

NIR TECHNOLOGY

Analyse this

Since 2013, MCSubstradd has been able to analyse raw materials used in compost with NIRS technology. The most important raw materials in compost are hay/straw and chicken manure. This article addresses the analysis of these raw materials (wheat straw, rye, rice, peas, rape and barley, but also hay and straw from stable bedding manure) to predict the optimal treatment of the straw for the composting process.

MC Substradd has been collecting straw samples from all over Europe since 2016. About 55 samples are sent to their laboratory each year to monitor quality and to obtain a quicker prediction of how the new harvest of straw will behave in the composting process.

Why we use straw

However, a single analysis does not say all that much. A far better picture of how to treat the straw is gained by establishing correlations and comparison with previous years. To determine how we should treat the straw, it is important to differentiate between the three main reasons we use straw: nutrients, water and structure.

- Nutrients for the micro-organisms that are responsible for the composting process. The constituents that are analysed include ash, nitrogen and carbohydrates: hemicellu-

lose, cellulose, and lignin. These carbohydrates are also an important source of energy for the mycelium.

- Water is crucial to dissolve and transport the nutrients in the compost to the mycelium.

MCSubstradd's straw calibration lines predict the following parameters:

- Dry matter percentage. Linked to storage life
- Fat content. Indicates the waxy layer thickness
- Water Absorption Capacity. WAC5 indicates how fast the straw can absorb water, WAC24 indicates how much water can be absorbed in total.
- One of the main functions of straw is to provide structure in the compost. Structure is vital to facilitate exchange in the compost later in the process, which is why structure and resistance are measured.

How can the figures above be applied in daily management? →

A single analysis does not say all that much.

		Wheat	Straw			
Average	2016	2017	2018	2019	2019	2019
	Average	Average	Average	Average	High	Low
Moisture	11.7	12.2	10.4	10.4	14.0	6.5
N in DM	0.5	0.3	0.3	0.4	0.7	0.2
Hemicellulose	29.3	32.2	30.9	30.0	33.6	25.2
Cellulose	45.4	48.2	44.9	44.2	48.1	40.5
Lignin	6.9	6.0	6.3	6.5	7.7	5.6
WAC5 in DM	2.8	2.5	2.8	3.0	3.2	2.6
WAC 24 in DM	3.5	3.5	3.6	3.6	3.9	3.3
Fat in DM	1.5	2.0	1.5	1.4	2.0	1.0
Resistance	9.7	10.8	10.6	10.2	12.0	7.0
Structure	0.64	0.66	0.65	0.63	0.69	0.59

Table 1. Average values straw 2016–2019.