**Supplementary material, Tables**

**Table S1** The optimized LC-ESI-MS/MS parameters for the confirmation and quantification of analysed mycotoxins and internal standards used: aflatoxin B1 (AFB1), aflatoxin B2 (AFB2), aflatoxin G1 (AFG1), aflatoxin G2 (AFG2), aflatoxin M1 (AFM1), aflatoxin B1-lysine (AFB1-lysine), and isotope-labelled aflatoxin B1 (13C17 –AFB1).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mycotoxins | Precursor ion (*m/z*) | Product ions (*m/z*) | Collision energy (V) | Mode | Cone voltage (V) | Retention time (min) |
| AFB1 | 313.1 | 269.1/285.1 | 30/20 | + | 30 | 7.5 |
| AFB2 | 315.1 | 259.1/287.1 | 26/23 | + | 40 | 6.8 |
| AFG1 | 329.1 | 243.1/283.1 | 25/25 | + | 30 | 6.1 |
| AFG2 | 329.1 | 243.1/283.1 | 25/25 | + | 30 | 5.7 |
| AFM1 | 329.1 | 259.1/273.1 | 25/22 | + | 30 | 5.9 |
| AFB1-lysine | 457.3 | 310.9/394.2 | 33/20 | + | 30 | 4.5 |
| 13C17 –AFB1 | 330.0 | 285.0/301.0 | 26/22 | + | 40 | 7.9 |

m/z: mass-to-charge ratio; V: Volts; Min: Minutes.

**Table S2** Validation of aflatoxin biomarkers

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Method Validation parameters** | **AFB1** | **AFB2** | **AFG1** | **AFG2** | **AFM1** | **AFB1-lys** |
| range (µg/L) | 0.015-2.00 | 0.015-2.00 | 0.015-2.00 | 0.015-2.00 | 0.015-2.00 |  |
| cut-off (x) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |  |
| LOD (µg/L) | 0.017 | 0.005 | 0.005 | 0.0002 | 0.004 | 0.015 |
| LOQ (µg/L) | 0.064 | 0.022 | 0.018 | 0.007 | 0.011 | 0.035 |
| MU (0.25x) (%) | 121.2 | 119.9 | 114.3 | 109.5 | 115.9 |  |
| MU (0.5x) (%) | 117.4 | 115.1 | 111.5 | 109.9 | 118.7 |  |
| MU (1x) (%) | 113.9 | 114.1 | 112.3 | 114.8 | 114.4 |  |
| MU (2x) (%) | 104.8 | 106.7 | 107.1 | 103.9 | 106.9 |  |
| MU (4x) (%) | 106.7 | 107.9 | 103.1 | 99.7 | 107.2 |  |

µg/L=microgram/liter ; LOD=limit of detection; LOQ=Limit of Quantitation; MU=maximun lmit; AFB1-lys: Aflatoxin B1-lysine; AFB1: Aflatoxin B1; AFB2: Aflatoxin B2; AFG1: Aflatoxin G1; AFG2:Aflatoxin G2; AFM1:Aflatoxin M1.

**Table S3** Spearman's correlations among aflatoxins, inflammation, protein biomarkers and growth in children during the pre-harvest season

