SUPPORTING INFORMATION

Occurrence and Profiles of Melamine and Cyanuric Acid in Bovine Feed and Urine from China, India, and the United States

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S1. Sample Preparation

Cow urine. Two 250 µL aliquots were transferred into 15 mL PP tubes. One aliquot was acidified with 50 µL 1% (ν/ν) FA for cyanuric acid analysis; the other aliquot was alkalized with 50 µL 5% (ν/ν) NH₄OH for the analysis of other analytes. The samples were then fortified with 5.0 ng of IS mixtures and extracted twice with 2 mL of ethyl acetate/isopropanol (95:5, ν/ν). The combined supernatant was concentrated to near dryness under a gentle nitrogen stream, reconstituted in 250 µL of acetonitrile/5 mM ammonium formate buffer (pH = 4.0) (9:1, ν/ν), and filtered through a 0.2 µm nylon filter (Corning, NY) into glass vials prior to HPLC-MS/MS analysis.

Cow feed. Two 0.2 g aliquots were weighed into 15 mL PP tubes. Samples were fortified with 10 ng each of IS mixtures to monitor analyte recovery. One aliquot was extracted twice with 5 mL 1% (ν/ν) FA in methanol for cyanuric acid analysis (as A); the other aliquot was extracted twice with 5 mL 5% (ν/ν) NH₄OH in methanol for the analysis of other analytes (as B). After shaking (3 h) and centrifuge (4000 g, 10 min), the combined supernatants were concentrated to near dryness under a gentle nitrogen stream and reconstituted in 3 mL 5% (ν/ν) NH₄OH in H₂O (for A; as C) and 1% (ν/ν) FA in H₂O (for B; as D), respectively. Mixed-mode ion exchange/reversed phase SPE cartridges (Oasis MAX and Oasis MCX; 150 mg, 30 mm, 6 ml, 30 µm; Waters Corp., Milford, MA, USA) were conditioned with 5 mL methanol followed by 5 mL H₂O. Aliquots C were applied to Oasis MAX cartridges, and aliquots D were applied to Oasis MCX cartridges. All cartridges were then washed with 3 mL 1% (ν/ν) FA in H₂O (for melamine, ammeline, and ammelide) or 5% (ν/ν) NH₄OH in H₂O (for cyanuric acid), followed by 3 mL methanol. Cyanuric acid was eluted from the MAX cartridges with 5 mL 1% (ν/ν) FA in methanol; the other analytes were eluted from

the MCX cartridges with 5 mL 5% (ν/ν) NH₄OH in methanol. MCX and MAX eluates were concentrated to near dryness under a gentle nitrogen stream, and reconstituted in 500 µL mobile phase. The extract was filtered through a 0.2 µm nylon syringe filter (Corning, NY) directly into a glass vial prior to HPLC/MS/MS analysis.

S2. Instrument Analysis.

Melamine, cyanuric acid, ammeline, and ammelide were analyzed using a Shimadzu LC-30 AD Series HPLC system (Shimadzu Corporation, Kyoto, Japan), connected to an API 5500 triplequadrupole mass spectrometer (Applied Biosystems, Foster City, CA). Chromatographic separations were performed, using a Luna hydrophilic-lipophilic interaction liquid chromatography (HILIC) column (100 mm × 3.0 mm, 3.0 µm particle size; Phenomenex, Torrance, CA), serially connected to a Betasil C18 guard column (20 mm \times 2.1 mm, 5 μ m particle size; Thermo Scientific, Waltham, MA) with acetonitrile (A) and 5 mM ammonium formate buffer (pH = 4.0; B) as mobile phases. Mobile phase flow rate and the sample injection volumes were 0.40 mL/min and 2.0 μ L, respectively. The mobile phase gradient used for the separation of target chemicals was, 10% B for 8.0 min initially, ramped to 35% B at 8.1 min which was maintained until the 12th min, and then returned to the initial condition (10% B) to equilibrate for 6 min. Flow was diverted to waste 8.0 min after sample injection. Two acquisition modes were used in the MS/MS analysis. The negative mode was applied from 0 to 4.2 min for cyanuric acid and ammelide detection and the positive mode was applied from 4.2 to 18 min for melamine and ammeline detection. Under these conditions, the elution order of cyanuric acid, ammelide, melamine, and ammeline, was at the retention time of 1.9, 3.4, 5.0, and 6.0 min, respectively.

