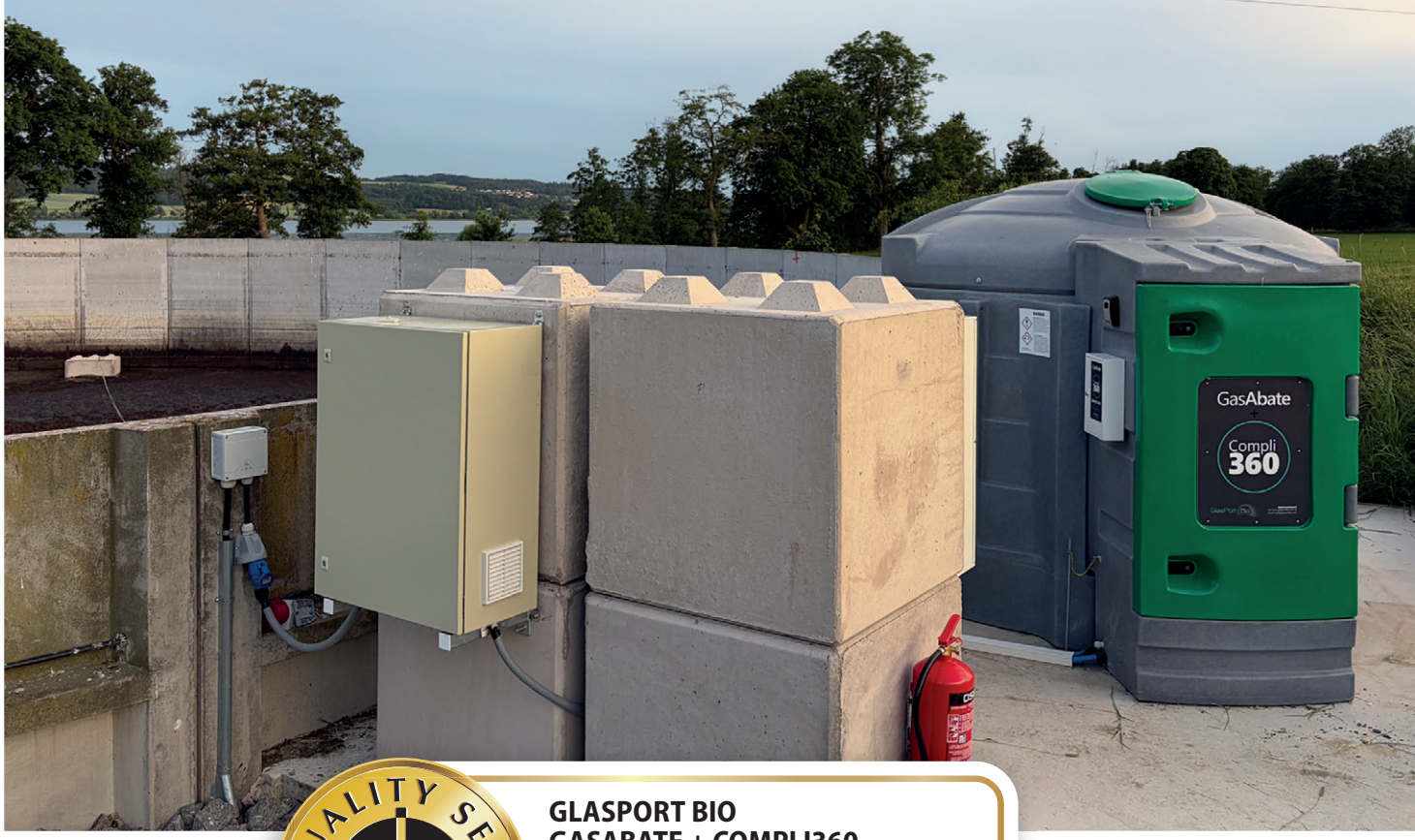
GlasPort Bio Ltd.

