

## FertilizationManager

golf plus

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Example report  
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**Analysis** Investigation/ordernr: 700469/003709444 Date sampling: 01-11-2023 Date report: 14-11-2023

| Results  | Unit                 | Result   | Target value | low          | rath.low | good | rath.high | high |
|----------|----------------------|----------|--------------|--------------|----------|------|-----------|------|
| Chemical | Total N stock        | kg N/ha  | 1680         | 1470 - 2200  |          |      |           |      |
|          | C/N ratio            |          | 13           | 13 - 17      |          |      |           |      |
|          | N-supplying capacity | kg N/ha  | 25           | 95 - 145     |          |      |           |      |
|          | S-plant available    | kg S/ha  | < 2          | 20 - 30      |          |      |           |      |
|          | Total S stock        | kg S/ha  | 340          | 320 - 595    |          |      |           |      |
|          | C/S ratio            |          | 67           | 50 - 75      |          |      |           |      |
|          | S-supplying capacity | kg S/ha  | 5            | 20 - 30      |          |      |           |      |
|          | P-plant available    | kg P/ha  | 0,7          | 2,4 - 4,1    |          |      |           |      |
|          | P-soil stock         | kg P/ha  | 130          | 205 - 265    |          |      |           |      |
|          | K-plant available    | kg K/ha  | 60           | 95 - 150     |          |      |           |      |
|          | K-soil stock         | kg K/ha  | 100          | 95 - 150     |          |      |           |      |
|          | Ca-plant available   | kg Ca/ha | 45           | 95 - 225     |          |      |           |      |
|          | Ca-soil stock        | kg Ca/ha | 675          | 1065 - 1355  |          |      |           |      |
|          | Mg-plant available   | kg Mg/ha | 45           | 95 - 150     |          |      |           |      |
|          | Mg-soil stock        | kg Mg/ha | 90           | 95 - 150     |          |      |           |      |
| Physical | Na-plant available   | kg Na/ha | 9            | 20 - 41      |          |      |           |      |
|          | Na-soil stock        | kg Na/ha | 12           | 22 - 40      |          |      |           |      |
|          | Si-plant available   | g Si/ha  | 10970        | 8110 - 35130 |          |      |           |      |
|          | Fe-plant available   | g Fe/ha  | 3360         | 3380 - 6080  |          |      |           |      |
|          | Zn-plant available   | g Zn/ha  | 2160         | 680 - 1010   |          |      |           |      |
|          | Mn-plant available   | g Mn/ha  | 15980        | 7840 - 10810 |          |      |           |      |
|          | Cu-plant available   | g Cu/ha  | 30           | 55 - 90      |          |      |           |      |
|          | Co-plant available   | g Co/ha  | 10           | 5 - 10       |          |      |           |      |
|          | B-plant available    | g B/ha   | < 105        | 215 - 295    |          |      |           |      |
|          | Mo-plant available   | g Mo/ha  | < 10         | 140 - 6760   |          |      |           |      |
|          | Se-plant available   | g Se/ha  | 3,4          | 4,7 - 6,1    |          |      |           |      |
|          | Acidity (pH)         |          | 5,3          | 5,4 - 6,0    |          |      |           |      |
|          | C-organic            | %        | 1,67         |              |          |      |           |      |
|          | Organic matter       | %        | 3,4          |              |          |      |           |      |
|          | SOC/SOM ratio        |          | 0,49         | 0,45 - 0,55  |          |      |           |      |
|          | Carbonate lime       | %        | 0,2          | 2,0 - 3,0    |          |      |           |      |
|          | Clay (<2 µm)         | %        | 1            |              |          |      |           |      |
|          | Silt (2-50 µm)       | %        | 12           |              |          |      |           |      |
|          | Sand (>50 µm)        | %        | 83           |              |          |      |           |      |
|          | Clay-humus (CEC)     | mmol+/kg | 38           | > 44         |          |      |           |      |
|          | CEC-saturation       | %        | 86           | > 95         |          |      |           |      |
|          | Ca-saturation        | %        | 66           | 80 - 90      |          |      |           |      |
|          | Mg-saturation        | %        | 14           | 6,0 - 10     |          |      |           |      |
|          | K-saturation         | %        | 5,0          | 2,0 - 4,0    |          |      |           |      |
|          | Na-saturation        | %        | 1,1          | 1,0 - 1,5    |          |      |           |      |
|          | H-saturation         | %        | 0,3          | < 1,0        |          |      |           |      |
|          | Al-saturation        | %        | < 0,1        | < 1,0        |          |      |           |      |

