

## Measurements with electronic Nose PEN2 at a self-contained composting plant

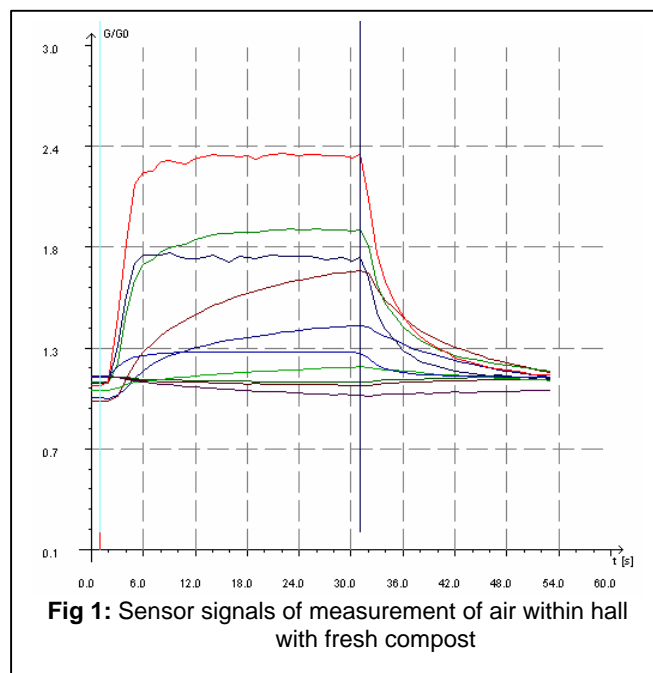
Odors from different places inside the composting plant have been investigated with the electronic nose PEN2. Measurements have been made within a hall where fresh compost is being deposited (hall A), a hall with intensively rotten material (hall B) and the warehouse for ready products (hall C). Additionally, measurements at the biological filter have been carried out.

The Measurements have been made with the basic unit of PEN2 online. Following a measurement phase of 30 seconds the sensors are rinsed with clean air for also 30 seconds.

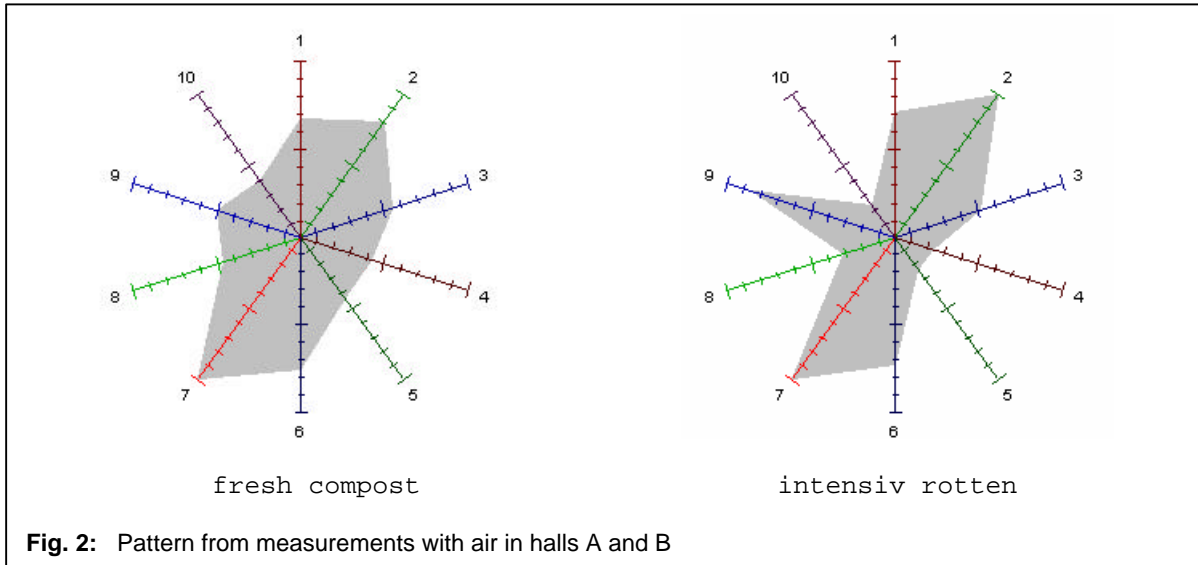
The Portable Electronic Nose consists of a sensor array with 10 metal oxide sensors and the including sampling system. A notebook computer has been connected to it for data acquisition.

