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THE COMPOSITION OF INORGANIC COLLOIDS EXTRACTED FROM THREE IOWA SOILS

H. C. DEAN, F. B. SMITH AND P. E. BROWN

The purpose of this work was to determine the colloidal content of certain soils and to make analyses of the inorganic colloids extracted from these soils. These soils ranging from a pH of 5.53 to a pH of 7.60 were obtained and the total colloidal content determined. The inorganic colloids were then extracted according to Truog and Drosdorff's procedure (2) and analyzed for total SiO_2 , Al_2O_3 , Fe_2O_3 , TiO_2 , P_2O_5 and available K_2O . The total SiO_2 , Fe_2O_3 , Al_2O_3 and TiO_2 were determined by Hillebrand's method (1). The phosphorus content was determined by the magnesium nitrate method. The available K_2O was determined by the *Aspergillus niger* method.

The data obtained, Table I, show that the Webster silty clay

Table I—Colloidal Content of Acid, Neutral and Basic Soils

SOIL	pH	PERCENTAGE TOTAL COLLOIDS	PERCENTAGE INOR- GANIC COLLOIDS
Tama silt loam	5.53	48.72	45.26
Webster clay loam	6.89	50.89	44.27
Webster silty clay loam	7.60	36.72	32.38

loam contained 36.72 per cent of colloids, whereas, the Tama silt loam contained 48.72 per cent. The Webster clay loam contained the largest amount of colloids, 50.89 per cent. The Tama silt loam contained the largest amount of inorganic colloids, containing considerably more than the Webster silty clay loam. There was no large difference in the amounts of inorganic colloids of the Tama silt loam and the Webster clay loam.

The analyses of the inorganic colloids, Table II, showed that the inorganic colloid of the Tama silt loam was much higher in SiO_2 and Fe_2O_3 than the two Webster soils. However, the inorganic colloid of the Webster clay loam contained the largest amount

Table II—Analysis of Inorganic Colloids

COLLOIDS	PERCENTAGE					
	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	P_2O_5	AVAILABLE K_2O
Tama silt loam	59.21	20.70	6.97	0.34	0.18	0.031
Webster clay loam	43.91	32.13	5.21	0.35	0.23	0.029
Webster silty clay loam	44.84	28.68	5.06	0.45	0.22	0.027

of Al_2O_3 . The inorganic colloid of the acid, Tama silt loam, had the largest $\left(\frac{\text{SiO}_2}{\text{R}_2\text{O}_3}\right)$ ratio. There was practically no difference between the ratios of the two inorganic colloids of the Webster soils. The inorganic colloid of the Webster clay loam, however, was somewhat higher in SiO_2 and P_2O_5 than the colloids of the other soils. There was only a small difference in the amounts of available K_2O of the inorganic colloids. The inorganic colloid of the two Webster soils was slightly lower in available K_2O than that of the Tama silt loam.

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