Activity report BGK

In general the annual data evaluation by BGK is done in February for the recent year. The evaluation for the year 2020 is shown below. The results for the year 2021 will be published in March 2022 as activity report.

The following figure shows the development of the total throughput of composting and digestion plants who took part in the BGK quality assurance scheme from 2000 to 2020.

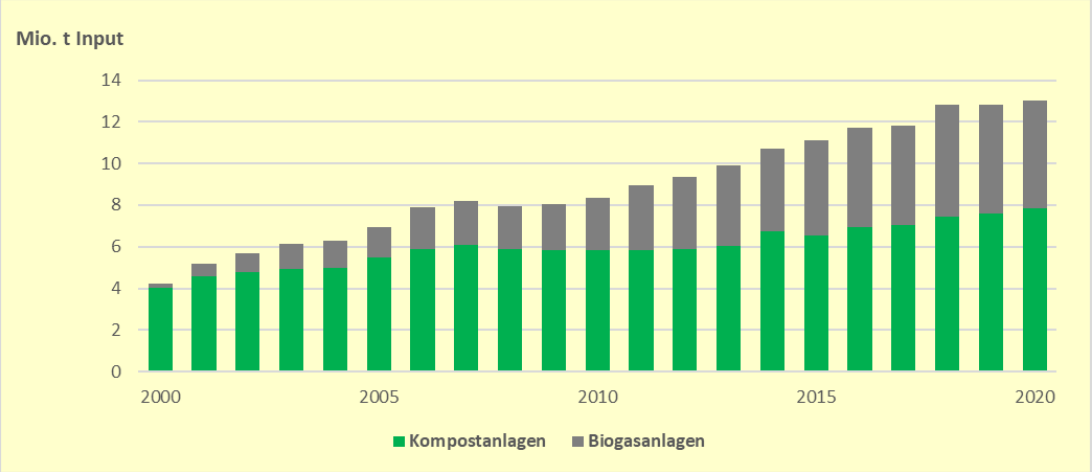

Figure 1: Development of input of compost and digestion plants with quality assurance from 2000 until 2020

The number of composting and digestion plants participating in quality assurance is still rising. In 2020, a total of 7.8 million tonnes of input materials were processed in composting plants with RAL quality assurance. This includes biowaste from the separate collection from private households via biowaste bin (49%), other biowaste (1%) and green waste delivered separately to plants (50%).

Usually the greenwaste composting plants are rather small ones and the composting is usually done in open windrow composting systems. Separate collected biowaste in mixture with greenwaste is usually treated and composted in enclosed and larger composting plants. Beyond that differentiation between open and enclosed systems a wide range of different composting systems can be found in practice.

The trend towards combining composting with digestion is still unbroken. In this way it is possible to use at first the biowaste to generate energy (biogas) and then to produce compost for recycling of organic matter and nutrients. 62 plants operated in the year 2020 with combined processes of digestion and composting.

About 5.2 million tonnes of various input materials were processed in biogas plants with quality assurance in 2020. In addition to the processing of separate collected biowaste (biobin) also other biogenic materials as for example, commercial food waste, overstocked food, flotates and grease separator contents are processed in co-fermentation biogas plants. In „NawaRo“ biogas plants, on the other hand, only energy crops and manure (no biowaste) are processed.

Plant inspection:

Plants are regulary visited by an inspector who checks the self-monitoring of the operators and process management on-site. The inspector/quality manager reports the result of his audit to the BGK office. For surveillance procedure the plant inspection has to be done every two years, for the recognition procedure every year if necessary. The work of the inspector/quality manager is based on a special contract.

List of approved labs and sample takers

The actual list of the 61 approved labs and 260 sample takers is published on the website of BGK under the heading: Laboratories and sample takers.

The laboratories have to be acknowledged for the quality assurance systems by BGK. For that they are obliged to take part successful in a ring test for biowaste every 2 years. With the certificate of the ring test they can be acknowledged for the quality assurance. Additionally they have to fill in a form to declare that they work according the guidelines of BGK (Acknowledged sample taking, analyses according to the method book, report of results 20 work days after sample taking, reporting with special software to BGK (ZASLab) without preliminary information to the compost plant, independance from compost producer). The last national ring test for all laboratories took place in 2021 in co-operation with BGK.

