67 ± 2.84 | 16.27 ± 6.38 | 15.43 ± 1.79 |
| **Zn** | 0.12 -1.2 | 15.60 ± 1.9 | 20.2 ± 2.73 | 13.50 ± 3.4 | 15.90 ± 2.3 | 24.70 ± 4.6 | 1.26 ± 0.3 | 1.93 ± 0.15 | 4.3 | 15.60 ± 4.2 | 18.77 ± 2.96 | 50.60 ± 14.57 |
| **Mn** | 0.09 - 0.18 | 10.50 ± 3.68 | 26.5 ± 12.2 | 7.50 ± 1.9 | 21.5 0± 4.4 | 5.50 ± 0.8 | 0.80 ± 0.22 | 2.48 ± 0.93 | 1.17 | 9.38 ± 2.83 | 25.91 ± 5.27 | 15.92 ± 3.0 |
| **Cr**  | 0.01 -0.01 | 0.08 ± 0.04 | 0.16 ± 0.14 | - | - | - |  - | - | - | 0.03 ± 0.05 | 0.08 ± 0.06 | 0.05 ± 0.06 |
| **Mo** | - | 0.79 ± 0.28 | 0.77 ± 0.28 | 0.58 ± 0.29 | 0.38 ± 0.14 | 0.33 ± 0.02  | - | - | - | 0.62 ± 0.24 | 0.65 ± 0.19 | 0.67 ± 1.21 |
| **Se** | - | 0.11 ± 0.07 | 0.13 ± 0.06 | 0.20 ± 0.19 | 0.03 ± 0.02 | 0.12 ± 0.04 | 0.012 ± 0.007 | 0.014 ±0.004 | 0.03 | 0.05 ± 0.04 | 0.06 ± 0.03 | 0.02 ± 0.01 |