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Effects of tillage, fallow and burning on selected properties and fertility status of Andosols in the Mounts Bambouto, West Cameroon

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ABSTRACT

To assess the impact of land use on the Andosol fertility, changes in chemical and physical properties affecting soil quality were monitored on Andosols from Mount Bambouto submitted to four different land use and management systems: natural cover, tillage, burning and fallow. In comparison with the natural cover, tillage reduces Andosol OC (6.5 to 4.8%), total N (4.51 to 2.95%), CEC (22.0 to 20.9 cmol.kg⁻¹) and the abundance of soil macro-aggregates expressed by the water stable aggregates (WSA) varies from 53.8 to 12.0%; and increases the bulk density (0.69 to 1.09 g.cm⁻³) and the sum of exchangeable cations (3.58 to 4.84 cmol.kg⁻¹). Burning also reduces Andosol OC (6.5 to 0.8%), total N (4.51 to 0.95%) and CEC (22.0 to 10.2 cmol.kg⁻¹), but increases soil pH (4.62 to 6.54), the sum of exchangeable cations (3.58 to 5.74 cmol.kg⁻¹) and the abundance of soil macroaggregates (WSA: 38.2 to 57.0%). In comparison with tillage, fallow increases Andosol OC (4.8 to 6.5%), total N (2.95 to 5.04%), CEC (18.0 to 21.6 cmol.kg⁻¹), the sum of exchangeable cations (3.58 to 5.05 cmol.kg⁻¹) and the abundance of soil macroaggregates (WSA: 12.0 to 48.8%). Globally, the tillage management deteriorates Andosol chemical and physical properties affecting fertility, whereas the fallow management restores them. The burning management also improves some Andosol chemical and physical properties affecting quality, but it won't last long.

KEYWORDS

Andosols; Land Use Management Systems; Soil Physic-Chemical Properties; Soil Fertility

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