

Basic cation saturation percentage:

The proportion of CEC occupied by a given cation is known as its cation saturation percentage.

Among the various cations adsorbed on the clay complex, H^+ and Al^{3+} are the acidic cations as aluminum ions on the exchange complex also give an acidic reaction. In acidic soils, H^+ and Al^{3+} ions dominate while in alkaline soils Ca^{2+} , Mg^{2+} , Na^+ , K^+ and NH_4^+ ions dominate and represent the major portion of CEC. The proportion of basic cations expressed on percentage basis to the total cations on the cation exchange complex is called as basic cation saturation percentage (BCSP) of soil. It can be calculated as:

$$BCSP = \frac{\text{Sum of basic cations} \times 100}{CEC}$$

A high basic cation saturation percentage is usually desirable. A direct correlation between soil pH and BCSP exists. The more acidic a soil is, the lower the percentage of basic cation saturation. Most soils are generally 100 % basic cation saturated at pH 7 or higher. The pH used for cation exchange and CEC determination must be specified whenever this concept is to be used.

Importance of BCSP:

The basic cation saturation percentage is useful for soil genesis and classification purposes. It is a criterion of soil taxonomy in the United States Soil Classification System.

Saturation does not provide much information that is not already available from pH values. However, it does provide numerical values of the amount of exchangeable Al and H ion species which helps in predicting the amount of lime required to neutralize soil acidity. Soils having more basic cation saturation percentage are generally more fertile than having lower percentage.

Reference:

The Nature and Properties of Soils 13th Edition, 2005

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