

EXPERIMENT 2

ORGANIC MATTER DETERMINATION

Purpose:

This test is performed to determine the organic content of soils. The organic content is the ratio, expressed as a percentage, of the mass of organic matter in a given mass of soil to the mass of the dry soil solids.

Standard Reference:

ASTM D 2974 – Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Organic Soils

Significance:

Organic matter influences many of the physical, chemical and biological properties of soils. Some of the properties influenced by organic matter include soil structure, soil compressibility and shear strength. In addition, it also affects the water holding capacity, nutrient contributions, biological activity, and water and air infiltration rates.

Equipment:

Muffle furnace, Balance, Porcelain dish, Spatula, Tongs



Test Procedure:

- (1) Determine and record the mass of an empty, clean, and dry porcelain dish (M_P).
- (2) Place a part of or the entire oven-dried test specimen from the moisture content experiment (Expt.1) in the porcelain dish and determine and record the mass of the dish and soil specimen (M_{PDS}).
- (3) Place the dish in a muffle furnace. Gradually increase the temperature in the furnace to 440°C . Leave the specimen in the furnace overnight.
- (4) Remove carefully the porcelain dish using the tongs (the dish is very hot), and allow it to cool to room temperature.

Determine and record the mass of the dish containing the ash (burned soil) (M_{PA}).

- (5) Empty the dish and clean it.

Data Analysis:

- (1) Determine the mass of the dry soil.

$$M_D = M_{PDS} - M_P$$

- (2) Determine the mass of the ashed (burned) soil.

$$M_A = M_{PA} - M_P$$

- (3) Determine the mass of organic matter

$$M_O = M_D - M_A$$

- (4) Determine the organic matter (content).

$$OM = \frac{M_O}{M_D} \times 100$$

EXAMPLE DATA

ORGANIC MATTER DETERMINATION DATA SHEET

Date Tested: *August 30, 2002*

Tested By: *CEMM315 Class, Group A*

Project Name: *CEMM315 Lab*

Sample Number: *B-1, AU-1, 0'-2'*

Sample Description: *Gray silty clay*

Specimen number	1	2
Porcelain dish number	5	8
M_P = Mass of empty, clean porcelain dish (grams)	23.20	23.03
M_{PDS} = Mass of dish and dry soil (grams)	35.29	36.66
M_{PA} = Mass of the dish and ash (Burned soil) (grams)	34.06	35.27
M_D = Mass of the dry soil (grams)	12.09	13.63
M_A = Mass of the ash (Burned soil) (grams)	10.86	12.24
M_O = Mass of organic matter (grams)	1.23	1.39
OM = Organic matter, %	10.17	10.20

Example Calculation: $M_P = 23.20g$, $M_{PDS} = 35.29g$, $M_{PA} = 34.06g$

$$M_D = 35.29 - 23.20 = 12.09g$$

$$M_A = 34.06 - 23.20 = 10.86g$$

$$M_O = 12.09 - 10.86 = 1.23g$$

$$OM = \frac{1.23}{12.09} \times 100 = 10.17\%$$

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Project Name:

Sample Number:

Sample Description:

Specimen number	1	2
Porcelain dish number		
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M_A = Mass of the ash (Burned soil) (grams)		
M_O = Mass of organic matter (grams)		
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