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| Results    | Unit                    | Result  | Target value | low       | rath.low | good | very good |      |  |
|------------|-------------------------|---------|--------------|-----------|----------|------|-----------|------|--|
|            |                         |         |              |           |          |      |           |      |  |
|            | Soil crumbling          | score   | 10,0         | 6,0 - 8,0 |          |      |           |      |  |
|            | Soil slaking            | score   | 7,7          | 6,0 - 8,0 |          |      |           |      |  |
|            | Risk on wind erosion    | score   | 5,3          | 6,0 - 8,0 |          |      |           |      |  |
|            |                         |         |              |           |          |      |           |      |  |
| Biological | Unit                    | Result  | Target value | low       | rath.low | good | rath.high | high |  |
|            | Moisture retention cap. | mm      | 19           |           |          |      |           |      |  |
|            | Microbial biomass       | mg C/kg | 413          | 170 - 510 |          |      |           |      |  |
|            | Microbial activity      | mg N/kg | 55           | 25 - 41   |          |      |           |      |  |
|            | Fungal/bacterial ratio  |         | 0,9          | 0,6 - 0,9 |          |      |           |      |  |
|            |                         |         |              |           |          |      |           |      |  |

**Fertilisation recommendations**

The result is compared with an agricultural target value and is categorized as low, rather low, good, rather high high. This is not an appreciation as meant in ISO 17025 (par. 7.8.6).

**Legislation**

The fertilisation recommendations aim to achieve an agronomical optimum yield and crop quality. The recommendations do not take any legal restrictions into consideration.

| Recommend.                                                | Recommend.                                 | Unit    |                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|--------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Soil-based recommendation (for the coming 4 years)</b> |                                            |         |                                                                                                                                                                                                                                                                               |
| Phosphate (P <sub>2</sub> O <sub>5</sub> )                | 175                                        | kg/ha   | When recommendations are high, it is advised to split the amount during the 4 years, for instance supply half the amount biannually. The soil based recommendation is meant to level the soil stocks of phosphorus, potassium, calcium and magnesium to the required amounts. |
| Potassium (K <sub>2</sub> O)                              | 0                                          | kg/ha   |                                                                                                                                                                                                                                                                               |
| Calcium (CaO)                                             | 275                                        | kg/ha   |                                                                                                                                                                                                                                                                               |
| Magnesium (MgO)                                           | 0                                          | kg/ha   | The lime gift is based on an optimal pH of 5,7 For every tenth increase in pH a lime gift is required of 40 kg/ha.                                                                                                                                                            |
| Lime (nw)                                                 | 160                                        | kg/ha   |                                                                                                                                                                                                                                                                               |
| Effective OM                                              | 2500                                       | kg/ha   | The amount of effective organic matter needed is calculated for a 4 year period. At the organic matter balance the yearly application of organic matter is calculated.                                                                                                        |
|                                                           | Crop                                       | Culture | Recommendation                                                                                                                                                                                                                                                                |
| <b>Crop-based recommendation (annual)</b>                 |                                            |         |                                                                                                                                                                                                                                                                               |
| in kg/ha                                                  | Nitrogen (N)                               | Fairway | 96                                                                                                                                                                                                                                                                            |
|                                                           | Sulphate (SO <sub>3</sub> )                | Fairway | 53                                                                                                                                                                                                                                                                            |
|                                                           | Phosphate (P <sub>2</sub> O <sub>5</sub> ) | Fairway | 40                                                                                                                                                                                                                                                                            |
|                                                           | Potassium (K <sub>2</sub> O)               | Fairway | 65                                                                                                                                                                                                                                                                            |
|                                                           | Calcium (CaO)                              | Fairway | 90                                                                                                                                                                                                                                                                            |
|                                                           | Magnesium (MgO)                            | Fairway | 10                                                                                                                                                                                                                                                                            |
|                                                           | Sodium (Na <sub>2</sub> O)                 | Fairway |                                                                                                                                                                                                                                                                               |
|                                                           | Zinc (Zn)                                  | Fairway | 0                                                                                                                                                                                                                                                                             |
|                                                           | Manganese (Mn)                             | -       | See the explanation.                                                                                                                                                                                                                                                          |
|                                                           | Copper (Cu)                                | Fairway | 0,25                                                                                                                                                                                                                                                                          |
|                                                           | Boron (B)                                  | Fairway | 0,5                                                                                                                                                                                                                                                                           |

