

TOC·TN APPLICATION NEWS No.1

Total Organic Carbon (TOC) Measuring of Compost With the TOC-5000A Solid Sample TOC Analyzer

Livestock excrement is an important agricultural resource which can be used as an organic fertilizer or soil conditioner. Effective uses of these are expected to reduce the burden on the environment caused by excrement and fertilizers.

Purpose

To measure the carbon component - which is one of the indicators of compost value - using Shimadzu's total organic carbon analyzer: Solid Sample TOC measuring system, TOC-5000A+SSM-5000A.

Problems of Conventional Method

Carbon is measured with equipment such as carbon element analysis devices at present. However, this method has the following problems.

1. Carbon maldistribution errors occur because sample amount is small,
2. Maintenance of absorbent is necessary.



Measuring Conditions

Measurements are made under the following conditions for two soil samples and two compost samples.

Analyzer: TOC-5000A + SSM-5000A

Analyte: TC (total carbon)

Measuring Method: Each sample is placed in the SSM-5000A sample boat without any pretreatment, and measured.

Results

Sample	TC value (%C)
Soil 1	3.767
Soil 2	0.517
Compost 1	40.80
Compost 2	40.66

The measuring results for each of the four samples are displayed in figures 1 to 4 on the following page. The coefficient of variation is under two percent for all measurements, and repeatability accuracy is excellent.

Benefits

The following Benefits can be obtained with the TOC-5000A + SSM-5000A. Sample weighing errors and errors due to carbon maldistribution in samples are minimized as a maximum of 30 mg of carbon can be measured in samples up to 1 g.

1. Asorbent maintenance is almost unnecessary.
2. A multitude of solid samples can be measured due to fast measuring.
3. Highly accurate measuring is possible.
4. Operation is easy.

Application in Other Fields

Total organic carbon measuring with the TOC-5000A + SSM-5000A can be applied to the variety of applications.

1. Measurement of TOC in garbage disposal units (bioremediation).
2. Measurement of TOC content in liquid nutrients used for hydroponic cultivation.
3. Measurement of TOC amount in sludge.
4. Measurement of TOC for evaluation of carbon cycle in Bioreactor or Fermenter

Features of the TOC-5000A Solid Sample TOC Analyzer

1. A maximum of 30 mg of carbon can be measured in samples up to 1 g.
2. IC (carbon in the form of carbonates) in solid samples can be easily measured
3. Water samples that contain large amounts of suspended matter also can be loaded into the sample boat, and measured.
4. Insoluble organic substance can be measured.