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **HAD** | **HAZ** | **WHZ** | **AFB1 (µg/L)** | **AFB2 (µg/L)** | **AFG1 (µg/L)** | **AFG2 (µg/L)** | **AFM1 (µg/L)** | **AFB1lys (µg/L)** | **AGP (g/L)** | **CRP (mg/L)** | **Serum transthyretin (g/L)** | **Serum IGF-1 (ng/mL)** | **Serum tryptophan (µmol/L)** |
| HAZ | r | 0.95\*\* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WHZ | r | 0.1 | 0.19\* |  |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.05 | 0.05 |  |  |  |  |  |  |  |  |  |  |  |  |
| AFB1 (µg/L) | r | 0.13 | 0.14 | 0.002 |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.20 | 0.15 | 0.98 |  |  |  |  |  |  |  |  |  |  |  |
| AFB2 (µg/L) | r | 0.04 | 0.07 | -0.13 | 0.63\*\* |  |  |  |  |  |  |  |  |  |  |
| sig | 0.69 | 0.48 | 0.21 | 0.00 |  |  |  |  |  |  |  |  |  |  |
| AFG1 (µg/L) | r | 0.02 | 0.04 | -0.04 | -0.01 | 0.273\*\* |  |  |  |  |  |  |  |  |  |
| sig | 0.84 | 0.68 | 0.69 | 0.93 | 0.005 |  |  |  |  |  |  |  |  |  |
| AFG2 (µg/L) | r | 0.07 | 0.087 | -0.09 | 0.41\*\* | 0.559\*\* | 0.38\*\* |  |  |  |  |  |  |  |  |
| sig | 0.48 | 0.44 | 0.32 | 0.00 | .000 | 0.00 |  |  |  |  |  |  |  |  |
| AFM1 (µg/L) | r | 0.10 | 0.11 | -0.03 | -0.135 | -0.072 | 0.09 | -0.08 |  |  |  |  |  |  |  |
| sig | 0.29 | 0.27 | 0.74 | 0.21 | 0.475 | 0.38 | 0.43 |  |  |  |  |  |  |  |
| AFB1lys (µg/L) | r | 0.11 | 0.10 | 0.13 | 0.06 | 0.010 | -0.08 | -0.004 | 0.04 |  |  |  |  |  |  |
| sig | 0.26 | 0.31 | 0.18 | 0.49 | 0.920 | 0.40 | 0.97 | 0.72 |  |  |  |  |  |  |
| AGP (g/L) | r | -0.13 | -0.13 | -0.06 | -0.05 | -0.133 | -0.05 | -0.17 | -0.06 | -0.05 |  |  |  |  |  |
| sig | 0.19 | 0.21 | 0.52 | 0.59 | 0.181 | 0.59 | 0.10 | 0.55 | 0.66 |  |  |  |  |  |
| CRP (mg/L) | r | -0.03 | -0.04 | -0.001 | -0.03 | -0.041 | 0.03 | 0.04 | -0.14 | 0.10 | 0.49\*\* |  |  |  |  |
| sig | 0.75 | 0.69 | 0.99 | 0.74 | 0.682 | 0.80 | 0.69 | 0.18 | 0.32 | 0.00 |  |  |  |  |
| Serum transthyretin (g/L) | r | 0.07 | 0.13 | 0.08 | -0.03 | 0.066 | -0.01 | 0.12 | 0.01 | 0.08 | -0.30\*\* | -0.33\*\* |  |  |  |
| sig | 0.43 | 0.21 | 0.39 | 0.79 | 0.507 | 0.88 | 0.22 | 0.94 | 0.42 | 0.002 | 0.001 |  |  |  |
| Serum IGF-1 (ng/mL) | r | 0.06 | 0.08 | 0.22\* | 0.11 | 0.046 | 0.01 | 0.09 | -0.01 | 0.11 | -0.25\* | -0.02 | 0.36\*\* |  |  |
| sig | 0.52 | 0.42 | 0.03 | 0.28 | 0.646 | 0.95 | 0.37 | 0.93 | 0.29 | 0.01 | 0.83 | 0.000 |  |  |
| Serum tryptophan (µmol/L) | r | 0.21\* | 0.15 | -0.06 | 0.10 | 0.003 | -0.02 | 0.11 | 0.01 | -0.08 | -0.23\* | 0.000 | 0.05 | -0.06 |  |
| sig | 0.04 | 0.13 | 0.49 | 0.29 | 0.975 | 0.86 | 0.28 | 0.92 | 0.46 | 0.02 | 0.10 | 0.63 | 0.56 |  |
| Serum lysine (µmol/L) | r | 0.065 | 0.05 | -0.04 | -0.107 | -0.081 | 0.07 | 0.07 | 0.12 | -0.06 | -0.06 | 0.09 | 0.04 | -0.05 | 0.44\*\* |
| sig | 0.518 | 0.61 | 0.63 | 0.28 | 0.420 | 0.47 | 0.47 | 0.23 | 0.56 | 0.56 | 0.39 | 0.67 | 0.65 | 0.00 |