**Crop based recommendation**

The crop-based recommendation is based upon the crop needs, average yields and climatic conditions and is corrected for soil nutrient stocks and the soil supplying capacity. During the growing season the SoilCropMonitor can be used for fertilization adjustments.

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**Explanation**

The results and/or the recommendations of this analysis are valid until 2027

For more information please use the following link:

<https://www.eurofins-agro.com/en/soil-analysis-explanation>

The soil based recommendation aims to maintain the soil nutrient stocks. The K, Ca and Mg recommendation will optimize the balance at the cation-exchange-capacity (CEC). It is advised to spread the soil based recommendation for nutrients and lime application across a 4 year period. When you have applied the soil based recommendation a new soil based analysis can be used to update the concentration of the nutrient stocks.

The crop based fertilization will feed the crop and improve its quality. Due to higher/lower yields and possible losses (e.g leaching) the amount of plant available nutrients can fluctuate. Therefore, we advise you to carry out a crop based analysis (Culture analysis) to determine the actual amount of available nutrients and to update the fertilization recommendations.

Look carefully at the appreciation of the nutrients on page 1. If the target values indicate that one or more nutrient quantities are very low, consult your advisor to level these quantities.

We have assumed the following yields, when calculating the crop based recommendations:

Fairway

-

When your yield differentiates from the above, it is recommended to adjust your fertilization accordingly

**Nitrogen:**

The N recommendation relates to an annual dose. If possible, we recommend splitting this N dose into several applications. You can use our SoilCheck soil test in season to determine whether subsequent applications are necessary. This test measures the plant-available N (mineral N) in the soil among other things.

**Sulphur:**

Sulphur (S) is released by the degradation (mineralisation) of organic matter or manure. This mineralisation is performed by soil organisms. Soil organisms are not very active under colder conditions, which means not much S is released from the soil early in the spring. Therefore, it is sensible to fertilise with S for many early crops, even if the soil content is good or high.

**Phosphate:**

P-supplying capacity is 44 . The target range is 17 - 27

The P-buffering capacity indicates whether the P-soil stock is high enough to maintain the level of plant available P. When the buffering capacity (buffering power) is low, the plant available P will not remain on level during the growing season: it will decrease.

**Potassium:****Calcium:**

Fertilization with calcium may benefit the soil structure.

You can reduce the calcium soil based recommendation with the amount of calcium applied with the lime.

**Manganese:**

No Manganese deficiency is to be expected.

**Lime:**

Give the lime prior to the most lime needing crop.

Note: with liming calcium and magnesium can be added.

**Clay-humus (CEC):**

You can increase the CEC by applying organic matter and/or increase the pH of your soil.

**Soil life:**

The biological soil fertility is measured by 3 characteristics, the microbial biomass, the microbial activity, and the fungal/bacterial ratio.

The acknowledgement of the measured results is based upon the amount of organic matter. There is not a recommendation given for the measured characteristics. On the basis of research projects there will be more information available.