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
CN1	male	13	Simmental	beef cattle	7.04	<loq< td=""><td><loq< td=""><td>394</td><td>34.8</td></loq<></td></loq<>	<loq< td=""><td>394</td><td>34.8</td></loq<>	394	34.8
CN2	male	12	Simmental	beef cattle	7.85	<loq< td=""><td><loq< td=""><td>1968</td><td>36.9</td></loq<></td></loq<>	<loq< td=""><td>1968</td><td>36.9</td></loq<>	1968	36.9
CN3	male	12	Simmental	beef cattle	8.10	<loq< td=""><td><loq< td=""><td>2108</td><td>50.2</td></loq<></td></loq<>	<loq< td=""><td>2108</td><td>50.2</td></loq<>	2108	50.2
CN4	male	10	Simmental	beef cattle	10.40	<loq< td=""><td><loq< td=""><td>748</td><td>46.5</td></loq<></td></loq<>	<loq< td=""><td>748</td><td>46.5</td></loq<>	748	46.5
CN5	male	9	Simmental	beef cattle	3.93	<loq< td=""><td>0.221</td><td>147</td><td>84.1</td></loq<>	0.221	147	84.1
CN6	male	14	Simmental	beef cattle	7.67	<loq< td=""><td><loq< td=""><td>359</td><td>28.4</td></loq<></td></loq<>	<loq< td=""><td>359</td><td>28.4</td></loq<>	359	28.4
CN7	male	12	Simmental	beef cattle	4.40	<loq< td=""><td>0.221</td><td>396</td><td>18</td></loq<>	0.221	396	18
CN8	male	12	Simmental	beef cattle	8.33	<loq< td=""><td>0.471</td><td>266</td><td>50.5</td></loq<>	0.471	266	50.5
CN9	male	12	Simmental	beef cattle	2.28	<loq< td=""><td>0.167</td><td>139</td><td>24.3</td></loq<>	0.167	139	24.3
CN10	male	12	Simmental	beef cattle	3.58	<loq< td=""><td>0.422</td><td>708</td><td>24</td></loq<>	0.422	708	24
CN11	male	11	Simmental	beef cattle	8.12	<loq< td=""><td><loq< td=""><td>873</td><td>35.1</td></loq<></td></loq<>	<loq< td=""><td>873</td><td>35.1</td></loq<>	873	35.1
CN12	male	11	Simmental	beef cattle	6.64	<loq< td=""><td><loq< td=""><td>414</td><td>7.9</td></loq<></td></loq<>	<loq< td=""><td>414</td><td>7.9</td></loq<>	414	7.9
CN13	male	10	Simmental	beef cattle	6.04	<loq< td=""><td><loq< td=""><td>205</td><td>48.2</td></loq<></td></loq<>	<loq< td=""><td>205</td><td>48.2</td></loq<>	205	48.2
CN14	male	8	Simmental	beef cattle	2.08	<loq< td=""><td><loq< td=""><td>81</td><td>18.2</td></loq<></td></loq<>	<loq< td=""><td>81</td><td>18.2</td></loq<>	81	18.2
CN15	male	10	Simmental	beef cattle	10.10	<loq< td=""><td>0.401</td><td>465</td><td>58.5</td></loq<>	0.401	465	58.5
CN16	male	12	Simmental	beef cattle	5.48	<loq< td=""><td>0.625</td><td>253</td><td>26.6</td></loq<>	0.625	253	26.6
CN17	male	11	Simmental	beef cattle	3.50	<loq< td=""><td><loq< td=""><td>98</td><td>10.9</td></loq<></td></loq<>	<loq< td=""><td>98</td><td>10.9</td></loq<>	98	10.9
CN18	male	9	Simmental	beef cattle	3.43	<loq< td=""><td>0.249</td><td>48</td><td>31.2</td></loq<>	0.249	48	31.2
CN19	male	11	Simmental	beef cattle	6.93	<loq< td=""><td><loq< td=""><td>410</td><td>45.8</td></loq<></td></loq<>	<loq< td=""><td>410</td><td>45.8</td></loq<>	410	45.8
CN20	male	10	Simmental	beef cattle	3.46	<loq< td=""><td><loq< td=""><td>126</td><td>86.8</td></loq<></td></loq<>	<loq< td=""><td>126</td><td>86.8</td></loq<>	126	86.8
CN21	male	11	Simmental	beef cattle	6.24	<loq< td=""><td><loq< td=""><td>505</td><td>16.3</td></loq<></td></loq<>	<loq< td=""><td>505</td><td>16.3</td></loq<>	505	16.3
CN22	male	11	Simmental	beef cattle	10.50	<loq< td=""><td>0.39</td><td>555</td><td>88.9</td></loq<>	0.39	555	88.9
CN23	male	13	Simmental	beef cattle	13.30	<loq< td=""><td><loq< td=""><td>467</td><td>30.1</td></loq<></td></loq<>	<loq< td=""><td>467</td><td>30.1</td></loq<>	467	30.1
CN24	male	16	Simmental	beef cattle	10.20	<loq< td=""><td><loq< td=""><td>1188</td><td>66.6</td></loq<></td></loq<>	<loq< td=""><td>1188</td><td>66.6</td></loq<>	1188	66.6
CN25	male	11	Simmental	beef cattle	10.20	<loq< td=""><td><loq< td=""><td>2328</td><td>57.9</td></loq<></td></loq<>	<loq< td=""><td>2328</td><td>57.9</td></loq<>	2328	57.9
CN26	male	12	Simmental	beef cattle	3.35	<loq< td=""><td>0.932</td><td>1118</td><td>58.7</td></loq<>	0.932	1118	58.7
CN27	male	4	Simmental	beef cattle	0.93	<loq< td=""><td><loq< td=""><td>24</td><td>52.4</td></loq<></td></loq<>	<loq< td=""><td>24</td><td>52.4</td></loq<>	24	52.4
CN28	male	11	Simmental	beef cattle	6.85	<loq< td=""><td>0.792</td><td>345</td><td>24.3</td></loq<>	0.792	345	24.3

 Table S1. Samples information for bovine urines collected from China, India, and United States and corresponding concentrations of melamine related compounds (ng/mL) and creatinine (mg/dL)