\*\*\*: p < 0.001, \*\*: p < 0.01, \* p < 0.05. HAZ: Height-for-age Z-score; HAD: Height‐for‐age difference; WHZ: Weight-for-height Z-scores. IGF-1: Insulin-like growth factor 1; AFB1-lys: Aflatoxin B1-lysine; AFB1: Aflatoxin B1; AFB2: Aflatoxin B2; AFG1: Aflatoxin G1; AFG2:Aflatoxin G2; AFM1:Aflatoxin M1; CRP: C-reactive protein; AGP: α-1-glycoprotein protein. g/L=gram/liter, µmol/L =micromole/liter; mg/L =milligram/liter; g/L =gram/liter; ng/mL=nanogram/millilitre.

**Table S4** Spearman's correlations among aflatoxins, inflammation, protein biomarkers, and growth in children during the post-harvest season

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | HAD | HAZ | WHZ | AFB1 (µg/L) | AFB2 (µg/L) | AFG1 (µg/L) | AFG2 (µg/L) | AFM1 (µg/L) | AFB1lys (µg/L) | AGP (g/L) | CRP (mg/L) | Serum transthyretin (g/L) | Serum IGF-1 (ng/mL) | Serum tryptophan (µmol/L) |
| HAZ | r | 0.97\*\* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WHZ | r | 0.17 | 0.214\* |  |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.08 | 0.031 |  |  |  |  |  |  |  |  |  |  |  |  |
| AFB1 (µg/L) | r | -0.12 | -0.126 | -0.14 |  |  |  |  |  |  |  |  |  |  |  |
| sig | 0.23 | 0.206 | 0.16 |  |  |  |  |  |  |  |  |  |  |  |
| AFB2 (µg/L) | r | -0.19 | -0.19 | 0.03 | 0.43\*\* |  |  |  |  |  |  |  |  |  |  |
| sig | 0.06 | 0.05 | 0.75 | 0.00 |  |  |  |  |  |  |  |  |  |  |
| AFG1 (µg/L) | r | 0.08 | 0.05 | 0.15 | 0.25\* | 0.13 |  |  |  |  |  |  |  |  |  |
| sig | 0.44 | 0.61 | 0.13 | 0.013 | 0.19 |  |  |  |  |  |  |  |  |  |
| AFG2 (µg/L) | r | -0.07 | -0.09 | -0.12 | 0.49\*\* | 0.65\*\* | 0.12 |  |  |  |  |  |  |  |  |
| sig | 0.49 | 0.35 | 0.25 | 0.00 | 0.00 | 0.23 |  |  |  |  |  |  |  |  |
| AFM1 (µg/L) | r | 0.00 | 0.01 | 0.06 | 0.04 | 0.12 | -0.05 | 0.05 |  |  |  |  |  |  |  |
| sig | 0.99 | 0.90 | 0.58 | 0.66 | 0.23 | 0.65 | 0.59 |  |  |  |  |  |  |  |
| AFB1lys (µg/L) | r | 0.08 | 0.06 | 0.07 | 0.20\* | 0.13 | 0.10 | 0.19 | 0.27\*\* |  |  |  |  |  |  |
| sig | 0.39 | 0.58 | 0.47 | 0.04 | 0.20 | 0.33 | 0.05 | 0.01 |  |  |  |  |  |  |
| AGP (g/L) | r | -0.04 | -0.03 | 0.08 | -0.08 | -0.11 | 0.07 | -0.09 | -0.05 | 0.04 |  |  |  |  |  |
| sig | 0.55 | 0.75 | 0.40 | 0.44 | 0.28 | 0.51 | 0.38 | 0.61 | 0.67 |  |  |  |  |  |
| CRP (mg/L) | r | 0.08 | 0.07 | 0.06 | -0.16 | -0.13 | -0.12 | -0.17 | -0.03 | -0.04 | 0.52\*\* |  |  |  |  |
| sig | 0.41 | 0.48 | 0.55 | 0.10 | 0.19 | 0.23 | 0.08 | 0.79 | 0.69 | 0.00 |  |  |  |  |
| Serum transthyretin (g/L) | r | 0.07 | 0.07 | 0.01 | 0.09 | -0.04 | 0.04 | 0.03 | -0.07 | 0.06 | -0.39\*\* | -0.46\*\* |  |  |  |
| sig | 0.51 | 0.48 | 0.89 | 0.38 | 0.70 | 0.66 | 0.77 | 0.48 | 0.57 | 0.00 | 0.00 |  |  |  |
| Serum IGF-1 (ng/mL) | r | 0.15 | 0.15 | 0.16 | -0.26\*\* | -0.09 | -0.13 | -0.15 | 0.07 | -0.04 | -0.15 | -0.06 | 0.17 |  |  |
| sig | 0.14 | 0.14 | 0.10 | 0.01 | 0.36 | 0.19 | 0.14 | 0.46 | 0.70 | 0.14 | 0.57 | 0.09 |  |  |
| Serum tryptophan (µmol/L) | r | 0.28\*\* | 0.23\* | -0.09 | -0.001 | -0.33\*\* | 0.02 | -0.17 | -0.14 | -0.003 | -0.25\* | -0.12 | 0.33\*\* | 0.20\* |  |
| sig | 0.005 | 0.02 | 0.34 | 0.99 | 0.001 | 0.81 | 0.08 | 0.17 | 0.98 | 0.01 | 0.23 | 0.001 | 0.04 |  |
| serum lysine (µmol/L) | r | 0.18 | 0.12 | -0.168 | -0.155 | -0.148 | -0.041 | -0.11 | -0.10 | -0.11 | -0.11 | 0.06 | 0.02 | 0.28\*\* | 0.42\*\* |
| sig | 0.08 | 0.22 | 0.092 | 0.120 | 0.137 | 0.685 | 0.29 | 0.32 | 0.28 | 0.29 | 0.52 | 0.83 | 0.01 | 0.00 |

