Abstract

Soil aggregates are groups of soil particles that bind together as a result of flocculation, redisposition and entanglement of soil particles, where soil organic carbon (SOC), soil biota, clay minerals, cations, Iron (Fe) and Aluminium (Al) oxides and carbonates, can act as binding agents in the formation and stabilization of aggregates.

Aggregate stability describes the ability of soil aggregates to resist breakdown caused by: Slaking, differential swelling, mechanical breakdown, dispersion and tillage practices, whereas bad aggregated soils may serve as an indicator for soil degradation and soil erosion and contribute to the release of carbon dioxide (CO₂) to the atmosphere. While strong aggregated soils may serve as an indicator for good soil quality and may lower the amount of atmospheric CO₂ as a consequence of SOC sequestration.

This paper will evaluate: The effects of the different binding agents on soil aggregates, the mechanisms that are responsible for aggregate breakdown and soil erosion, the effects of land use and soil management on soil aggregates and the methods that are used to measure aggregate stability.

Since soil aggregates play an essential role in SOC dynamics and soil quality, understanding of the mechanisms that are responsible for aggregate formation, stabilization and breakdown is essential to improve soil quality and prevent soil erosion.