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
CN29	male	8	Simmental	beef cattle	2.87	<loq< td=""><td>0.362</td><td>283</td><td>52.1</td></loq<>	0.362	283	52.1
CN30	male	12	Simmental	beef cattle	3.21	<loq< td=""><td>0.509</td><td>229</td><td>59</td></loq<>	0.509	229	59
CN31	male	14	Simmental	beef cattle	3.08	<loq< td=""><td><loq< td=""><td>158</td><td>121.3</td></loq<></td></loq<>	<loq< td=""><td>158</td><td>121.3</td></loq<>	158	121.3
CN32	male	9	Simmental	beef cattle	8.75	<loq< td=""><td>0.732</td><td>591</td><td>30.7</td></loq<>	0.732	591	30.7
CN33	male	9	Simmental	beef cattle	3.73	<loq< td=""><td><loq< td=""><td>146</td><td>52.1</td></loq<></td></loq<>	<loq< td=""><td>146</td><td>52.1</td></loq<>	146	52.1
CN34	male	12	Simmental	beef cattle	0.98	<loq< td=""><td>0.144</td><td>25</td><td>24.1</td></loq<>	0.144	25	24.1
CN35	male	12	Simmental	beef cattle	4.67	0.265	<loq< td=""><td>715</td><td>45.2</td></loq<>	715	45.2
CN36	male	12	Simmental	beef cattle	3.56	0.174	0.132	389	74.2
CN37	male	12	Simmental	beef cattle	0.70	<loq< td=""><td><loq< td=""><td>72</td><td>15.4</td></loq<></td></loq<>	<loq< td=""><td>72</td><td>15.4</td></loq<>	72	15.4
CN38	male	14	Simmental	beef cattle	17.20	<loq< td=""><td><loq< td=""><td>1348</td><td>30.6</td></loq<></td></loq<>	<loq< td=""><td>1348</td><td>30.6</td></loq<>	1348	30.6
CN39	male	10	Simmental	beef cattle	0.96	<loq< td=""><td>0.107</td><td>7</td><td>53</td></loq<>	0.107	7	53
CN40	male	14	Simmental	beef cattle	3.46	<loq< td=""><td>0.143</td><td>490</td><td>35.1</td></loq<>	0.143	490	35.1
CN41	male	14	Simmental	beef cattle	22.10	<loq< td=""><td>1.49</td><td>1168</td><td>76.8</td></loq<>	1.49	1168	76.8
CN42	male	14	Simmental	beef cattle	1.84	<loq< td=""><td>0.247</td><td>140</td><td>36.3</td></loq<>	0.247	140	36.3
CN43	male	12	Simmental	beef cattle	26.90	<loq< td=""><td>0.352</td><td>1418</td><td>46.7</td></loq<>	0.352	1418	46.7
CN44	male	12	Simmental	beef cattle	5.30	<loq< td=""><td>0.773</td><td>172</td><td>18.9</td></loq<>	0.773	172	18.9
CN45	male	12	Simmental	beef cattle	3.84	<loq< td=""><td>0.317</td><td>448</td><td>48.7</td></loq<>	0.317	448	48.7
CN46	male	12	Simmental	beef cattle	17.00	<loq< td=""><td>0.05</td><td>1868</td><td>44.8</td></loq<>	0.05	1868	44.8
CN47	male	12	Simmental	beef cattle	7.92	<loq< td=""><td>0.05</td><td>555</td><td>31.8</td></loq<>	0.05	555	31.8
CN48	male	7	Simmental	beef cattle	2.13	<loq< td=""><td>0.05</td><td>42</td><td>43.6</td></loq<>	0.05	42	43.6
CN49	male	12	Simmental	beef cattle	7.84	<loq< td=""><td>1.6</td><td>126</td><td>23.6</td></loq<>	1.6	126	23.6
CN50	male	11	Simmental	beef cattle	5.80	<loq< td=""><td>0.321</td><td>90</td><td>47.5</td></loq<>	0.321	90	47.5
CN51	female	27	Holstein	cow	5.38	<loq< td=""><td>0.387</td><td>1298</td><td>41.3</td></loq<>	0.387	1298	41.3
CN52	female	36	Holstein	cow	8.01	<loq< td=""><td>0.422</td><td>2178</td><td>103.4</td></loq<>	0.422	2178	103.4
CN53	female	49	Holstein	cow	5.49	<loq< td=""><td><loq< td=""><td>1578</td><td>123.2</td></loq<></td></loq<>	<loq< td=""><td>1578</td><td>123.2</td></loq<>	1578	123.2
CN54	female	not known	Holstein	cow	8.02	<loq< td=""><td><loq< td=""><td>2588</td><td>120.7</td></loq<></td></loq<>	<loq< td=""><td>2588</td><td>120.7</td></loq<>	2588	120.7
CN55	female	39	Holstein	cow	14.90	<loq< td=""><td><loq< td=""><td>4718</td><td>41.3</td></loq<></td></loq<>	<loq< td=""><td>4718</td><td>41.3</td></loq<>	4718	41.3
CN56	female	28	Holstein	cow	1.89	<loq< td=""><td><loq< td=""><td>139</td><td>148.7</td></loq<></td></loq<>	<loq< td=""><td>139</td><td>148.7</td></loq<>	139	148.7
CN57	female	not known	Holstein	cow	2.91	<loq< td=""><td><loq< td=""><td>912</td><td>44.2</td></loq<></td></loq<>	<loq< td=""><td>912</td><td>44.2</td></loq<>	912	44.2
CN58	female	63	Holstein	cow	6.45	<loq< td=""><td><loq< td=""><td>2998</td><td>125.2</td></loq<></td></loq<>	<loq< td=""><td>2998</td><td>125.2</td></loq<>	2998	125.2
CN59	female	25	Holstein	cow	3.48	<loq< td=""><td><loq< td=""><td>902</td><td>26.8</td></loq<></td></loq<>	<loq< td=""><td>902</td><td>26.8</td></loq<>	902	26.8

