

Impacts of COVID-19 outbreak on the municipal solid waste (MSW) management: Now and beyond the pandemic

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Table SI-1 Emission limits of incineration processes in different countries/regions.

| Country/ region | Waste type | Emission factors, mg/Nm ³ | | | | | | Reference |
|-----------------|-------------------|--------------------------------------|-----------------|--------|-----------------|--------|--------|-----------|
| | | CO | SO ₂ | HCl | NO _x | PM | HF | |
| China | MSW | 80 | 80 | 50 | 250 | 20 | - | (80,82) |
| China | *SMW | 63 | 9.3 | 8.7 | 91 | 32 | 0.72 | (80) |
| China | *MSW | - | 314 | 279 | 341 | - | - | (81) |
| Japan | MSW | 38.2 | - | 77.7 | 522.6 | 44 | - | (81) |
| Japan | *MSW | - | 564 | 618 | 259 | - | - | (81) |
| South Korea | MSW | 57.3 | 78.5 | 29.9 | 131.7 | 20 | - | (81) |
| South Korea | *MSW | - | 65 | 263 | 604 | - | - | (81) |
| US | MSW | 89 | 60 | 32.5 | 270 | 10 | - | (80) |
| US | *MSW | - | 226 | - | 867 | - | - | (80) |
| EU | MSW | 50 | 50 | 10 | 200 | 10 | - | (81) |
| France | *MSW [^] | 43.9 | 54.0 | 23.6 | 763 | 6.24 | - | (89) |
| Vietnam | *SMW | 0.065 | 0.536 | 0.0014 | - | 0.0125 | 0.0006 | (83) |
| Vietnam | SMW | 250 | 250 | 50 | - | 100 | - | (83) |

PM: particulate matter; EU: European Union; US: United States; MSW: municipal solid waste; SMW: solid medical waste; HF: hydrogen fluoride; *measured data; [^]g/t MSW;

Table SI-2 Composition of waste streams.

| Waste stream | Composition, % | | | | | | | | | | Reference |
|--------------|----------------|---------|---------------|-------|-------|---------|------|------------|-------------------|--------|-----------|
| | Organic | Plastic | Paper & board | Glass | Metal | Textile | Wood | Electronic | Building material | Others | |
| MSW | 64.1 | 14.1 | 7.6 | 2.8 | 1.2 | 2.2 | - | - | - | 8.0 | (90) |
| MSW (LIC) | 64.0 | 8.0 | 5.0 | 3.0 | 3.0 | - | - | - | - | 17.0 | (82) |
| MSW (HIC) | 28.0 | 11.0 | 31.0 | 7.0 | 6.0 | - | - | - | - | 17.0 | (82) |
| MSW | 36.6 | 10.6 | 15.0 | 2.2 | 3.8 | - | 3.8 | 2.2 | 9.4 | 16.5 | (69) |
| MSW | 46.5 | 20.0 | 17.0 | 4.0 | 3.0 | - | 3.0 | - | - | 6.0 | (91) |

| | | | | | | | | | | | |
|-----|------|------|------|-----|-----|-----|-----|---|---|-----|------|
| MSW | 52.7 | 16.8 | 19.3 | 3.2 | 1.7 | - | - | - | - | 6.3 | (74) |
| MSW | 51.0 | 9.7 | 12.5 | 1.7 | 2.1 | 4.9 | 2.5 | - | - | 5.0 | (92) |

MSW: municipal solid waste; MW: medical waste; LIC: low income countries; HIC: high income countries