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

# **Short description**

Within NFR category **5.B.1**, ammonia (NH<sub>3</sub>) emissions from composting of organic wastes are reported.

	NFR Code	Method	ΑD	EF
	5.B.1	CS	NS	CS
Method(s) applied				
D	Default			
T1	Tier 1 / Simple Methodology *			
T2	Tier 2*			
Т3	Tier 3 / Detailed Methodology *			
С	CORINAIR			
CS	Country Specific			
M	Model			
* as described in the EM	IEP/EEA Emission Inventory Guidebook - 2019, in category chapters.			
(source for) Activity I	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			
С	Confidential			
(source for) Emission	Factors			
D	Default (EMEP Guidebook)			
CS	Country Specific			
PS	Plant Specific			
М	Model / Modelled			
С	Confidential			

emitted:	$NO_x$	NMVOC	SO <sub>2</sub>	NΗ₃	PM <sub>2.5</sub>	PM <sub>10</sub>	TSP	ВС	СО	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	PCDD/F	B(a)P	B(b)F	B(k)F	I(x)P	PAH1-4	НСВ	PCBs
Key																										
Source				-/-																						
by:																										

Separately collected organic waste (biowaste) from e.g. households, public garden and park service, food industry, restaurants, canteens and from agriculture can be treated in two different ways: aerobic treatment (composting) and anaerobic treatment (biogas production).

The aim of the treatment 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 two thirds 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, Fachserie 19, Reihe 1: Abfallentsorgung (Waste management), Table 2.1; <sup>1)</sup>) are used for the estimation. The data are published on a yearly basis with an exception for the actual year of reporting. The activity data for the actual year of reporting are obtained, initially, by carrying the relevant data from the previous year forward, in unchanged form. In the following year, when the actual activity data for the given year becomes available, they replace the data that were carried forward. 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 <sup>2)</sup>. 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  $\pm 2\%$  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, as the Federal Statistical Office's waste statistics are one year behind schedule. 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. Since the resulting recalculation is always very small, it is no longer reported here.

Additionally, a transmission error has been noticed during the annual quality assurance - the 1990 value for the annual data on biowaste was falsely entered for the year 1991. The error has been corrected. For 1991 and 1992 statistical data do not exist, which is why an intrapolation for the missing values has been performed. The correction leads to significantly higher emissions in 1990.

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

	1990	1991	1992	2020
current submission	1.515	1.809	2.103	9.134
previous submission	724	1.515	1.956	8.808

Table 2: Accordingly revised NH<sub>3</sub> emissions, in [t]

	1990	1991	1992	2020
current submission	336	402	467	2.028
previous submission	161	336	434	1.955



For pollutant-specific information on recalculated emission estimates for Base Year and 2020, please see the recalculation tables following chapter 8.1 - Recalculations.

# **Planned improvements**

Currently no improvements are planned.

https://www.umweltbundesamt.de/publikationen/ermittlung-der-emissionssituation-bei-der; im Auftrag des Umweltbundesamtes, April 2015

<sup>&</sup>lt;sup>1)</sup> Statistisches Bundesamt, Fachserie 19, Reihe 1: Abfallentsorgung; Wiesbaden; URL: https://www.destatis.de/DE/Publikationen/Thematisch/UmweltstatistischeErhebungen/Abfallwirtschaft/Abfallentsorgung.html

<sup>&</sup>lt;sup>2)</sup> Carsten Cuhls, Birte Mähl, Joachim Clemens; gewitra Ingenieurgesellschaft für Wissenstransfer mbH: Ermittlung der Emissionssituation bei der Verwertung von Bioabfällen;