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
CN60	female	36	Holstein	cow	4.83	<loq< td=""><td><loq< td=""><td>741</td><td>57.2</td></loq<></td></loq<>	<loq< td=""><td>741</td><td>57.2</td></loq<>	741	57.2
CN61	female	not known	Holstein	cow	7.38	<loq< td=""><td><loq< td=""><td>665</td><td>158.2</td></loq<></td></loq<>	<loq< td=""><td>665</td><td>158.2</td></loq<>	665	158.2
CN62	female	74	Holstein	cow	1.19	<loq< td=""><td>0.378</td><td>189</td><td>78.8</td></loq<>	0.378	189	78.8
CN63	female	65	Holstein	cow	7.77	<loq< td=""><td><loq< td=""><td>1138</td><td>12.5</td></loq<></td></loq<>	<loq< td=""><td>1138</td><td>12.5</td></loq<>	1138	12.5
CN64	female	not known	Holstein	cow	3.52	<loq< td=""><td>0.94</td><td>854</td><td>20.8</td></loq<>	0.94	854	20.8
CN65	female	27	Holstein	cow	5.85	<loq< td=""><td>0.213</td><td>2418</td><td>160.4</td></loq<>	0.213	2418	160.4
CN66	female	27	Holstein	cow	4.09	<loq< td=""><td><loq< td=""><td>440</td><td>45.4</td></loq<></td></loq<>	<loq< td=""><td>440</td><td>45.4</td></loq<>	440	45.4
CN67	female	45	Holstein	cow	1.86	<loq< td=""><td>0.27</td><td>148</td><td>10.8</td></loq<>	0.27	148	10.8
CN68	female	67	Holstein	cow	3.55	<loq< td=""><td>0.455</td><td>778</td><td>13.3</td></loq<>	0.455	778	13.3
CN69	female	33	Holstein	cow	10.70	<loq< td=""><td><loq< td=""><td>586</td><td>96.7</td></loq<></td></loq<>	<loq< td=""><td>586</td><td>96.7</td></loq<>	586	96.7
CN70	female	35	Holstein	cow	13.70	<loq< td=""><td><loq< td=""><td>624</td><td>43.2</td></loq<></td></loq<>	<loq< td=""><td>624</td><td>43.2</td></loq<>	624	43.2
CN71	female	27	Holstein	cow	2.54	<loq< td=""><td>0.22</td><td>543</td><td>76.3</td></loq<>	0.22	543	76.3
CN72	female	49	Holstein	cow	15.30	<loq< td=""><td>1.47</td><td>1838</td><td>154.7</td></loq<>	1.47	1838	154.7
CN73	female	40	Holstein	cow	3.03	<loq< td=""><td>0.373</td><td>498</td><td>29</td></loq<>	0.373	498	29
CN74	female	44	Holstein	cow	8.62	<loq< td=""><td><loq< td=""><td>851</td><td>236.9</td></loq<></td></loq<>	<loq< td=""><td>851</td><td>236.9</td></loq<>	851	236.9
CN75	female	93	Holstein	cow	11.00	<loq< td=""><td><loq< td=""><td>913</td><td>182.1</td></loq<></td></loq<>	<loq< td=""><td>913</td><td>182.1</td></loq<>	913	182.1
CN76	female	62	Holstein	cow	7.24	<loq< td=""><td><loq< td=""><td>2878</td><td>68.4</td></loq<></td></loq<>	<loq< td=""><td>2878</td><td>68.4</td></loq<>	2878	68.4
CN77	female	not known	Holstein	cow	7.97	<loq< td=""><td>0.416</td><td>1088</td><td>108.1</td></loq<>	0.416	1088	108.1
CN78	female	25	Holstein	cow	3.00	<loq< td=""><td><loq< td=""><td>605</td><td>4.5</td></loq<></td></loq<>	<loq< td=""><td>605</td><td>4.5</td></loq<>	605	4.5
CN79	female	39	Holstein	cow	6.61	<loq< td=""><td><loq< td=""><td>5268</td><td>36.4</td></loq<></td></loq<>	<loq< td=""><td>5268</td><td>36.4</td></loq<>	5268	36.4
CN80	female	not known	Holstein	cow	10.60	<loq< td=""><td><loq< td=""><td>1778</td><td>26.9</td></loq<></td></loq<>	<loq< td=""><td>1778</td><td>26.9</td></loq<>	1778	26.9
CN81	female	49	Holstein	cow	11.60	<loq< td=""><td>0.26</td><td>2278</td><td>21.6</td></loq<>	0.26	2278	21.6
CN82	female	63	Holstein	cow	5.08	<loq< td=""><td><loq< td=""><td>1638</td><td>158.4</td></loq<></td></loq<>	<loq< td=""><td>1638</td><td>158.4</td></loq<>	1638	158.4
CN83	female	not known	Holstein	cow	6.09	<loq< td=""><td><loq< td=""><td>1898</td><td>45.7</td></loq<></td></loq<>	<loq< td=""><td>1898</td><td>45.7</td></loq<>	1898	45.7
CN84	female	60	Holstein	cow	1.78	<loq< td=""><td>0.849</td><td>97</td><td>18.3</td></loq<>	0.849	97	18.3
CN85	female	48	Holstein	cow	3.42	<loq< td=""><td><loq< td=""><td>940</td><td>70.4</td></loq<></td></loq<>	<loq< td=""><td>940</td><td>70.4</td></loq<>	940	70.4
CN86	female	62	Holstein	cow	10.20	<loq< td=""><td>0.183</td><td>1358</td><td>53.2</td></loq<>	0.183	1358	53.2
CN87	female	91	Holstein	cow	4.18	<loq< td=""><td><loq< td=""><td>1378</td><td>5.1</td></loq<></td></loq<>	<loq< td=""><td>1378</td><td>5.1</td></loq<>	1378	5.1
CN88	female	79	Holstein	cow	5.79	<loq< td=""><td><loq< td=""><td>514</td><td>106.5</td></loq<></td></loq<>	<loq< td=""><td>514</td><td>106.5</td></loq<>	514	106.5
CN89	female	23	Holstein	cow	5.55	<loq< td=""><td><loq< td=""><td>335</td><td>9.6</td></loq<></td></loq<>	<loq< td=""><td>335</td><td>9.6</td></loq<>	335	9.6
CN90	female	39	Holstein	cow	9.34	<loq< td=""><td><loq< td=""><td>3668</td><td>80.1</td></loq<></td></loq<>	<loq< td=""><td>3668</td><td>80.1</td></loq<>	3668	80.1