Due to the sampling system of PEN2 the sensor signals are proportional to the concentration of organic compounds in the air. Comparing these signals with the results of olfactory measurements a correlation to odor units can be achieved.

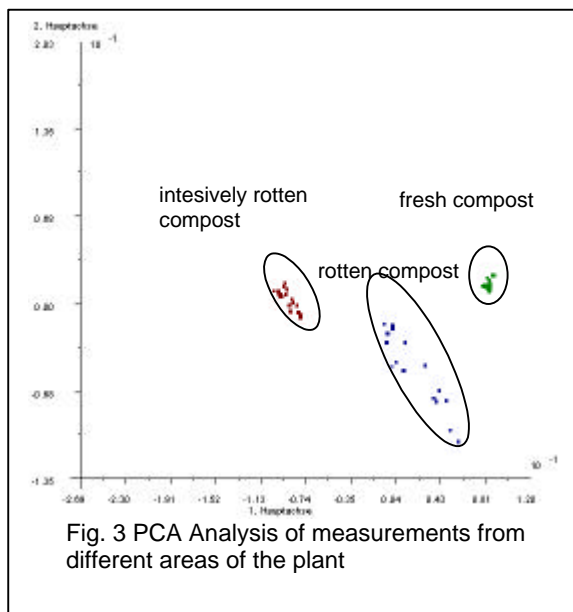
Fig. 1 shows the raw signals of the sensors, when doing a measurement with the air from hall A.



The pattern from different halls are displayed in fig. 2. They show significant differences, following that

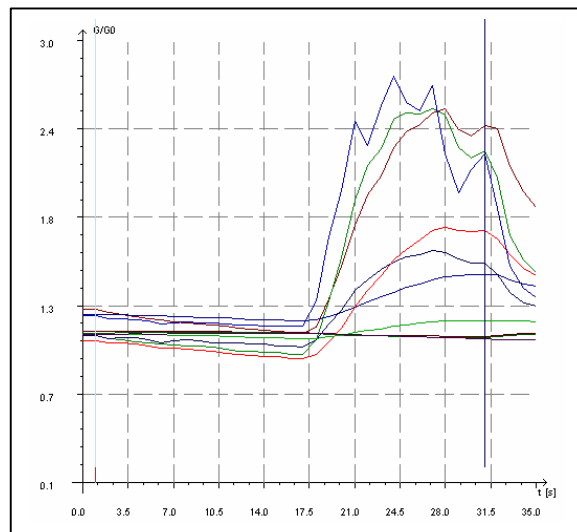


different states of the materials can be identified. Differences in pattern result partially from the different amount of methane in the air, because sensor No. 9 is sensitive to methane.



After performing several measurements at the places of different grades of rotting a PCA Analysis (fig. 3) of the measurement data shows the discrimination capability of the instrument. Data for the different degrees of composting are grouped far apart.

Figure 4 shows the measurement of gases emitted from the correctly working biological filter. The clear change of sensor signals between air and the emission source show, that the electronic nose also can be used for the supervision of the filter.



**Fig 4:** Measurement signals when moving the instrument from clean air into the emission of the biological filter.

Result of these short term measurements are that these sensors can be applied for the supervision of composting plants. Peaks in odor emission and the efficiency of the emission cleaning equipment and the grades of the rotting process can be detected on-site with the electronic nose.