Sample takers has to qualify with trainings every 3 years. The also have to fill in a form to declare independance and working according the guidelines.

Compost quality

An overview about product quality in the year 2020 is given in the following table 1 with the average and range of values for compost and in table 2 with average and range of values for digestate.

Table 1: Product quality of compost in the QAS in 2020 (n=3.841 samples)

Criteria Compost 2020	Mean	25% quantile	Median 50% quantile	75% quantile	95% quantile
Nutrients:					
Nitrogen, total (N) [% DM]	1,39	1,08	1,35	1,67	2,15
Phosphate, total (P_2O_5) [% DM]	0,64	0,44	0,59	0,79	1,10
Potassium, total (K_2O) [% DM]	1,16	0,83	1,12	1,44	1,88
Magnesium, total (MgO) [% DM]	0,76	0,46	0,67	0,91	1,57
Nutrients soluble:					
Nitrogen, $CaCl_2$-soluble (N) [mg/l FM]	267,18	58,13	173,01	407,30	823,00
Ammonium soluble (NH_4-N) [mg/l FM]	221,25	23,00	118,00	339,00	774,00
Nitrate soluble (NO_3-N) [mg/l FM]	45,93	2,00	5,92	37,00	240,00
Phosphat, CAL-soluble (P_2O_5) [mg/l FM]	943,91	607,00	880,00	1210,00	1810,00
Potassium, CAL-soluble (K_2O) [mg/l FM]	3365,76	2310,00	3220,00	4270,00	5862,36
Physical criteria					
Bulk density [g/l FM]	623,49	543,00	621,00	700,00	830,00
Dry matter [%]	63,51	56,40	63,30	70,50	80,80
Impurities › 2 mm [% DM]	0,07	0,01	0,03	0,09	0,25
Plastic foils as impurities › 2 mm [% DM]	0,01	0,00	0,00	0,01	0,02
Surface area impurities [cm2/litre FM]	2,98	0,30	1,80	4,10	11,00
Biological criteria					
Plant response (25 % rel.) [%]	111,88	103,00	110,00	118,00	138,40
Plant response (50 % rel.) [%]	104,85	95,00	104,00	113,00	136,40
Chemical criteria					
Salt content [g/l FM]	4,11	2,16	3,47	5,59	8,80
pH	8,14	7,70	8,40	8,80	9,10
C/N ratio	18,03	13,84	16,70	20,56	29,24
Hygiene:					
Seeds [per litre]	0,03	0,00	0,00	0,00	0,00
Loss of ignition [%]	40,14	33,10	39,60	46,60	57,00
Basic substances (CaO) [% DM]	4,61	2,80	4,10	5,86	9,66
Heavy metals:					
Lead Pb [mg/kg DM]	27,92	19,00	24,90	33,00	52,30
Cadmium Cd [mg/kg DM]	0,40	0,29	0,36	0,46	0,77
Chromium Cr [mg/kg DM]	19,07	13,80	17,40	22,60	33,00
Copper Cu [mg/kg DM]	35,93	27,00	33,50	42,00	61,30
Nickel Ni [mg/kg DM]	12,40	8,10	11,00	15,00	24,00
Zinc Zn [mg/kg DM]	150,38	120,00	143,00	170,00	230,00
Mercury Hg [mg/kg DM]	0,10	0,07	0,09	0,11	0,19

Table 2: Product quality of digestate in the QAS in 2020 (n=1.563 samples)

