

## Summary: BioAgenasol® trial by the Styrian Chamber of Agriculture - Danger of nitrate discharge in sensitive groundwater areas

Already in 2016, the Styrian Chamber of Agriculture has created an exact trial with oil pumpkins to clarify the performance and behavior of the organic fertilizer BioAgenasol® in sensitive groundwater areas. In the trial of 2017, it was tested how BioAgenasol® behaves on a vegetable acreage related to nitrate discharge hazards in the groundwater compared to a mineral full-fertilizer variant. For this purpose, a trial with salad - especially „Grazer Krauthäupln” - was created in 2017 and 2018 new potatoes were planted on the same trial area.

The test field is located in the Graz field in the dedication area 2 regarding groundwater protection program. The soil is a loamy sand and the soil type is a medium to deep carbonate-free brown earth. At a depth of 55-70 cm there is a transition to sand, gravel and crushed rock. To measure the nitrate hazard were lysimeter system, as well as several suction plugs available.

In 2018, the trial area experienced above-average precipitation in the first half of the year compared to the long-term average. Locally in April and May heavy rain events happened, which led also to slurrries. The temperature trend from April was permanently above the long-term monthly average.

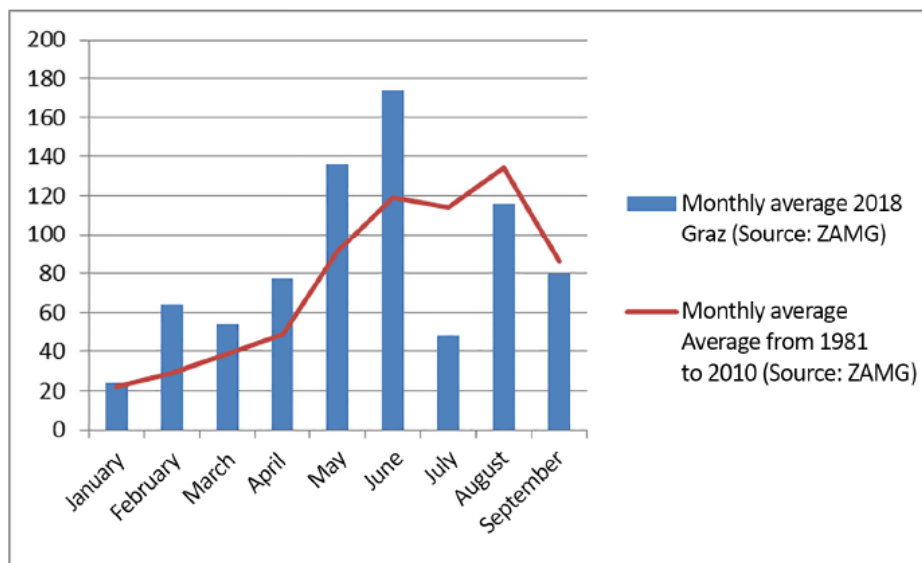


Fig. 1: Precipitation data from 2018 and the yearly average from 1981 to 2010 (Graz).

Fertilization was carried out on March 27, 2018 - 2 days before potato laying. 1,800kg BioAgenasol® per hectare was used; this corresponds with an additional 500kg of patent potassium per hectare of total nutrient yield of 99kg of nitrogen, 45kg of phosphorus and 177kg of potassium. Attention was paid to nutrient equivalency both in the BioAgenasol® variant and in the mineral fertilizer variant. The set amount on March 29 was 2,200kg per hectare. The harvest date was June 12th.



*Fig. 2: Various variants of fertilizers on 22 May 2018.*

The total soil examination showed that phosphorus is in the range C and potassium in the range D. This corresponds to a good nutrient supply. The pH was 6.3 in the weakly acidic range. The humus contents were in the middle range, with BioAgenasol® reaching a humus increase of 0.2%. The nitrogen supply potential was also in the middle range. Particularly striking here was a rapid drop in nitrogen supply potential for the mineral fertilizer variant in the low range (<35 mg N / 1,000 g fine soil).