GasAbate additive + Compli360 dosing system for slurry tanks containing pig slurry

Reduction of methane emissions and odour



QUALITY SEAL DLG DLG.ORG

GLASPORT BIO
GASABATE + COMPLI360
FOR PIG SLURRY

✔ **Reduction of Methane Emission**
✔ **Reduction of Odour Emission**

DLG Certificate 7611

Overview



A test mark „DLG-APPROVED for individual criteria“ is awarded for agricultural products which have successfully fulfilled a scope-reduced usability testing conducted by DLG according to independent and recognised evaluation criteria. The test is intended to highlight particular innovations and key criteria of the test object. The test may contain criteria from the DLG test scope for overall tests, or focus on other value-determining characteristics and properties of the test subject. The minimum requirements, test conditions and procedures as well as the evaluation bases of the test results will be specified in consultation with an expert group of DLG. They correspond to the recognised rules of technology, as well as scientific and agricultural knowledge and requirements. The successful testing is concluded with the publication of a test report, as well as the awarding of the test mark which is valid for five years from the date of awarding.

In order to obtain the certification mark, the slurry additive GasAbate + Compli360, manufactured by GlasPort Bio Ltd., was tested for its effectiveness in reducing methane emissions and odours in open slurry tanks containing pig slurry.

The DLG's requirements regarding the reduction of methane and odour were met and, in some cases, exceeded. Consequently, GlasPort Bio's slurry additive for pig slurry has been certified.

Other criteria were not investigated.

The product

Manufacturer and Applicant

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Product:
GasAbate + Compli360 slurry additive and dosing system – an automated dosing system for reducing emissions from open slurry tanks containing pig slurry

Description and Technical Specifications

The automatic dosing system containing the active ingredient GasAbate + Compli360, manufactured by GlasPort Bio Ltd., is suitable for use in open slurry tanks with the aim of minimising emissions from stored slurry during the storage period. Table 1 sets out the key product characteristics.

The dosing system consists of a storage container (IBC) containing the liquid active ingredient, a dosing pump – the operating time of which can be recorded electronically – and several stainless-steel lances. During installation, the lances are fitted into the slurry tank and permanently secured. The ends of the lances are installed in such a way that any escaping GasAbate + Compli360 can rise and take effect as evenly as possible within the slurry tank.

Safety regulations must be observed during use and installation. The information in the safety data sheet must be followed. Personal protective equipment (PPE) must be worn.

Warranty

The manufacturer offers a warranty of 1 year, subject to the product being used correctly.

Table 1:
Product characteristics for the treatment of pig slurry (manufacturer's specifications)

Suitability	2-8 % Dry matter content
Active ingredient	Hydrogen peroxide
Dosage	Automatic
Positive impact on	Methane, nitrous oxide, ammonia, odour
Dosage for use	2.49 l/m³ slurry
Duration of use	Every 30 days
Accessories	Dosing pump, stainless steel lances, storage tank for GasAbate + Compli360
Safety	Harmless to health (GRAS) and non-biocide
Power consumption of the pump	0.000562 kWh/m³ slurry

Assessment – in brief

The slurry additive GasAbate + Compli360, manufactured by GlasPort Bio Ltd., is a liquid chemical that is automatically added to open slurry tanks and reduces methanisation through chemical reactions. This results in less methane being produced and a reduction in odour emissions.

The product includes a dosing system that ensures that a sufficient amount of active ingredient is always added automatically and distributed throughout the container.

A 75.7 % reduction in methane levels was recorded in the slurry on an annual average basis. A reliable reduction in methane is therefore guaranteed when the product is dosed correctly.

In addition, the reduction in odour in the slurry was also verified by measurement. The use of GasAbate + Compi360 can reduce the odour in the slurry by an annual average of 79.3 %. It can therefore be assumed that, when the technology is used correctly, a reliable reduction in odour is ensured. The results are shown in Table 2.

No effect on the formation of nitrous oxide could be detected.

The increase in ammonia emissions observed in some cases during the test involved only a small amount of gas and plays a minor role in an overall carbon footprint assessment.

The effects of this reduction on other gases have not been investigated.

This certification also involved a survey of users in real-world settings.

Reliable dosing in working practice can be easily demonstrated. The dosing system, which uses the active ingredient GasAbate + Compli360, therefore meets the requirements of the DLG test framework and is certified for the reduction of methane and odour.

Table 2:
Measurement results at a glance

QUALITY PROFILE	Test result	Evaluation*
Reduction of Emission		
Methane reduction [%]	75.7	■■■■□
Odour reduction [%]	79.3	■■■□□

* DLG Evaluation range:
■■■ or better = meets, exceeds or significantly exceeds the established DLG standards,
□□ = meets the legal requirements for marketability, ■ = failed

The method

The test is based on the DLG test framework for external slurry storage facilities, which was drawn up in collaboration with the Technical Committee for process-integrated mitigation measures. Large parts of the test framework are identical to the 'VERA test protocol for covers and other emission-reducing technologies to reduce gaseous emissions from farm manure storage facilities, Version 3:2018-07'.