Criteria Liquid Digestate 2020	Mean	25% quantile	Median 50% quantile	75% quantile	95% quantile
Nutrients:					
Nitrogen, total (N) [% DM]	13,06	6,68	12,75	18,00	25,04
Phosphate, total (P_2O_5) [% DM]	3,77	2,00	3,76	5,03	7,12
Potassium, total (K_2O) [% DM]	6,13	3,66	5,24	7,57	14,05
Magnesium, total (MgO) [% DM]	0,75	0,29	0,60	0,98	1,64
Nutrients soluble:					
Nitrogen, $CaCl_2$-soluble (N) [mg/l FM]	3679,58	2454,50	3601,20	4741,31	6566,34
Ammonium soluble (NH_4-N) [mg/l FM]	3674,59	2452,00	3600,00	4740,00	6559,00
Nitrate soluble (NO_3-N) [mg/l FM]	4,98	0,50	1,47	3,00	10,00
Phosphat, CAL-soluble (P_2O_5) [mg/l FM]					
Potassium, CAL-soluble (K_2O) [mg/l FM]					
Physical criteria					
Bulk density [g/l FM]	1012,76	1000,00	1003,00	1020,00	1060,00
Dry matter [%]	6,06	3,30	4,40	7,00	16,00
Impurities › 2 mm [% DM]	0,02	0,00	0,00	0,00	0,07
Plastic foils as impurities › 2 mm [% DM]	0,00	0,00	0,00	0,00	0,02
Surface area impurities [cm2/litre FM]	1,09	0,00	0,00	0,00	6,00
Biological criteria					
Stability (organic acids) mg/litre	808,15	220,00	440,00	970,00	2393,86
Chemical criteria					
Salt content [g/l FM]	17,58	13,11	17,00	22,11	27,24
pH	8,44	8,30	8,43	8,60	8,90
C/N ratio	3,69	1,87	2,56	5,30	8,46
Hygiene:					
Seeds [per litre]	0,01	0,00	0,00	0,00	0,00
Loss of ignition [%]	56,83	51,00	57,10	63,20	75,28
Basic substances (CaO) [% DM]	5,28	3,54	4,90	6,61	10,14
Heavy metals:					
Lead Pb [mg/kg DM]	10,02	3,00	3,79	8,30	40,79
Cadmium Cd [mg/kg DM]	0,41	0,24	0,34	0,50	0,87
Chromium Cr [mg/kg DM]	15,38	8,35	12,30	20,20	35,18
Copper Cu [mg/kg DM]	59,16	34,50	49,90	67,90	118,00
Nickel Ni [mg/kg DM]	13,46	9,00	12,00	17,00	24,58
Zinc Zn [mg/kg DM]	271,19	183,00	232,00	330,00	566,90
Mercury Hg [mg/kg DM]	0,06	0,03	0,04	0,08	0,17

Market report:

Biodegradable waste products are used in quite different fields on account of their manifold characteristics. Statistical numbers of 2020 for compost are shown in the following figure for RAL quality assured compost products (figure 2):