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
CN91	female	85	Holstein	cow	6.78	<loq< td=""><td>0.212</td><td>2038</td><td>164.3</td></loq<>	0.212	2038	164.3
CN92	female	34	Holstein	cow	3.61	<loq< td=""><td>0.176</td><td>367</td><td>177.2</td></loq<>	0.176	367	177.2
CN93	female	57	Holstein	cow	5.89	<loq< td=""><td>0.598</td><td>2198</td><td>91</td></loq<>	0.598	2198	91
CN94	female	26	Holstein	cow	3.06	<loq< td=""><td>0.37</td><td>420</td><td>78.6</td></loq<>	0.37	420	78.6
CN95	female	24	Holstein	cow	7.38	<loq< td=""><td><loq< td=""><td>643</td><td>57.9</td></loq<></td></loq<>	<loq< td=""><td>643</td><td>57.9</td></loq<>	643	57.9
CN96	female	40	Holstein	cow	4.46	<loq< td=""><td><loq< td=""><td>844</td><td>358</td></loq<></td></loq<>	<loq< td=""><td>844</td><td>358</td></loq<>	844	358
CN97	female	28	Holstein	cow	7.03	<loq< td=""><td><loq< td=""><td>2368</td><td>113.8</td></loq<></td></loq<>	<loq< td=""><td>2368</td><td>113.8</td></loq<>	2368	113.8
CN98	female	not known	Holstein	cow	7.19	<loq< td=""><td>0.182</td><td>1788</td><td>12.1</td></loq<>	0.182	1788	12.1
CN99	female	22	Holstein	cow	3.73	<loq< td=""><td>0.134</td><td>260</td><td>115.1</td></loq<>	0.134	260	115.1
CN100	female	43	Holstein	cow	8.40	<loq< td=""><td><loq< td=""><td>4468</td><td>16.6</td></loq<></td></loq<>	<loq< td=""><td>4468</td><td>16.6</td></loq<>	4468	16.6
IN1	female	12-84	Jersey breed	cow	0.42	<loq< td=""><td>0.05</td><td>22</td><td>12</td></loq<>	0.05	22	12
IN2	female	12-84	Jersey breed	cow	0.50	<loq< td=""><td>0.05</td><td>28</td><td>19.4</td></loq<>	0.05	28	19.4
IN3	female	12-84	Jersey breed	cow	0.47	<loq< td=""><td>0.171</td><td>27</td><td>18.5</td></loq<>	0.171	27	18.5
IN4	female	12-84	Jersey breed	cow	0.51	<loq< td=""><td>0.102</td><td>26</td><td>18.9</td></loq<>	0.102	26	18.9
IN5	female	12-84	Jersey breed	cow	0.41	<loq< td=""><td>0.05</td><td>23</td><td>15.3</td></loq<>	0.05	23	15.3
IN6	female	12-84	Jersey breed	cow	0.43	<loq< td=""><td>0.102</td><td>26</td><td>20.7</td></loq<>	0.102	26	20.7
IN7	female	12-84	Jersey breed	cow	0.24	<loq< td=""><td>0.05</td><td>8</td><td>4.9</td></loq<>	0.05	8	4.9
IN8	female	12-84	Jersey breed	cow	0.43	<loq< td=""><td>0.05</td><td>26</td><td>18.4</td></loq<>	0.05	26	18.4
IN9	female	12-84	Jersey breed	cow	0.29	<loq< td=""><td>0.05</td><td>11</td><td>6.4</td></loq<>	0.05	11	6.4
IN10	female	12-84	Jersey breed	cow	0.28	<loq< td=""><td>0.05</td><td>14</td><td>5.7</td></loq<>	0.05	14	5.7
IN11	female	12-84	Jersey breed	cow	1.04	<loq< td=""><td>0.591</td><td>11</td><td>30.8</td></loq<>	0.591	11	30.8
IN12	female	12-84	Jersey breed	cow	0.83	<loq< td=""><td>0.676</td><td>18</td><td>27.2</td></loq<>	0.676	18	27.2
IN13	female	12-84	Jersey breed	cow	0.70	<loq< td=""><td>0.272</td><td>4</td><td>13.9</td></loq<>	0.272	4	13.9
IN14	female	12-84	Jersey breed	cow	0.95	<loq< td=""><td>0.383</td><td>13</td><td>20.3</td></loq<>	0.383	13	20.3
IN15	female	12-84	Jersey breed	cow	1.03	<loq< td=""><td>0.916</td><td>21</td><td>70.5</td></loq<>	0.916	21	70.5
IN16	female	12-84	Jersey breed	cow	1.05	<loq< td=""><td>0.111</td><td>37</td><td>40</td></loq<>	0.111	37	40
IN17	female	12-84	Jersey breed	cow	1.10	<loq< td=""><td>0.175</td><td>23</td><td>38.1</td></loq<>	0.175	23	38.1
IN18	female	12-84	Jersey breed	cow	0.94	<loq< td=""><td>0.135</td><td>6</td><td>20.8</td></loq<>	0.135	6	20.8
IN19	female	12-85	Jersey breed	cow	0.87	<loq< td=""><td>0.129</td><td>12</td><td>30.7</td></loq<>	0.129	12	30.7
IN20	female	12-86	Jersey breed	cow	1.05	<loq< td=""><td>0.128</td><td>41</td><td>47.7</td></loq<>	0.128	41	47.7
IN21	female	84	Indian buffalo	servitude	0.63	<loq< td=""><td>1.03</td><td>97</td><td>34.7</td></loq<>	1.03	97	34.7

