# 5.B.1 - Biological Treatment of Waste: Composting

## Short description

Within NFR category **5.B.1**, ammonia ($NH_3$) emissions from composting of organic wastes are reported.

| NFR Code | Method | AD | EF |
|---|---|---|---|
| 5.B.1 | CS | NS | CS |

| **Method(s) applied** | |
|---|---|
| **D** | Default |
| **T1** | Tier 1 / Simple Methodology * |
| **T2** | Tier 2* |
| **T3** | Tier 3 / Detailed Methodology * |
| **C** | CORINAIR |
| **CS** | Country Specific |
| **M** | Model |
| * as described in the EMEP/EEA Emission Inventory Guidebook - 2019, in category chapters. | |
| **(source for) Activity Data** | |
| **NS** | National Statistics |
| **RS** | Regional Statistics |
| **IS** | International Statistics |
| **PS** | Plant Specific |
| **As** | Associations, business organisations |
| **Q** | specific Questionnaires (or surveys) |
| **M** | Model / Modelled |
| **C** | Confidential |
| **(source for) Emission Factors** | |
| **D** | Default (EMEP Guidebook) |
| **CS** | Country Specific |
| **PS** | Plant Specific |
| **M** | Model / Modelled |
| **C** | Confidential |

| $NO_x$ | NMVOC | $SO_2$ | **$NH_3$** | $PM_{2.5}$ | $PM_{10}$ | TSP | BC | CO | Heavy Metals | POPs |
|---|---|---|---|---|---|---|---|---|---|---|
| NA | NA | NA | **-/-** | NA | NA | NA | NA | NA | NA | NA |

| | |
|---|---|
| **L/-** | key source by **L**evel only |
| **-/T** | key source by **T**rend only |
| **L/T** | key source by both **L**evel and **T**rend |
| -/- | no key source for this pollutant |
| IE | emission of specific pollutant **I**ncluded **E**lsewhere (i.e. in another category) |
| NE | emission of specific pollutant **N**ot **E**stimated (yet) |
| NA | specific pollutant not emitted from this source or activity = **N**ot **A**pplicable |
| * | no analysis done |

Separately collected organic waste (biowaste) from e.g. households, public garden and park service, food industry, restaurants, canteens and from agriculture can be treated either (i) aerobically (= composting) or (ii) anaerobically (= biogas production).

The aim of the treatment reported under this category is the production of compost, leading to the recycling of nutrients and organic matter.

The produced compost is used as fertilizer or soil improver in agriculture or horticulture and also in private gardening.

In Germany about 50% of the organic waste is treated in composting plants and ammonia ($NH_3$) is an important emission to air.

# Method

Emissions from composting are not a key source and of minor priority.

### Activity Data

Official statistical data (Statistisches Bundesamt, GENESIS, Table Nr. 32111-0003 - Erhebung der Abfallentsorgung; [1)]) are used for the estimation.

The data are published annualy with an exception for the current year of reporting. Therefore, activity data for the current year of reporting are obtained, initially, by extrapolating the trend of the last 3 years. In the following year, when the actual activity data for the given year becomes available, they replace the extrapolated data. This procedure has only a very small impact on the total emissions in the relevant current report year.

### Emission factors

The emission factor used for calculating $NH_3$ emissions is based on emission data from a research project [2)]. The $NH_3$-EF is 222 g/t and used for the whole time series. The use of abatement technologies (such as biofilters) are taken into account.

# Uncertainties

The AD from Statistisches Bundesamt have an uncertainty of ±2% whereas the uncertainty for the EF is -59/+130% (ibid.).

# Recalculations

When preparing the current inventory data, statistical data are only available for the previous reporting year. The current reporting year must therefore be extrapolated on the basis of the previous year. The result of this approach is revised by the correct data in the following year. For this reason, annual recalculations are required for the previous year.

Table 1: Revised biowaste activity data, in [kt]

| | **2022** |
|---|---|
| **current submission** | 8,174 |
| **previous submission** | 9,092 |

Table 2: Accordingly revised $NH_3$ emissions, in [t]

| | **2022** |
|---|---|
| **current submission** | 1,815 |
| **previous submission** | 2,018 |

For **pollutant-specific information on recalculated emission estimates for Base Year and 2022**, please see the recalculation tables following chapter 8.1 - Recalculations.

# Planned improvements

At the moment, no category-specific improvements are planned.

[1)] Statistisches Bundesamt, GENESIS, Table Nr. 32111-0003 - Erhebung der Abfallentsorgung; Wiesbaden; https://www-genesis.destatis.de/genesis//online?operation=table&code=32111-0003&bypass=true&levelindex=0&levelid=1630573034654#abreadcrumb

[2)] Carsten Cuhls, Birte Mähl, Joachim Clemens; gewitra Ingenieurgesellschaft für Wissenstransfer mbH: Ermittlung der Emissionssituation bei der Verwertung von Bioabfällen; https://www.umweltbundesamt.de/publikationen/ermittlung-der-emissionssituation-bei-der; im Auftrag des Umweltbundesamtes, April 2015