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Organic matter Figure: Organic matter balance



Yearly breakdown rate (percentage) of the total organic matter content (%): 1,8

|                                                                                                                           | Crop (residue)     | Culture: | Input of effective organic matter |
|---------------------------------------------------------------------------------------------------------------------------|--------------------|----------|-----------------------------------|
| Stock of organic matter which will remain after 1 year in the sampled layer if no (effective) organic matter is supplied. |                    |          |                                   |
| Total required supply of effective organic matter as a result of the degradation of the organic matter.                   | Fairway            |          | 200                               |
| Supply through crop residues (average within provided rotation scheme or crops).                                          | Average input/year |          | 200                               |
| Remaining to be supplied through e.g. animal manure, green manures and/or compost.                                        |                    |          |                                   |

For increasing the soil organic matter content by 0.1%: 1350 kg effective organic matter per hectare is needed.

Figure: Quality of the organic matter

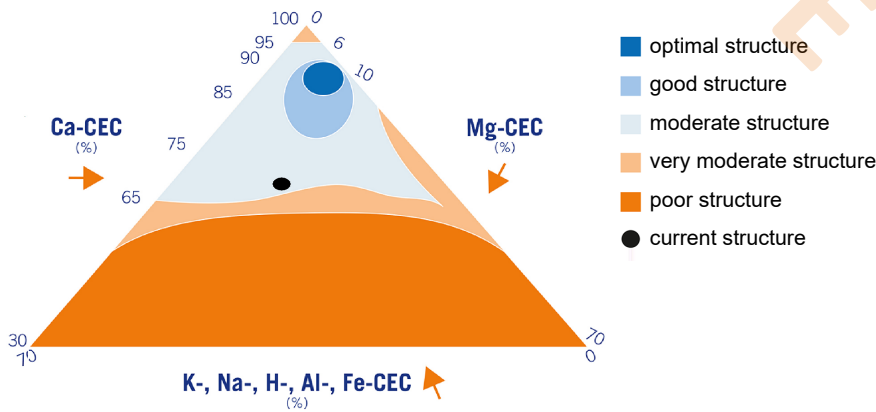


Organic matter consists primarily of C, N, P, S. If the organic matter contains relatively high amounts of N and/or S, this makes it attractive to soil organisms. Soil organisms happily eat this organic matter. N and S are released in the process and the amount of organic matter decreases slightly (dynamic organic matter). Organic matter can also contain a lot of C. This is generally less attractive to soil organisms (bacteria). As a result, the organic matter is not consumed as quickly by the soil organisms; making the organic matter more stable. Stable organic matter contributes - among other factors - to the workability of the soil and the looseness. Dynamic organic matter contributes primarily to the release of N and S and is therefore a source of these nutrients for the crop. The quality of the organic matter can be changed (gradually) by paying attention to the properties of soil improvers such as animal manure, compost and crop residues.

Physical

The assessment of soil structure is based on the Ca-CEC, K-CEC, and Mg-CEC ratio. Actual soil structure is - of course - not merely depending on ratio, but also on weather conditions, moisture condition of the soil, and the weight of the machinery.