The test involves measurements to determine emission reductions on a pilot scale. Several identical plastic containers were used for this purpose, which were operated in a case-control mode. The purpose of this arrangement is to compare the emissions from a container holding untreated farm manure (control) with those from a container holding treated farm manure (case). The reduction is calculated from the difference.

Key process-related parameters (e.g. slurry temperature, ambient climate data and dry matter content or slurry composition) were recorded regularly and taken into account in the analysis.

Four identical tanks were available at the test site for the trial. Two tanks containing homogenised pig slurry were tested using a case-control design. For strategic reasons, the applicant decided to carry out duplicate determinations, although this is not strictly required under the DLG test framework. For this reason, all four available tanks were used for the measurements. An overview of the experimental design is shown in Table 3. Table 4 sets out the characteristics of the tanks. All tanks can be climate-controlled and are not exposed to direct sunlight. A fan in the outlet opening of each container ensures ventilation of the slurry surface, with the exhaust air being separated from the supply air as far as possible via a duct. The air velocity across the slurry surface was set at 0.1 to 0.3 m/s and was continuously recorded and stored.

During the test, care is taken to ensure that both the manufacturer's specific requirements regarding the addition of the active substance (e.g. TM content) and standard industry requirements (e.g. agitators) are taken into account. The slurry was sourced from nearby livestock farms, agitated and distributed into the test containers 24 hours before measurements began.

The tests measured ammonia (NH_3), methane (CH_4) and nitrous oxide (N_2O). Odour samples were also taken from all containers in order to determine technical efficiency.

Table 3:
Experimental setup for determining emission reductions in pig slurry

Container 1	Container 2	Container 3	Container 4
Pig Control	Pig Case	Pig Control	Pig Case

Table 4:
Characteristics of the test containers



Test container of the experimental setup for determining emission reductions in pig slurry

(Image source: DTI)

Material	MDPE
Shape	Cylindrical
Volume	5,000 l
Height	2.30 m
Inner diameter	1.88 m
Ø of the inlet opening	3 mm x 88 mm
Ø of the outlet opening	1 mm x 200 mm

Odour

The odour concentration measurements were carried out in accordance with EN 13725:2022. The odour samples were analysed using an olfactometer. The laboratory states that the measurement uncertainty is ± 2.1 %.

The samples were taken from the outlet opening of the containers. Three test days were scheduled for each of the two measurement periods, with three samples taken per container on each test day.

Ammonia

Ammonia concentrations were recorded continuously over a period of 30 days per measurement period using a PICARRO G2508 analyser (CRD spectrometer) and extracted from the outlet of the test contain-

ers. The measurements were verified by means of a 24-hour impingement measurement on one measurement day per measurement period in one test tank and one control tank. The background concentration was recorded and taken into account in the analysis.

The laboratory states that the measurement uncertainty is < 1 ppb + 0.05 %.

Methane

Methane concentrations were recorded continuously over a period of 30 days per measurement period using a PICARRO G2508 analyser (CRD spectrometer) and extracted from the outlet of the test containers. Background levels were recorded and taken into account in the analysis.

The laboratory stated that the measurement uncertainty was < 5 ppb + 0.02 %.

During the first measurement period, methane concentrations were also recorded and analysed on a selective basis using GC/MS analysis. As there was good agreement with the continuously operating CRD spectrometer, the GC/MS technique was not used in subsequent measurements.

Nitrous oxide

Nitrous oxide concentrations were continuously recorded over a period of 30 days per measurement period using a PICARRO analyser (CRD spectrometer) and extracted from the outlet of the test containers. Background levels were recorded and taken into account in the analysis.

The laboratory stated that the measurement uncertainty was < 5 ppb + 0.008 %.

Analysis of harmful gas emissions

The tests are based on the recorded slurry temperatures, so that the tests can be unambiguously assigned to the measurement periods.

Hourly averages were recorded and stored throughout the entire measurement period as part of the continuous measurements. Outliers were removed. The total of the measured values in grams was normalised to the previously measured dry weight for each test container. The two corresponding test containers (case/control) were compared and the percentage reduction determined.

