



Compost of macroalgae from the Baltic Sea – a product of sustainable agriculture and marine farming

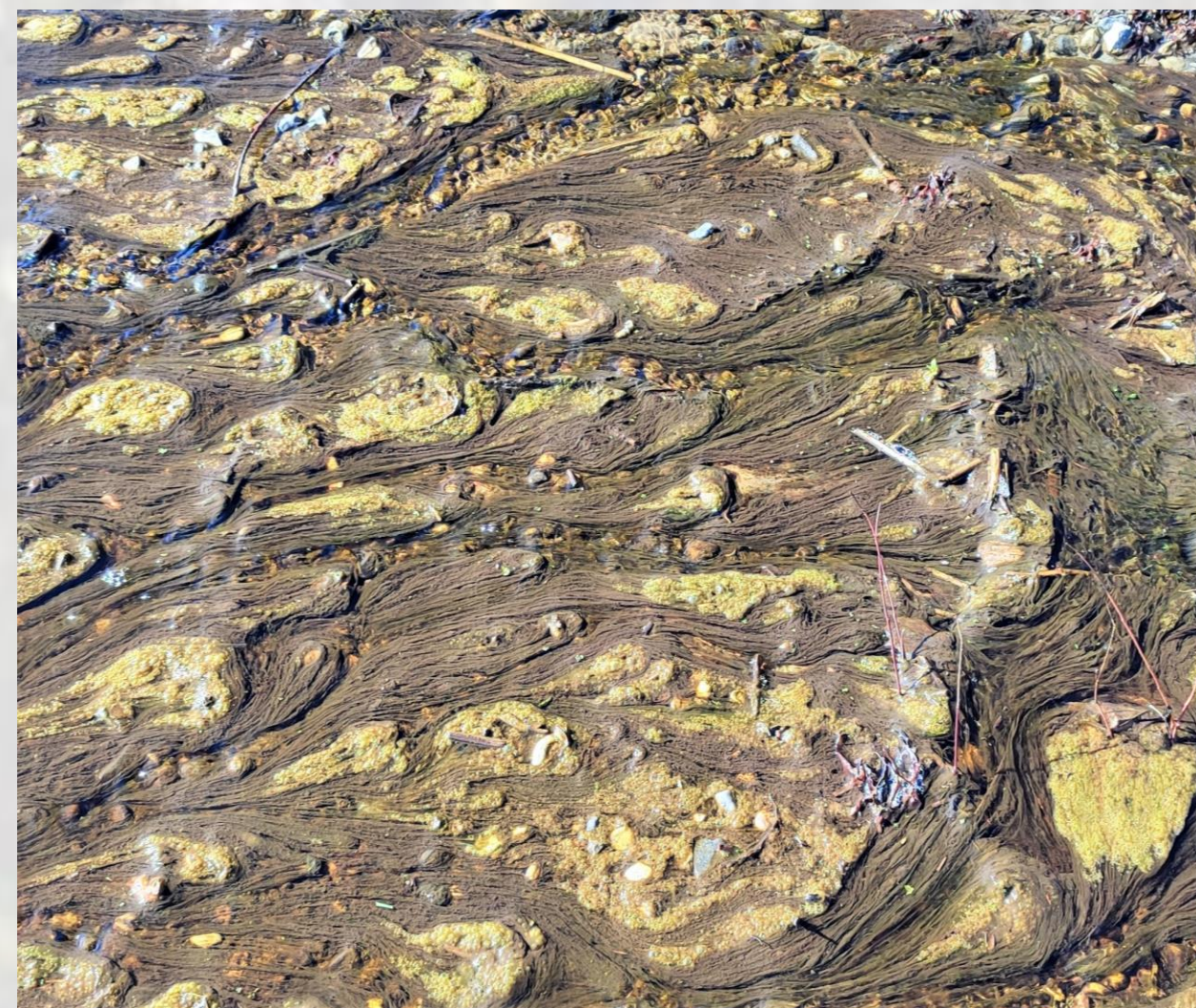
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1. *Fucus vesiculosus*