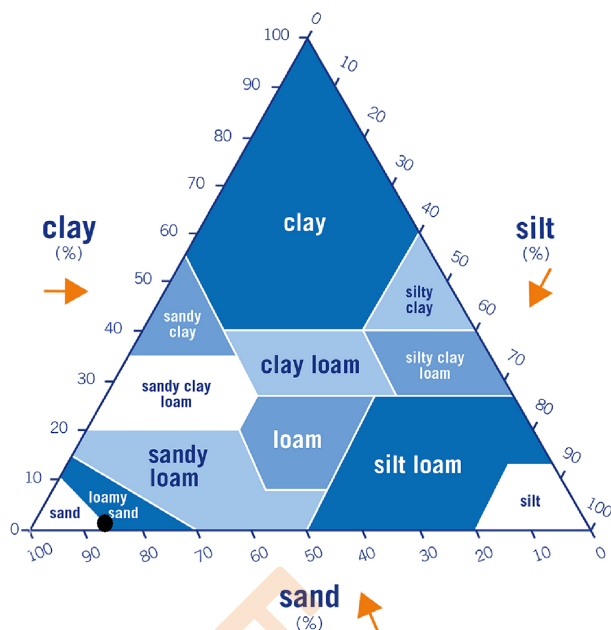
Figure: Structure triangle



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## Physical

Figure: Texture triangle



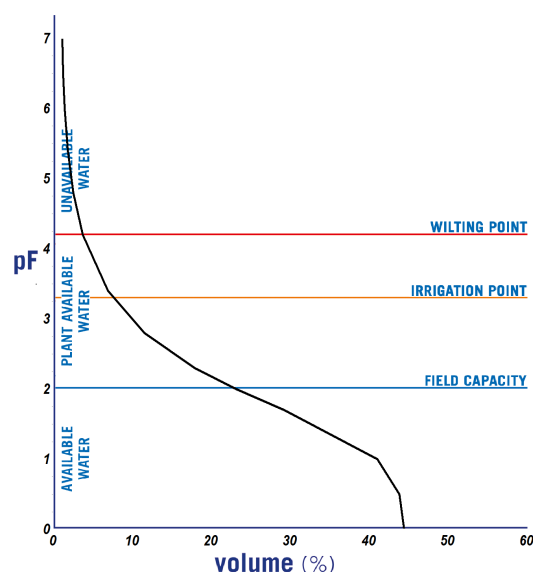
Besides clay, the silt and sand fractions are presented as well. Clay is smaller than 2 micrometer ( $\mu\text{m}$ ), silt particles are 2-50  $\mu\text{m}$  and sand particles are larger than 50  $\mu\text{m}$ . The relative distribution of soil particles is used to estimate the risk of slaking. Slaking causes the soil pores to be clogged with smaller particles and degrades soil structure. The risk of slaking is greatest at 10-20% clay.

Soil crumbling score is: good, however the evaluation of soil crumbling status is also depending on crop type. Considering the results, the chance of soil slaking is small.

displayed in  
the mineral  
parts  
(granular)

| Grain size            | Unit | Result | Grain size              | Unit          | Result |
|-----------------------|------|--------|-------------------------|---------------|--------|
| 0-2 $\mu\text{m}$     | %    | 1,9    | 250-355 $\mu\text{m}$   | %             | 17,5   |
| 2-16 $\mu\text{m}$    | %    | 2,1    | 355-500 $\mu\text{m}$   | %             | 5,1    |
| 16-50 $\mu\text{m}$   | %    | 2,3    | 500-1000 $\mu\text{m}$  | %             | 1,9    |
| 50-63 $\mu\text{m}$   | %    | 1,1    | 1000-2000 $\mu\text{m}$ | %             | 0,3    |
| 63-125 $\mu\text{m}$  | %    | 8,9    | M50 Median              | $\mu\text{m}$ | 198    |
| 125-180 $\mu\text{m}$ | %    | 29,4   | D60/D10                 | ratio         | 2,6    |
| 180-250 $\mu\text{m}$ | %    | 29,5   |                         |               |        |

Figure: Water retention curve



The amount of plant available water in the sampled layer is 19 mm. This is the maximum amount you should irrigate. All excess irrigation will drain off the parcel or will sink to deeper layers.

Field capacity (pF 2,0): 23,2 % moisture  
Irrigation point (pF 3,3): 7,6 % moisture  
Wilting point (pF 4,2): 3,8 % moisture

Crops have difficulties to obtain water when the actual moisture level is below pF 3,3. When you are able to measure the moisture level, start with irrigation if the moisture content of the parcel is at 7,6 % and irrigate 16 mm.

The actual moisture level can be measured by using a soil moisture sensor, or collect soil from ten spots in the parcel. Measure the weight of the moist soil and the weight after 24 h drying. The difference between moist and dry soil is an indication of the moisture level of the parcel.