Survey

Surveys on handling practices were carried out and analysed at three agricultural holdings. Where practical experience is available, tips and advice on improved handling are provided.

Documentation

The legal requirements regarding monitoring by the licensing authorities are discussed, and options are provided for the simple and sustainable documentation of correct usage.

The test results in detail

Tests were carried out on a pilot scale using several slurry tanks. The test results are based on a comparison between treated and untreated slurry, with the tanks being filled with identical slurry in each case. The results are summarised below.

The test under warm ambient conditions (summer) took place in June and August 2024. The measurements under cooler ambient conditions (autumn) took place in October and November 2024. The composition of the slurry, with ranges of variation across all test containers, is shown in Table 5. The temperature ranges in the test containers used are shown in Table 6.

During the summer measurement period, the average outdoor temperature was 17.0°C and the average relative humidity was 80.4 %. In autumn, the average temperature was 6.9°C and the average relative humidity was 90.3 %.

During the test, foaming occurred in some of the test containers. This mainly occurs during the dosing process and can be attributed to the shape of the containers. This phenomenon tends to occur more frequently in containers with a small diameter-to-height ratio.

Table 5:
Composition of pig slurry before and after the series of tests

	Summer		Autumn	
	before measurement	after measurement	before measurement	after measurement
Dry matter DM [%]	2.7 … 4.2	3.3 … 3.8	2.2 … 2.8	2.6 … 2.9
Total nitrogen [% DM]	9.26 … 13.28	9.58 … 10.90	10.39 … 11.24	9.97 … 10.57
Ammonium nitrogen [% DM]	5.88 … 9.23	6.53 … 7.77	8.47 … 9.7	8.26 … 9.05
Phosphorus [% DM]	2.10 … 2.39	2.14 … 2.22	2.14 … 2.24	2.25 … 2.44
Potassium [% DM]	5.15 … 8.03	5.48 … 6.27	7.01 … 8.76	6.70 … 8.02
pH [––]	7.0 … 7.1	7.1 … 7.5	7.2 … 7.3	7.1 … 7.3

Table 6:
Temperature and humidity in all test containers

	Summer			Autumn		
	Ø-Temperature Slurry	Ø-Air temperature above the slurry surface	Ø-Humidity	Ø-Temperature Slurry	Ø-Air temperature above the slurry surface	Ø-Humidity
Container 1 (Control)	18.1 °C	17.9 °C	84.2 % rH	5.9 °C	6.4 °C	92.6 % rH
Container 2 (Case)	17.8 °C	17.9 °C	87.6 % rH	6.5 °C	6.0 °C	97.1 % rH
Container 3 (Control)	18.3 °C	17.9 °C	79.5 % rH	5.4 °C	6.3 °C	94.0 % rH
Container 4 (Case)	––[1]	17.8 °C	73.7 % rH	6.3 °C	6.1 °C	89.2 % rH

[1] Sensor temporarily out of action

Odour

The average odour-causing substance mass flows generated by the untreated slurry tanks (control group) were 237,270 GE/h in summer and 225,558 GE/h in autumn. Following treatment with the additive, values of 65,868 GE/h (summer) and 30,801 GE/h (autumn) were achieved. This represented a reduction of 72.2 % in summer and 86.3 % in autumn. On average over the year, emissions were reduced by 79.3 %. The results are shown in Table 7.

Table 7:
Results of the olfactometric odour measurement

	Summer	Autumn
Control		
Number of measurements	17	17
Averaged mass flow rate of odour [GE/h]	237,270	225,558
Case		
Number of measurements	17	17
Averaged mass flow rate of odour [GE/h]	65,868	30,801
Odour reduction, individual [%]	72.2	86.3
Overall odour reduction [%]	79.3	

Ammonia

During the study, elevated ammonia emissions were observed in some of the treated slurry tanks, and the difference in the fall measurement was statistically significant. However, due to uncertainties in determining the dry matter content, the observed effects should be interpreted with caution. A NH_3-reducing effect could not be demonstrated in this study.

A supplementary analysis of the greenhouse gas impact in CO_2 equivalents shows that the indirect climate impact of the increased NH_3 emissions is of minor significance compared to the significantly reduced CH_4 emissions. The overall positive climate impact of the CH_4 reduction thus remains largely intact. The certification is limited to the reduction of methane and odour.