2. Algae in Mērsrags

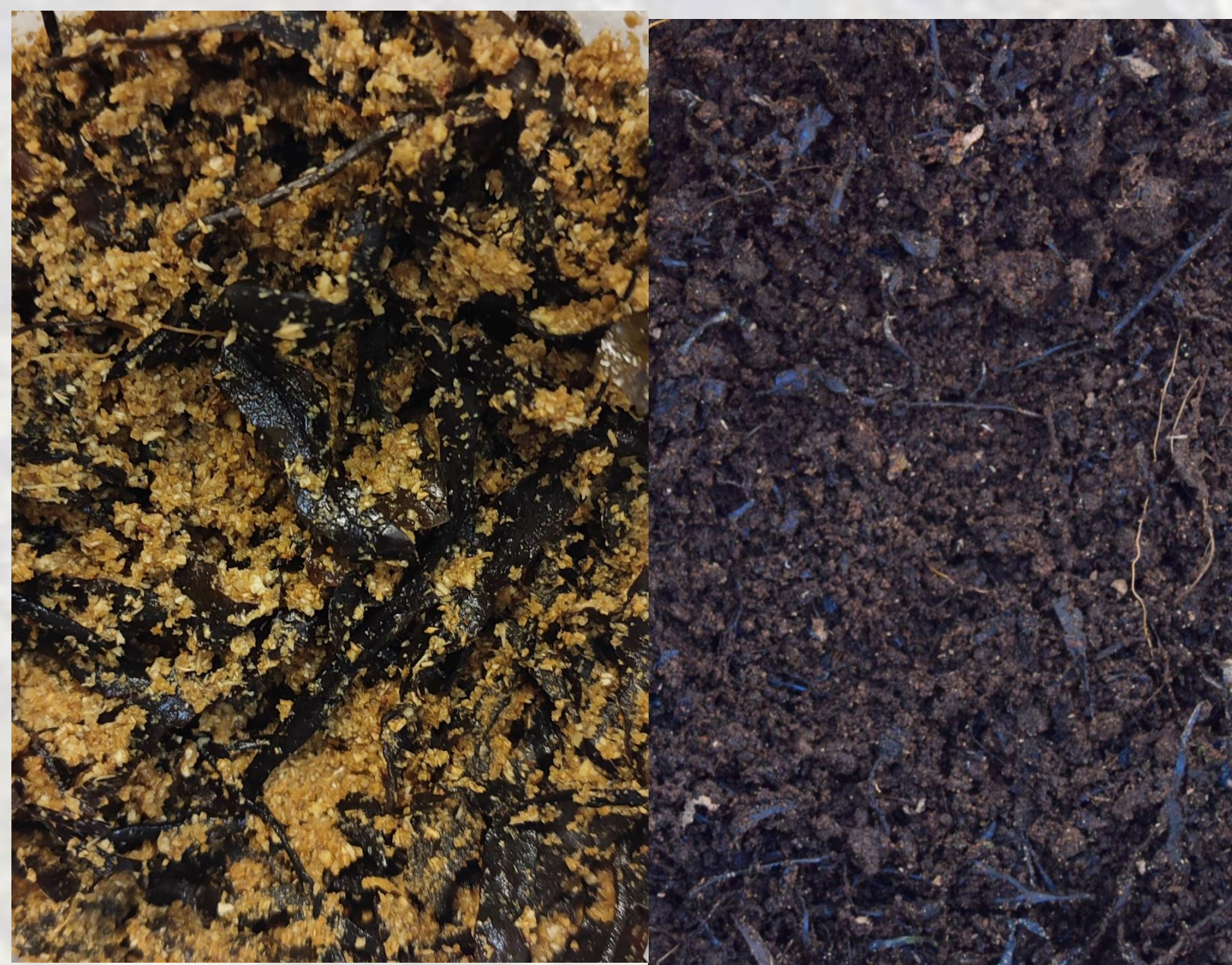


2. Material collecting point in Mērsrags

The algal material collected on April 22, 2022 in Mērsrags (57°21'54.8"N 23°07'26.6"E) was selected for the practical trial compost, in which dominated by *Fucus vesiculosus*, *Battersia arctica* and fine sawdust fractions from deciduous trees. In order to determine the optimal mass ratio and quantity of algae and sawdust, chemical analyzes were at first performed on the used shavings and a previously collected algae pilot sample. The mass values of the materials were compiled, keeping the C:N ratio within 20-25.



