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Soil carbon stocks in no-tillage vegetables areas in the mountain region of the Rio de Janeiro state, Brazil

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In the mountain region, Rio de Janeiro state, the traditional agriculture is carried in hilly landscape. In these places, sharp erosion, soil degradation, and plant health problems are found, mainly due to the vegetable cultivation under intensive systems. This has led to losses in ecosystem services. An alternative is conservative agriculture, such as no-tillage, which consists of direct planting of the main crop on cultural remains of cover crops cultivated to keep the soil covered, reducing the use of agricultural inputs, improving soil quality, contributing to the increase in carbon stock and reducing greenhouse gas. However, there is a deficit of quantitative information on carbon stored in no-tillage system. This paper presents the carbon stock values in soil under three no-tillage areas. This study was done in the mountainous area in Nova Friburgo municipality. The carbon stock values in soil was quantified under three no-tillage areas: a lowland area cultivated with cucumber (*Cucumis sativus*) on mulch of black oat (*Avena strigosa*) and, in slope condition, an area used to grow cauliflower (*Brassica oleracea* var. botrytis L.) on mulch of black oat, and a third one even with oat desiccated for ground cover. The soil carbon stocks to 30 cm depth ranged from 41.1 to 59.6 Mg ha⁻¹. The average values of carbon stock are in this following sequence: 45.0 Mg ha⁻¹ in the lowland area with cucumber, 45.1 Mg ha⁻¹ in the slope covered with black oat and 53.4 Mg ha⁻¹ on the slope with cauliflower on mulch of black oat. The information gathered in this work provides the initial diagnosis of the carbon stock in the soil of the site studied and contributes to the creation and input of a soil database on vegetable cultivation which can be used as a basis for the valuation of soil ecosystem services.

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