Methane

The results of the methane measurements were consistently good. In summer, emissions were reduced by 79.8 %, in autumn, the figure was 71.6 %, making a combined total of 75.7 %. The results are shown in Table 8.

Nitrous oxide

No significant reduction in nitrous oxide was detected over the entire duration of the test. The reduction in nitrous oxide following the addition of GasAbate + Compli360 was barely measurable and cannot be statistically substantiated. However, nitrous oxide concentrations in all slurry tanks remained at a very low level.

An increase in nitrous oxide emissions resulting from the addition of GasAbate + Compli360 can therefore be ruled out.

Table 8:
Results of methane measurements in pig slurry

	Summer	Autumn
Control		
Measurement days[1]	30	27
Summed mean methane [g CH_4/kg TM]	26.54	4.30
Case		
Measurement days[1]	30	27
Summed mean methane [g CH_4/kg TM]	5.35	1.22
Odour reduction, individual [%]	79.8	71.6
Overall odour reduction [%]	75.7	

[1] 3 days of measurement failure in autumn

Survey

The survey of three farmers yielded predominantly positive results. Two of the three farmers added the additive to their tanks of pig slurry, whilst one farmer used a tank of cattle manure. As the set-up is identical and the method of application differs only slightly, the statements from all three farmers can be taken into account equally in the survey.

The automatic dosing was found to be particularly convenient. This meant that the time required by the operators was kept to a minimum. The fact that there was no need for additional stirring was also well received. A follow-up survey carried out at one of the three farms two years after installation revealed that even the operation of a mobile agitator had not caused any visible damage to the pipework. However, all operators would like to have a control display (if no logger station has been installed) or remote monitoring (e.g. via a mobile app). An alarm relay or an additional level sensor in the IBC container could also be beneficial. Installation should be carried out by the manufacturer's qualified personnel.

The time required was stated as ten minutes per week, provided that the active ingredient (IBC container) does not need to be replaced; otherwise, an additional two hours per IBC container should be allowed for.

All participants in the survey would use the technology again at any time if its positive effects were conclusively proven.

Documentation

The operation of the dosing pump can be recorded via a data logger (optional) and saved in tabular form, including the date and time. In addition, purchase receipts for the active ingredient can be collated. This enables regulatory authorities to monitor the sustainable use of the dosing system.

Conclusion

The study involved technical measurements to reduce odour and methane emissions from an external slurry tank containing pig slurry under laboratory conditions. The additive for pig slurry was assessed for ease of use in practical applications, and a survey was carried out amongst operators.

Based on the available results, the additive GasAbate + Compli360, when used with the dosing system supplied by GlasPort Bio Ltd., meets the requirements for the award of the DLG Quality Seal in respect of the test criteria 'Odour and methane emission reduction'. The composition of the active ingredient is assessed and awarded an accolade annually.

No other criteria were assessed.

Further information

Testing agency

DLG TestService GmbH,
Groß-Umstadt location, Germany

The tests are conducted on behalf of DLG e.V.

Labor and emissions measurements

Teknologisk Institut, Agro Food Park 15,
8200 Aarhus N, Denmark

Test location: Høgemosevej 24, 8380 Trige, Denmark

DLG test framework

DLG APPROVED test “Emission reduction in slurry tanks” (current as of 08/2026)

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Founded in 1885 by the German engineer Max Eyth, DLG (Deutsche Landwirtschafts-Gesellschaft – German Agricultural Society) is an expert organisation in the fields of agriculture, agribusiness and the food sector. Its mission is to promote progress through the transfer of knowledge, quality standards and technology. As such, DLG is an open network and acts as the professional voice of the agricultural, agribusiness and food sectors.

As one of the leading organisations in the agricultural and food market, DLG organises international trade fairs and events in the specialist areas of crop production, animal husbandry, machinery and equipment for farming and forestry work as well as energy supply and food technology. DLG’s quality tests for food, agricultural equipment and farm inputs are highly acclaimed around the world.

For more than 130 years, our mission has also been to promote dialogue between academia, farmers and the general public across disciplines and national borders. As an open and independent organisation, our network of experts collaborate with farmers, academics, consultants, policymakers and specialists in administration in the development of future-proof solutions for the challenges facing the agriculture and the food industry.

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