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CATION EXCHANGE CAPACITY AND CHEMICAL COMPOSITION OF CLAY FRACTION OF SOME IMPORTANT SOIL GROUPS OF KERALA

It is well established that the clay fraction has a dominant role to play in determining the cation exchange properties of any soil. The cation exchange capacity is one of the parameters used for characterising the minerological composition of the clay. The cation exchange capacity and chemical composition of the clay fraction of seven samples were studied. The clay fraction from the samples were separated by the method outlined by Piper (1950). Cation exchange capacity and estimation of silica, sesquioxides, iron oxides and alumina of the clay samples was carried out by methods outlined by Sankaram (1966).

Table 1

Cation exchange capacity and chemical composition of clay fraction of different soil groups

Soil group	Cation exchange capacity me/100g	Sesqui-oxides R_2O_3 %	Fe_2O_3 %	Al_2O_3 %	SiO_2 %	$\frac{Fe_2O_3}{Al_2O_3}$	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{R_2O_3}$
Sandy	28	24.75	11.67	13.08	55.50	0.57	7.23	4.60
Alluvial	34	38.75	15.58	23.17	51.95	0.43	3.81	2.67
Laterite	10	46.00	17.62	28.38	30.89	0.39	1.81	1.32
Black	57	28.68	13.26	15.42	50.80	0.54	5.59	3.63
Forest	19	34.67	13.67	21.00	42.88	0.41	3.47	2.50
Red	11	38.55	12.22	26.33	37.96	0.24	2.45	1.97
Kari	33	38.66	16.00	22.66	50.43	0.45	3.78	2.62

Data are given in Table 1. The cation exchange capacity varied from 10 me/100 g to 57 me/100 g clearly indicating the differences in their electro chemical nature. In the present study the cation exchange capacity of the clay fraction from laterite soil (10 me/100 g) and red soil (11 me/100 g) clearly indicate the preponderance of kaolinitic type of minerals, This observation is in conformity with the findings of Sathyanarayana and Thomas (1962). The Sio_2/R_2O_3 ratio for the laterite and red soils were 1.32 and 1.92 respectively. Manickam

(1961) on a study of the clay fraction of typical red, black, laterite and alluvial soils of Tamilnadu reported that the SiO_2/R_2O_3 ratio was 3 for black soil, 2 for laterite soil and between 2 and 3 for other soils. The results of the present study are in agreement with the above findings. The clay fraction from black soil recorded the highest cation exchange capacity (57 me/100 g) and SiO_2/R_2O_3 ratio of 3.63. The results of the present study agrees with the findings of Manickam (1961) on black soils of Tamiinadu. The high values of cation exchange capacity for these soils can be reasonably attributed to the presence of 2:1 type of clay minerals. The clay fraction of kari soils has a cation exchange capacity of 39 me/100 g. The silica/alumina ratios were 2.62 and 3.78 respectively. Pillai (1964) has reported that the high cation exchange capacity, high SiO_2/R_2O_3 ratio > 2and $SiO_2/A1_2O_3$ ratio of 3.5 - 6 indicated the possibility of some illitic minerals also. The results of the present study agree with the above observations and it can be concluded that these soils have a dominance of the 2:1 type of clay minerals.

സംഗ്രഹം

കേരളത്തിലെ ഏഴുതരം മണ്ണ്ഗ്രൂപ്പുകളെ പ്രതിനിധാനം ചെയ്യുന്ന ഏഴ് ഉപരിതല സാമ്പിളുകളുടെ കളിമൺ ഘടകത്തിന്റെ സംഘടനയും – കാറ്റയോൺ എക്സ്ചേഞ്ച് കപ്പാസിറ്റിയും പഠന വിധേയമാക്കി. കാറ്റയോൺ എക്സ്ചേഞ്ച് കപ്പാസിറ്റിയുടെ ഏറ്റവും കുറഞ്ഞ മൂല്യം പ്രകടമാക്കിയത് ലാറ്ററൈറ്റ് മണ്ണിന്റെ കളിമൺ ഘടകവും, ഏറ്റവും കൂടിയ മൂല്യം വെളിപ്പെടുത്തിയത് "ബ്ലാക്ക്" മണ്ണിന്റെ കളിമൺ ഘടകവുമാണ്.

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