The main focus of this trial was the nitrate nitrogen in the soil, which was examined regularly. The measurement results showed a similar course over the regular measuring dates. It was striking that the BioAgenasol® variant generally had lower nitrate nitrogen levels in the soil compared to the mineral fertilizer variant. The measured nitrate concentrations at the leachate studies may be considered moderate and are quite common for these soils. The lysimeter measurements of the fertilizer variations show a similar course of the measured nitrate concentrations. The mineral fertilizer variant is generally at a higher level. At the beginning of October, the measured nitrate concentration in the leachate is significantly lower for the BioAgenasol® variant than for the mineral fertilizer variant. The lower level of the BioAgenasol® variant is also confirmed by the result of the suction plugs. During the time period of measuring, 37% less nitrogen was removed from the lysimeter of the BioAgenasol® plot compared to the mineral fertilizer variant and 43% less in the suction plugs.

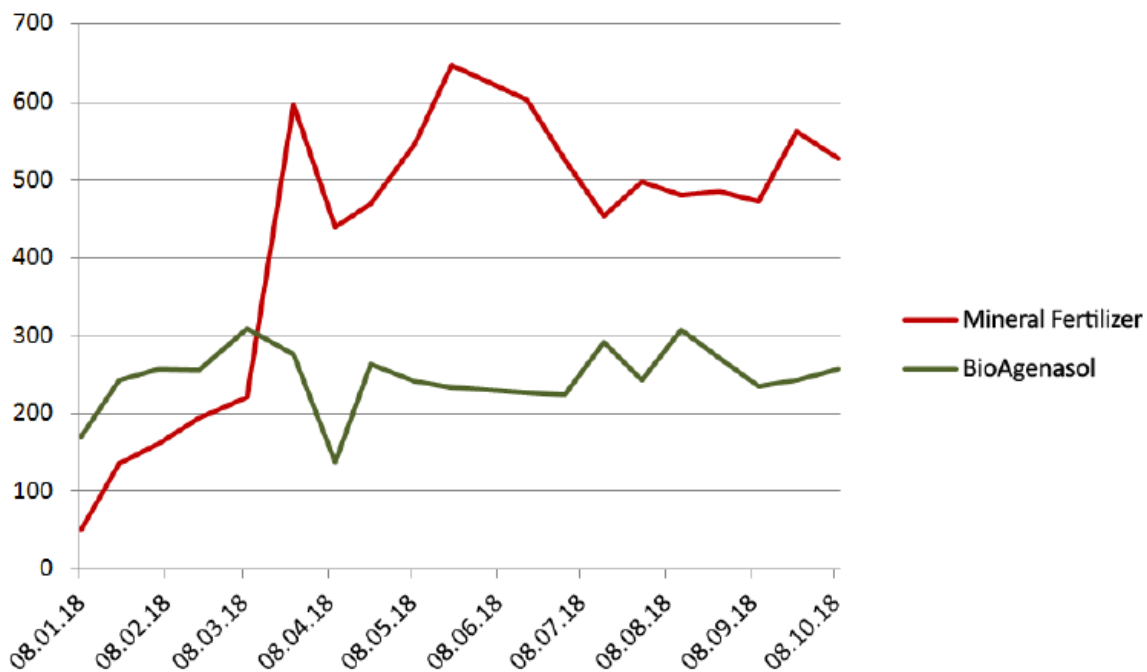


Fig. 3: Nitrate concentrations of the suction plugs in mg NO<sub>3</sub>/l (comparison of BioAgenasol and mineral fertilizer).

BioAgenasol® was able to keep up with only a 12% reduction in yield in this one-year, new potato fertilization trial with mineral fertilizers. It should be noted here that, according to the literature, the yields of potatoes fertilized with organic fertilizers is about 50% lower than the yield of potatoes fertilized with mineral fertilizers. Regular soil samples showed lower levels of nitrate nitrogen in the BioAgenasol® variant over the entire period. These were ultimately even below those of the control variant. The nitrate levels in the leachate of the lysimeter system may be considered moderate and are quite common for these soils. This also offers a positive outlook on the reduction of nitrate levels in groundwater. BioAgenasol® was also able to demonstrate its positive contribution to groundwater conservation in 2018.

For the full version of the trial please contact us: [feed@agrana.com](mailto:feed@agrana.com)