Shimadzu Total Organic Carbon Analyzer
TOC-5000A Solid Sample TOC Analyzer

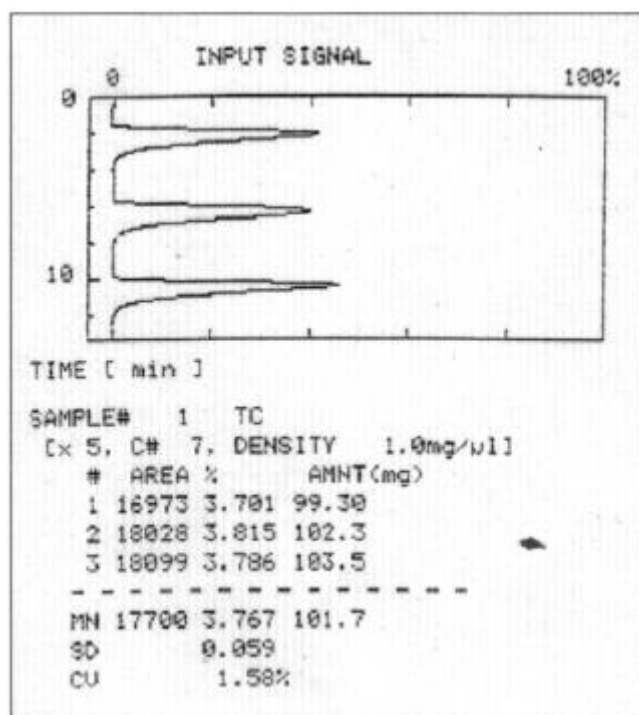


Fig. 1: Soil 1

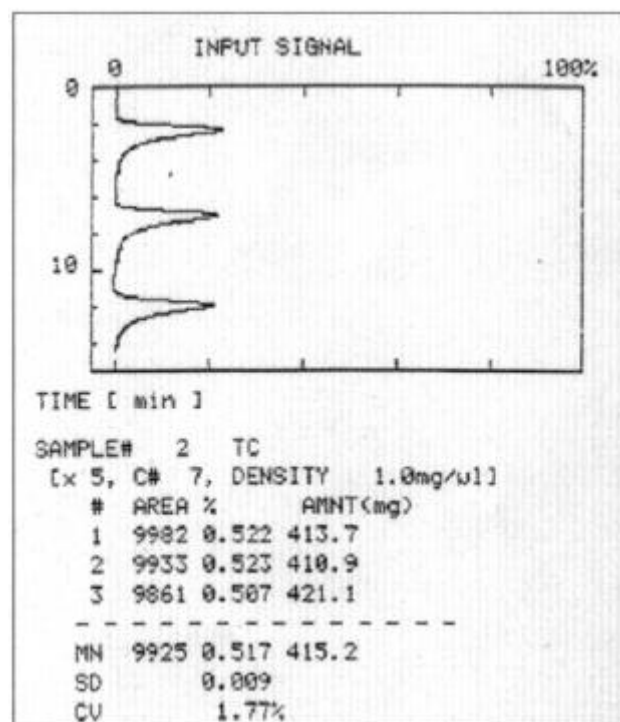


Fig.2: Soil 2

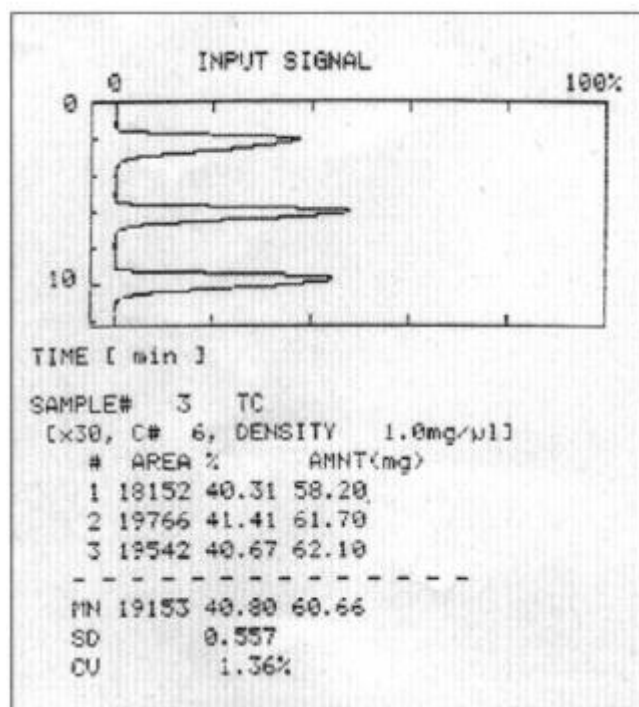


Fig.3: Compost 1

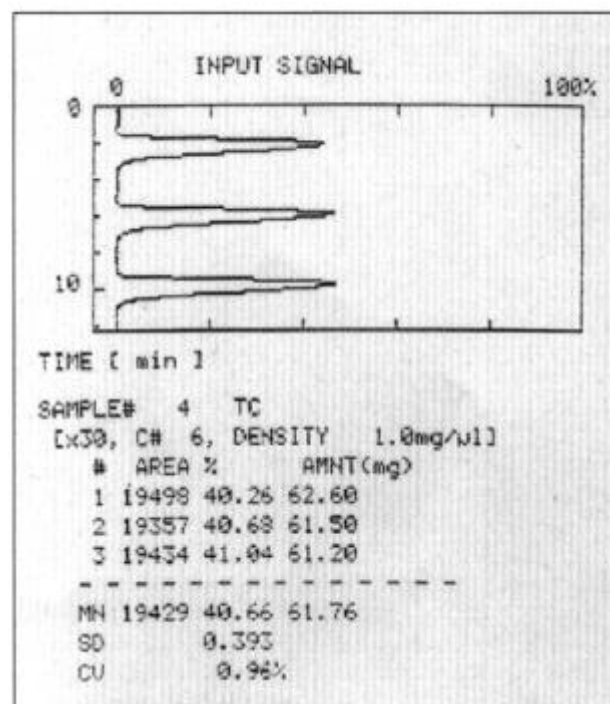


Fig.4: Compost 4