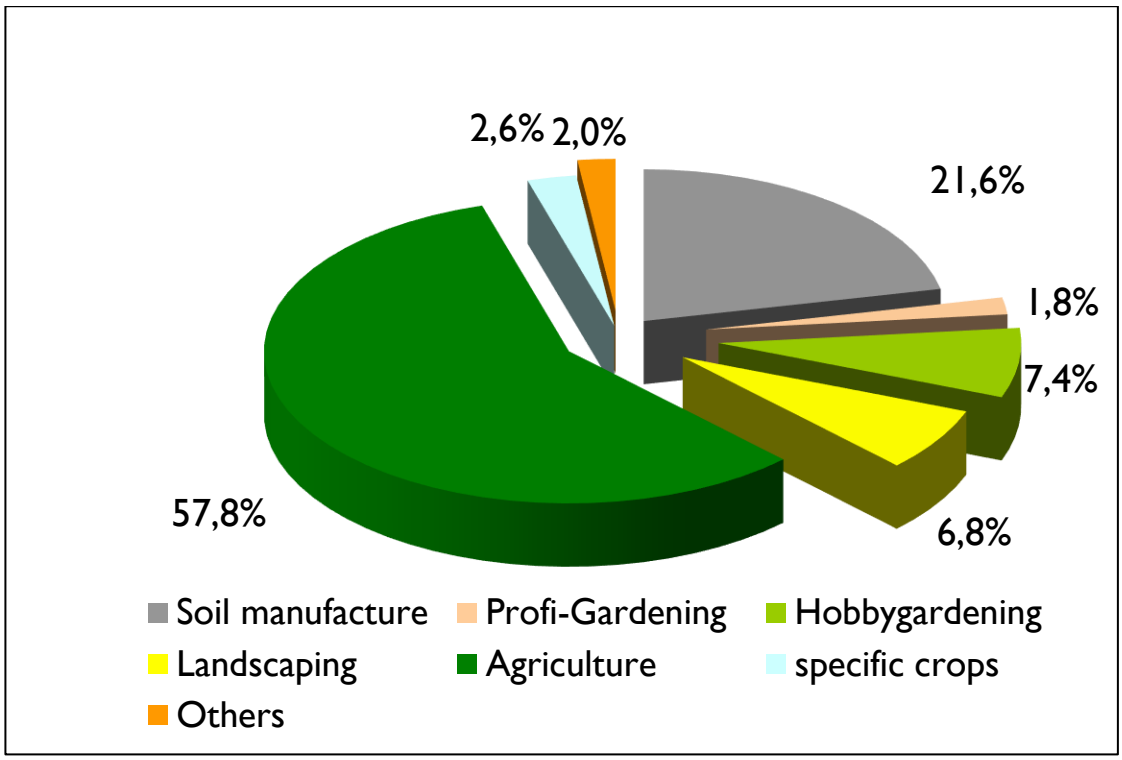

Figure 2: Market distribution of compost in 2020

Agriculture continues to be the main market for composts and digestate. More than half of the composts produced and almost all digestate are used as organic fertilisers on agricultural land.

Not only the nutrient content but also the organic matter of compost and considerable contents of alkaline material (lime) argue for compost use in agriculture. Especially the demand for compost for organic farming is increasing.

The decline of organic matter in European soils as well as the soil degradation by erosion become more and more important. To improve soil properties by using the stable organic matter of high quality composts is seen as an appropriate solution for these problems. Initiatives such as „Save our soils“ or the „Carbon farming“ initiative by the European Commission document that soil fertility will remain one of the most important challenges on the road to sustainable development.

Other areas of compost application like gardening or soil manufactory show a more favourable market situation because higher proceeds can be generated. But those fields compared with agriculture have distinctly smaller areas. But they are provided with a real demand in the sense of a free economy, based on the necessary use of humus which has to be bought as an additional means of soil improving. Especially the branch of horticulture and landscaping should be mentioned here. Also the use of compost as replacement for peat e.g. in potting soils will be an important market in future.

Quality Assurance as a marketing tool

The consumer demand for quality assured products has increased considerably. This is reflected in the high amount of product quality labels of the food processing industry. According to this development the demands on the input materials of the foodstuff industry or of agricultural systems growth up, too. The experience has shown that without a well-established and acknowledged quality assurance system the market for waste-derived products is turning down. Today in several cropping systems only quality assured products are allowed. Furthermore in environmental risk areas (like water protection areas) the demand on controlled and certificated fertilisers and soil improvers plays an important role. Quality assured compost products and digestate which fulfil the requirements of the EU regulation on organic farming (EU Regulation N0. 834/2007) are listed in the official organic input material list of the research institute for organic farming (FiBL). Also other organisations for organic farming like BIOLAND or NATURLAND opened their guidelines for certified compost regarding additional requirements.

Additionally to the certification of the compost products the BGK has also published different guidelines for good practice

- for the application and use of compost in agriculture
- for the application and use of compost in landscaping
- for the application and use of compost in water protection areas
- and for the good practice of composting in order to avoid emissions

Other projects of BGK

In recent years, BGK has focused in addition to the impurity content and quality of compost or digestate products on the topic of avoidance of impurities at the source means in the input material like separate collected biowaste from households. Due to the discussion of plastic pollution in environment and soils improving the quality of biowaste input material is essential.

BGK published a paper about plastics in compost and digestate, their significance and possible ways to avoid them,

further a paper for quality and ensured purity of biowaste and developed

unified methods for assessing the quality of biowaste as input material.