

	Laboratory of Soil Resources Faculty of Agriculture Universitas Pembangunan Nasional "Veteran" Jawa Timur		
	WORK INSTRUCTION FOR SOIL TESTING		
	ORGANIC CARBON ANALYSIS	Document No.	: LPTA.05.12.06.02-7.4
		Revision No.	: 01
		Date of Issue	: March 1, 2020
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1. REFERENCE

- Black, C.A. 1965. Methods of Soil Analysis, Part 2, Agronomy 9. American Society of Agronomy, Madison, Wis.
- Graham, E.R. 1948. Determination of soil organik mater by means of a photoelectric colorimeter. Soil Sci. 65: 181 - 183.
- Page, A.L. , Miller R.H. and Keeney D.R. (Eds.). 1982. Methods of Soil Analysis, Part 2- Chemical and microbiological properties, 2nd Edition. American Society of Agronomy, Madison, Wisconsin.
- Rayment, G.E. and F.R. Higginson. 1992. Australian laboratory handbook of soil and water chemicals methods. Australian soil and land survey handbook. Inkata Press, Melbourne, Sydney.

2. PRINCIPLE

The following work instructions are provided information of organic matter content testing procedure in soil and the methods for calculating.

3. BASIS OF DETERMINATION

Carbon as the organic compound will reduce Cr^{6+} , identified as orange color, to Cr^{3+} , which is green color, in an acidic environment. The intensity of the green color formed is aligned to the carbon content and can be measured using a spectrophotometer at a wavelength of 561 nm.

4. EQUIPMENT

- Analytical Balance
- Spectrophotometer
- 100 mL Volumetric Flask
- 10 mL Dispenser
- 5 mL Volumetric Pipette

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5. REAGENTS

- Concentrated Sulfuric Acid
- 1 N Potassium Dichromate

Dissolve 98.1 g of potassium dichromate in 600 ml of deionized water in a glass beaker, add 100 ml of concentrated sulfuric acid, and stir until completely dissolved. Sit it for cooling down, and dilute it in a 1-liter volumetric flask with deionized water up to the mark line.

- 5,000 ppm Carbon Standard Solution.

Dissolve 12.510 g of crystallized glucose in distilled water in a 1-liter volumetric flask.

6. WORK PROCEDURE

Weigh 0.500 g of soil sample (particle size <0.5 mm) into a 100 ml volumetric flask. Add 5 ml of 1 N $K_2Cr_2O_7$ and swirl. Add 7.5 ml of concentrated H_2SO_4 , swirl slowly, and let it sit for 30 minutes. Dilute with deionized water, cool it down again, and add the deionized water up to the mark. The next day, measure the absorbance of the clear solution using a spectrophotometer at a wavelength of 561 nm. For comparison, prepare 0 and 250 ppm standards by pipetting 0 and 5 ml of the 5,000 ppm standard solution into a 100 ml volumetric flask and process it similar to the sample.

Note: If the reading of the sample exceeds the highest standard, repeat the determination with a smaller sample weight. Adjust the factor in the calculation according to the weight of the sample.

7. CALCULATION

Organic Carbon Content (%)

$$= \text{curve ppm} \times \text{ml extract} \times 1000 \text{ ml}^{-1} \times 100 \text{ mg sample}^{-1} \times \text{cf}$$

$$= \text{curve ppm} \times 100 \times 1000^{-1} \times 100 \times 500^{-1} \times \text{cf}$$

$$= \text{curve ppm} \times 10 \times 500^{-1} \times \text{cf}$$

$$\text{Organic Matter Content (\%)} = 100/58 \times \text{Organic Carbon Content (\%)}$$

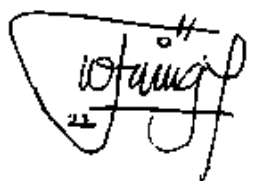
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Description :

curve ppm = Concentration obtained from the regression curve of the standard series with its reading after subtracting the blank.

cf = Correction factor for moisture content = $100 / (100 - \% \text{ moisture content})$.

Appendix

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