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|                           |                        |                                                                                  |
|---------------------------|------------------------|----------------------------------------------------------------------------------|
| <b>Contact &amp; info</b> | Soil layer:            | 0 - 10 cm                                                                        |
|                           | Sample was taken by:   | Eurofins Agro, Monsternemer                                                      |
|                           | Contact sample taking: | Klantenservice Agro: 0888761010                                                  |
|                           | Sampling method:       | W-pattern, at least 40 sub samples, according to Eurofins Agro standard MIN 1000 |

If the following information is shown in the reports, this information may have been provided by the client and may affect the valuation, advice and/or analysis result:  
sampling depth, crop, culture.

| Method   | Result               | Unit  | Method                                  | RvA                       |
|----------|----------------------|-------|-----------------------------------------|---------------------------|
| Results  | Total nitrogen stock | 1240  | mg N/kg                                 | Em: NIRS                  |
| analyses | S-plant available    | < 1,1 | mg S/kg                                 | Em: CCL3 (Gw NEN 17294-2) |
|          | Total sulphur stock  | 250   | mg S/kg                                 | Em: NIRS                  |
|          | P-plant available    | 0,5   | mg P/kg                                 | Em: CCL3 (Gw NEN 15923-1) |
|          | P-soil stock         | 22    | mg P <sub>2</sub> O <sub>5</sub> /100 g | PAL1: Gw NEN 5793         |
|          | P-soil stock         | 10    | mg P/100 g                              | PAL1: Gw NEN 5793         |
|          | K-plant available    | 43    | mg K/kg                                 | Em: CCL3 (Gw NEN 17294-2) |
|          | K-soil stock         | 1,9   | mmol+/kg                                | Em: NIRS                  |
|          | Ca-plant available   | 0,4   | mmol Ca/l                               | Em: NIRS                  |
|          | Ca-soil stock        | 26    | mmol+/kg                                | Em: NIRS                  |
|          | Mg-plant available   | 35    | mg Mg/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Mg-soil stock        | 5,4   | mmol+/kg                                | Em: NIRS                  |
|          | Na-plant available   | 7     | mg Na/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Na-soil stock        | 0,4   | mmol+/kg                                | Em: NIRS                  |
|          | Si-plant available   | 8120  | µg Si/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Fe-plant available   | 2490  | µg Fe/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Zn-plant available   | 1600  | µg Zn/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Mn-plant available   | 11830 | µg Mn/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Cu-plant available   | 24    | µg Cu/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Co-plant available   | 8,2   | µg Co/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | B-plant available    | < 76  | µg B/kg                                 | Em: CCL3 (Gw NEN 17294-2) |
|          | Mo-plant available   | < 4   | µg Mo/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Se-plant available   | 2,5   | µg Se/kg                                | Em: CCL3 (Gw NEN 17294-2) |
|          | Acidity (pH)         | 5,3   |                                         | Em: NIRS                  |
|          | C-organic            | 1,67  | %                                       | Em: NIRS                  |
|          | Organic matter       | 3,4   | %                                       | Em: NIRS                  |
|          | C-inorganic          | 0,03  | %                                       | Em: NIRS                  |
|          | Carbonate lime       | 0,2   | %                                       | Em: NIRS                  |
|          | Clay (<2 µm)         | 1     | %                                       | Em: NIRS                  |
|          | Silt (2-50 µm)       | 12    | %                                       | Em: NIRS                  |
|          | Sand (>50 µm)        | 83    | %                                       | Em: NIRS                  |
|          | Clay-humus (CEC)     | 38    | mmol+/kg                                | Em: NIRS                  |
|          | Microbial biomass    | 413   | mg C/kg                                 | Em: NIRS                  |
|          | Microbial activity   | 55    | mg N/kg                                 | Em: NIRS                  |
|          | Fungal biomass       | 141   | mg C/kg                                 | Em: NIRS                  |
|          | Bacterial biomass    | 157   | mg C/kg                                 | Em: NIRS                  |
|          | Granulair            |       |                                         | GKL1: Gw NEN 5753         |
|          | Bulk density         | 1351  | kg/m <sup>3</sup>                       | Em: NIRS                  |

The values stated on page 1 and 2 under 'Result' are calculated from the above mentioned analysis results.

Q Method accredited by RvA  
Em: Method Eurofins Agro, Gw: Equivalent of, Cf: In conformity with

Results are reported in dry soil.

The analyses were done at Eurofins Agro, Wageningen (NL).

The results relate exclusively to the sample taken and received by Eurofins Agro, and to the material processed on 02-11-2023, and therefore to the sample analysed. For a detailed description of the sampling and analysis methods used, visit [www.eurofins-agro.com](http://www.eurofins-agro.com)