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
IN22	female	96	Indian buffalo	servitude	3.25	<loq< td=""><td>4.17</td><td>2368</td><td>136.7</td></loq<>	4.17	2368	136.7
IN23	female	96	Indian breed	cow	2.20	<loq< td=""><td>4.31</td><td>3378</td><td>91.4</td></loq<>	4.31	3378	91.4
IN24	female	36	Indian breed	cow	3.16	<loq< td=""><td>0.705</td><td>731</td><td>170.6</td></loq<>	0.705	731	170.6
IN25	female	36	Indian breed	cow	0.99	<loq< td=""><td>1.1</td><td>525</td><td>58.5</td></loq<>	1.1	525	58.5
IN26	female	84	jersey breed	cow	0.48	<loq< td=""><td>0.134</td><td>10</td><td>22.1</td></loq<>	0.134	10	22.1
IN27	female	72	Indian buffalo	servitude	0.46	<loq< td=""><td>0.05</td><td>22</td><td>11.7</td></loq<>	0.05	22	11.7
IN28	female	36	Indian buffalo	servitude	0.40	<loq< td=""><td>0.05</td><td>36</td><td>13</td></loq<>	0.05	36	13
IN29	female	6	Indian buffalo	servitude	1.05	<loq< td=""><td>0.938</td><td>757</td><td>53.1</td></loq<>	0.938	757	53.1
IN30	female	60	jersey breed	cow	1.56	0.528	0.05	575	146.9
IN31	female	48	Indian buffalo	servitude	0.81	<loq< td=""><td>1.77</td><td>181</td><td>29.3</td></loq<>	1.77	181	29.3
IN32	female	72	jersey breed	cow	0.84	<loq< td=""><td>1.08</td><td>94</td><td>36.4</td></loq<>	1.08	94	36.4
IN33	female	192	Indian buffalo	servitude	1.19	<loq< td=""><td>0.643</td><td>8</td><td>24.4</td></loq<>	0.643	8	24.4
IN34	female	36	Jersey breed	cow	8.05	<loq< td=""><td>0.05</td><td>2378</td><td>153.5</td></loq<>	0.05	2378	153.5
IN35	female	204	Indian buffalo	servitude	0.68	<loq< td=""><td>0.05</td><td>52</td><td>18.2</td></loq<>	0.05	52	18.2
IN36	female	108	Jersey breed	cow	0.60	<loq< td=""><td>0.05</td><td>60</td><td>36.9</td></loq<>	0.05	60	36.9
IN37	female	240	Indian buffalo	servitude	0.71	<loq< td=""><td>0.05</td><td>26</td><td>15.2</td></loq<>	0.05	26	15.2
IN38	female	240	Indian buffalo	servitude	2.19	<loq< td=""><td>0.05</td><td>275</td><td>65.7</td></loq<>	0.05	275	65.7
IN39	female	84	Indian buffalo	servitude	2.36	<loq< td=""><td>0.05</td><td>35</td><td>30.7</td></loq<>	0.05	35	30.7
IN40	male	6	Indian buffalo	servitude	0.58	<loq< td=""><td>0.18</td><td>33</td><td>23.7</td></loq<>	0.18	33	23.7
IN41	male	84	Indian buffalo	servitude	1.60	<loq< td=""><td>0.267</td><td>22</td><td>100.2</td></loq<>	0.267	22	100.2
IN42	female	60	Indian buffalo	servitude	0.75	<loq< td=""><td>0.05</td><td>3</td><td>12</td></loq<>	0.05	3	12
IN43	female	204	Indian buffalo	servitude	3.22	<loq< td=""><td>0.05</td><td>10</td><td>109.4</td></loq<>	0.05	10	109.4
IN44	female	120	Jersey breed	cow	1.45	<loq< td=""><td>0.195</td><td>104</td><td>135.7</td></loq<>	0.195	104	135.7
IN45	female	72	Indian breed	cow	4.69	<loq< td=""><td>0.05</td><td>41</td><td>9.1</td></loq<>	0.05	41	9.1
US1	female	48	Angus	cow	8.90	<loq< td=""><td><loq< td=""><td>176</td><td>67.6</td></loq<></td></loq<>	<loq< td=""><td>176</td><td>67.6</td></loq<>	176	67.6
US2	female	96	Angus	cow	2.42	<loq< td=""><td><loq< td=""><td>302</td><td>34.7</td></loq<></td></loq<>	<loq< td=""><td>302</td><td>34.7</td></loq<>	302	34.7
US3	female	180	Angus	cow	0.83	<loq< td=""><td>0.35</td><td>58</td><td>153.3</td></loq<>	0.35	58	153.3
US4	female	12	Angus	cow	3.44	<loq< td=""><td><loq< td=""><td>332</td><td>32.5</td></loq<></td></loq<>	<loq< td=""><td>332</td><td>32.5</td></loq<>	332	32.5
US5	female	12	Angus	cow	1.50	<loq< td=""><td>0.1972</td><td>139</td><td>87.5</td></loq<>	0.1972	139	87.5
US6	female	12	Angus	cow	6.24	<loq< td=""><td><loq< td=""><td>814</td><td>20.5</td></loq<></td></loq<>	<loq< td=""><td>814</td><td>20.5</td></loq<>	814	20.5
US7	female	204	Angus	cow	0.97	<loq< td=""><td>0.594</td><td>138</td><td>18.3</td></loq<>	0.594	138	18.3