\*\*\*: p < 0.001, \*\*: p < 0.01, \* p < 0.05. HAZ: Height-for-age Z-score; HAD: Height‐for‐age difference; WHZ: Weight-for-height Z-scores. IGF-1: Insulin-like growth factor 1; AFB1-lys: Aflatoxin B1-lysine; AFB1: Aflatoxin B1; AFB2: Aflatoxin B2; AFG1: Aflatoxin G1; AFG2:Aflatoxin G2; AFM1:Aflatoxin M1; CRP: C-reactive protein; AGP: α-1-glycoprotein protein. g/L=gram/liter, µmol/L =micromole/liter; mg/L =milligram/liter; g/L =gram/liter; ng/mL=nanogram/millilitre.

**Table S5** Exposure to aflatoxin and height-for-age z-scores at pre-harvest, post-harvest, and endline

|  |  |  |  |
| --- | --- | --- | --- |
| Exposure to aflatoxin | Pre-harvest HAZ (mean ± SD) | Post-harvest HAZ (mean ± SD) | HAZ at endline (mean ± SD) |
| yes | -2.44 ± 0.39 | -2.62 ± 0.55 | -2.45 ± 0.82 |
| no | -2.83 ± 0.67 | -2.72 ± 0.66 | -2.63 ± 0.72 |

HAZ: height-for-age Z-score; SD: standard deviation.