3. Composting tank

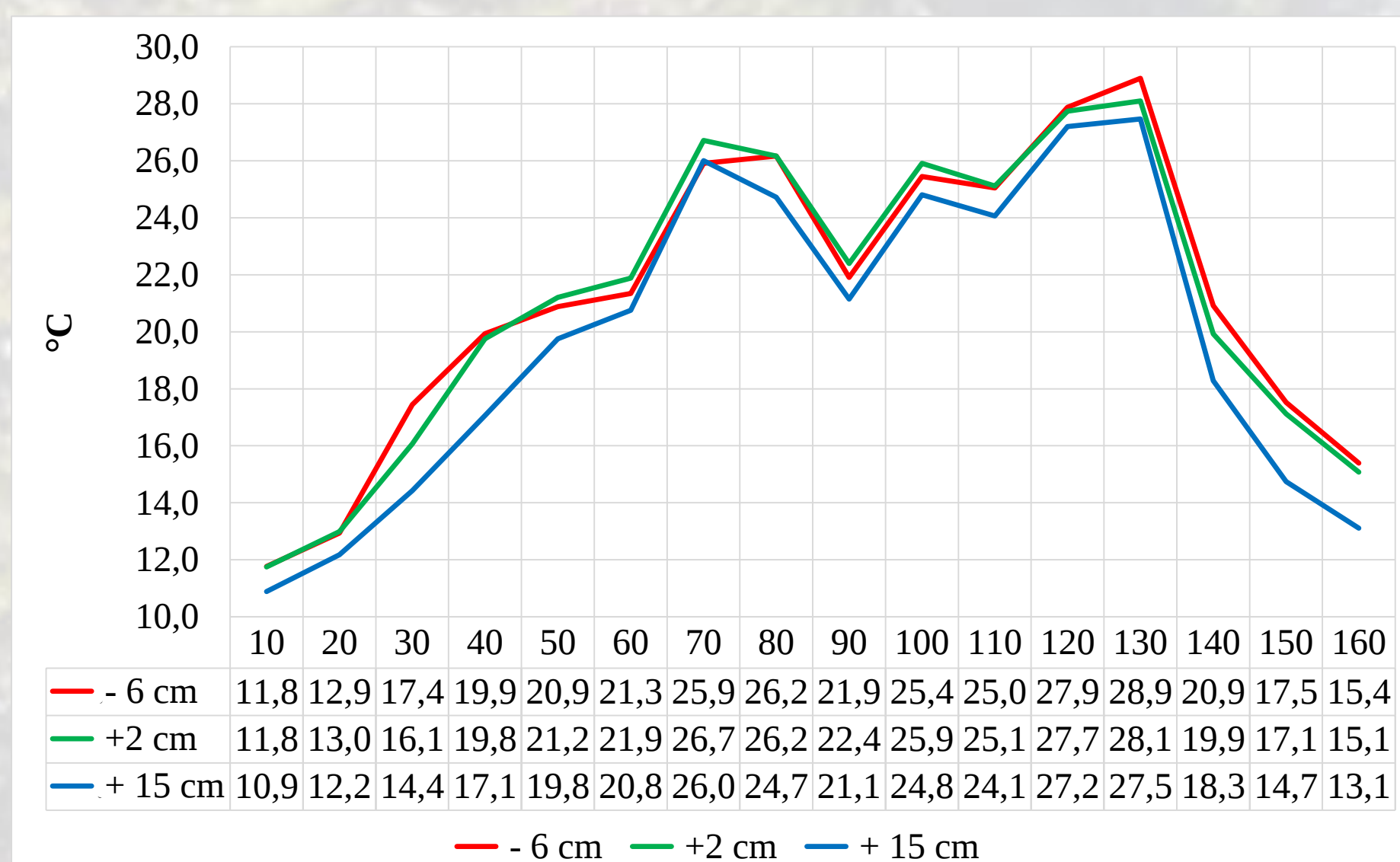


4. Composted material before and after process of composting

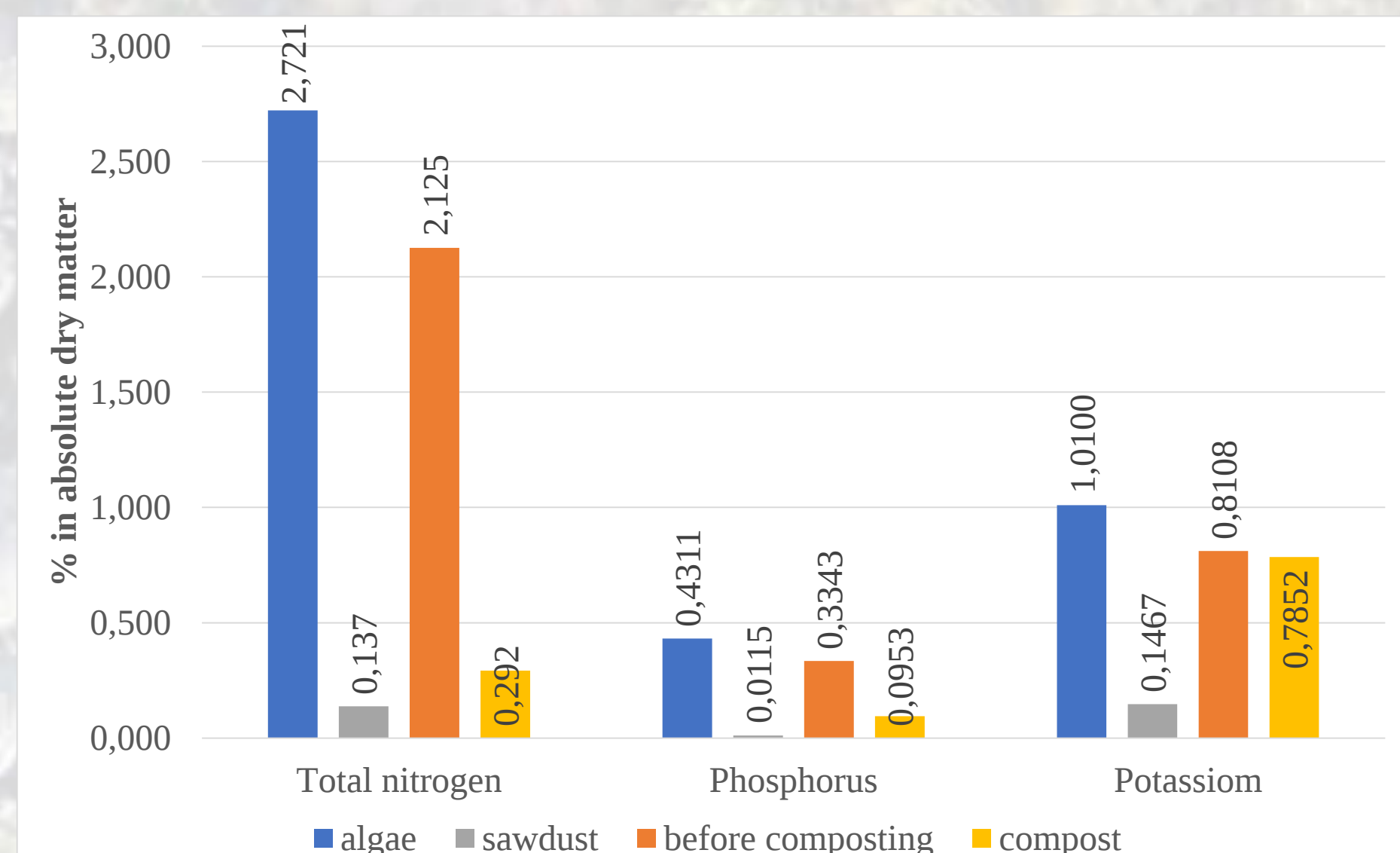


5. Ash extract for chemical analyzes

Before mixing the compost for the first time, the macroalgae material was washed, cleaning it as much as possible from sand and other impurities. Composting was carried out in a ventilated tank, with "TMS-4 Standard" monitoring the moisture content and temperature of the material at a depth of -6, +2 and +15 cm, adding additional water as needed so that the moisture content of the mass stays normal (~60%), as well as stirring the mass for smoother processes. The tank was stored outdoors until the end of the experiment in October 2022, when repeated chemical analyzes were performed on the material.



6. Temperature measurements in compost and tank



7. Chemical composition of collected algae and compost

In the composting process organic material passes through four different phases in order for the material to fully compost and be safe to be used as a fertilizer:

- 1) Mesophilic phase; 2) Thermophilic and Hygienization phase;
- 3) Cooling or Mesophilic phase II; 4) Maturation phase.

In order to determine the optimal mass ratio and quantity of algae and sawdust, chemical analyzes were at first performed on the used shavings and a previously collected algae pilot sample. The chemical composition of mixture is calculated according to raw material data. For compost chemical composition used homogenized mean sample.

Discussion: Algal compost significantly changed its appearance during the experiment, the temperature graphic shows that no peaks were reached. This could be explained by the limited composting volume, as well as the relatively small depth of the measurement sensor. Initial results showed that potassium had decreased, however, sampling locations found that it had mostly migrated in the lower part of the tank. On the other hand, with phosphorus, there is no real clarity, it has 'disappeared' or is hiding in composting process. The N₂O is a potential flow out of algal biomass composting, algae compost usually has a low C/N ratio. The stability being a measure of the biological activity of the compost and maturity being defined as the extent to which biodegradable material has decomposed. It has been shown that algae compost can be both mature and highly stable.