No.	Sex	Age/month	Species	Use	Melamine	Ammeline	Ammelide	Cyanuric acid	Creatinine
US8	female	204	Angus	cow	6.02	<loq< td=""><td><loq< td=""><td>2040</td><td>22.7</td></loq<></td></loq<>	<loq< td=""><td>2040</td><td>22.7</td></loq<>	2040	22.7
US9	female	48	Angus	cow	6.40	<loq< td=""><td><loq< td=""><td>376</td><td>33.7</td></loq<></td></loq<>	<loq< td=""><td>376</td><td>33.7</td></loq<>	376	33.7
US10	female	48	Angus	cow	0.49	<loq< td=""><td>1.216</td><td>57</td><td>36.9</td></loq<>	1.216	57	36.9
US11	female	24	Angus	cow	0.69	<loq< td=""><td><loq< td=""><td>22</td><td>18</td></loq<></td></loq<>	<loq< td=""><td>22</td><td>18</td></loq<>	22	18
US12	female	120	Angus	cow	1.35	<loq< td=""><td><loq< td=""><td>163</td><td>90.9</td></loq<></td></loq<>	<loq< td=""><td>163</td><td>90.9</td></loq<>	163	90.9
US13	female	24	Angus	cow	0.61	<loq< td=""><td>0.984</td><td>113</td><td>29.4</td></loq<>	0.984	113	29.4
US14	female	24	Angus	cow	1.53	<loq< td=""><td><loq< td=""><td>538</td><td>125.5</td></loq<></td></loq<>	<loq< td=""><td>538</td><td>125.5</td></loq<>	538	125.5
US15	female	48	Angus	cow	1.07	<loq< td=""><td>0.68</td><td>61</td><td>74.2</td></loq<>	0.68	61	74.2
US16	female	24	Corriente	cow	0.84	<loq< td=""><td>0.652</td><td>46</td><td>23.5</td></loq<>	0.652	46	23.5
US17	female	48	Corriente	cow	1.77	<loq< td=""><td><loq< td=""><td>540</td><td>150</td></loq<></td></loq<>	<loq< td=""><td>540</td><td>150</td></loq<>	540	150
US18	female	60	Corriente	cow	1.96	<loq< td=""><td><loq< td=""><td>810</td><td>295.2</td></loq<></td></loq<>	<loq< td=""><td>810</td><td>295.2</td></loq<>	810	295.2
US19	female	72	Corriente	cow	3.32	<loq< td=""><td><loq< td=""><td>1254</td><td>466.8</td></loq<></td></loq<>	<loq< td=""><td>1254</td><td>466.8</td></loq<>	1254	466.8
US20	female	60	Corriente	cow	2.30	<loq< td=""><td>13.1</td><td>752</td><td>94.5</td></loq<>	13.1	752	94.5
US21	female	24	Corriente	cow	2.88	<loq< td=""><td>32.6</td><td>882</td><td>115.9</td></loq<>	32.6	882	115.9
US22	female	36	Corriente	cow	0.71	<loq< td=""><td>1.074</td><td>218</td><td>30.1</td></loq<>	1.074	218	30.1
US23	male	60	Corriente	beef cattle	3.46	<loq< td=""><td><loq< td=""><td>83</td><td>247.2</td></loq<></td></loq<>	<loq< td=""><td>83</td><td>247.2</td></loq<>	83	247.2
US24	male	36	Corriente	beef cattle	4.48	<loq< td=""><td><loq< td=""><td>40</td><td>110.3</td></loq<></td></loq<>	<loq< td=""><td>40</td><td>110.3</td></loq<>	40	110.3
US25	female	36	Jersey	cow	1.39	<loq< td=""><td>1.182</td><td>51</td><td>26.4</td></loq<>	1.182	51	26.4
US26	female	36	Jersey	cow	1.36	<loq< td=""><td>0.766</td><td>28</td><td>33.1</td></loq<>	0.766	28	33.1
US27	female	60	Jersey	cow	1.86	<loq< td=""><td><loq< td=""><td>318</td><td>31.4</td></loq<></td></loq<>	<loq< td=""><td>318</td><td>31.4</td></loq<>	318	31.4
US28	female	72	Jersey	cow	2.56	<loq< td=""><td>2.04</td><td>380</td><td>56.5</td></loq<>	2.04	380	56.5
US29	male	12	Jersey	beef cattle	1.92	0.598	0.836	21	23.4
US30	male	12	Jersey	beef cattle	1.09	<loq< td=""><td>0.478</td><td>8</td><td>17</td></loq<>	0.478	8	17
US31	male	12	Jersey	beef cattle	1.82	<loq< td=""><td>0.95</td><td>38</td><td>21.4</td></loq<>	0.95	38	21.4
US32	female	not known	Angus	cow	4.53	<loq< td=""><td>1.1</td><td>2200</td><td>34.5</td></loq<>	1.1	2200	34.5
US33	female	48	Angus	cow	1.72	<loq< td=""><td>0.245</td><td>59</td><td>29.9</td></loq<>	0.245	59	29.9
US34	female	48	Angus	cow	0.73	<loq< td=""><td>0.248</td><td>31</td><td>57.6</td></loq<>	0.248	31	57.6
US35	female	30	Angus	cow	6.37	<loq< td=""><td>0.595</td><td>120</td><td>72</td></loq<>	0.595	120	72
US36	male	108	Shorthorn	beef cattle	2.88	<loq< td=""><td><loq< td=""><td>2080</td><td>336.2</td></loq<></td></loq<>	<loq< td=""><td>2080</td><td>336.2</td></loq<>	2080	336.2
US37	male	120	Shorthorn	beef cattle	0.80	<loq< td=""><td>1.234</td><td>768</td><td>71.3</td></loq<>	1.234	768	71.3
US38	male	132	Shorthorn	beef cattle	4.22	<loq< td=""><td><loq< td=""><td>3420</td><td>208.1</td></loq<></td></loq<>	<loq< td=""><td>3420</td><td>208.1</td></loq<>	3420	208.1

No	Description	Melamine	Ammeline	Ammelide	Cyanuric acid
CN1	Commercial feed: Compound premix feed additive for cow lactation period	8.275	1.975	6.45	34.25
CN2	Home-made feed: Maize	8.05	1.875	3.425	68
CN3	Commercial feed: Concentrated fodder1	13.85	9.05	19.325	1050
CN4	Commercial feed: Bean pulp	10.2	4.25	14.35	201.75
CN5	Commercial feed: Rapeseed Meal	20.45	12.175	16.825	211.75
CN6	Commercial feed: Distillers dried grains with soluble	29	117.75	44.7	487.5
CN7	Commercial feed: Wheat bran	26.5	3.6	40.45	119.25
CN8	Commercial feed: Microelement compound premixed feed	5.75	3.325	8.45	15.975
CN9	Commercial feed: Kaoline	173.25	34	9.225	1.525
CN10	Commercial feed: Rumen fermentation enhancers	10.95	12.9	16	2375
CN11	Commercial feed: MetaSmart Dry	7.35	0.4575	0.9925	36
CN12	Home-made feed: Alfalfa	35.5	83.5	1434.7	757.5
CN13	Home-made feed: Oat grass	11.325	44.75	31.45	592.5
CN14	Commercial feed: Concentrated fodder2	17.15	8.025	171.95	3622.5
CN15	Commercial feed: Concentrated fodder3	18.3	27.75	707.2	5472.5
CN16	Commercial feed: Concentrated fodder4	119.5	23.125	82.2	1475
In1	Commercial feed: Mix grain cake	2.61	6.09	44.1	1513
In2	Commercial feed: Corn flour oil cake	1.29	1.69	1.23	17.0
In3	Commercial feed: Peanut oil cake	2.38	1.46	7.65	29.0
In4	Commercial feed: Paddy husk powder cake	1.28	3.6	11.9	63.3
In5	Commercial feed: Wheat flour oil cake	3.51	13.4	12.2	180
In6	Commercial feed: Coconut oil cake	3.45	2.16	11.0	153
In7	Commercial feed: Cotton seed oil cake	2.11	1.99	8.33	45.3
US1	Commercial feed: Mix grain	3.53	3.38	16	178
US2	Commercial feed: Mix grain	1.66	11.4	12.6	186
US3	Commercial feed: Corn flour	2.54	8.46	63.9	1763
US4	Commercial feed: Peanut cake	3.96	5.71	26.6	6.55
US5	Home-made feed: grass1	1.88	8.81	3.05	12.5
US6	Home-made feed: grass2	1.76	2.11	14.6	24.5

Table S2. Samples information for bovine feed collected from China, India, and United States and corresponding concentrations of melamine related compounds (ng/g)

Compounds	Ionisation mode	Transition (m/z)	CE	DP	СХР	EP
Malamina		127→85*	30	30	8	12
Wieldlille		127→68	40	25	10	10
$^{13}C_{3}, ^{15}N_{3}$ -		133→89*	25	40	8	12
melamine	ES-	133→72	40	40	10	12
Ammalina		128→86*	20	20	10	15
Ammenne		128→69	40	20	10	10
¹³ C ₃ -		131→88*	40	20	10	10
ammeline		131→71	20	20	10	10
Cyanuric		128→42*	-30	-30	-12	-12
acid		128→85	-20	-15	-8	-10
$^{13}C_3$, $^{15}N_3$ -		134→44*	-35	-20	-12	-10
cyanuric acid	ES	134→89	-20	-15	-12	-12
Ammalida	L3-	127→84*	-20	-25	-8	-12
Ammende		127→42	-35	-25	-8	-10
		130→86*	-20	-30	-8	-8
C ₃ -AwiD		130→43	-30	-25	-12	-15

Table S3. MRM conditions for tandem mass spectrometry

Note: *Quantitation transition



Figure S1. Typical chromatograms of standard (A), blank (B), real urine (C), and feed (D and E)

samples