Soil C: N: P stoichiometric characteristics and soil quality evaluation under different restoration modes in the loess region of Northern Shaanxi Province

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Abstract

The vegetation restoration is very important for the stability of the ecological system structure and function in the loess region of North Shaanxi Province. Natural restoration and artificial restoration are the two primary modes for vegetation recovery and soil quality improvement in this region. In this study, two adjacent watersheds with similar ecological environment conditions but different restoration modes were selected for research; and one watershed adopted natural restoration (He Gou watershed) and the other adopted artificial restoration (Chai Gou watershed). According to the study of soil stoichiometric characteristics and soil quality after the vegetation restoration in these two watersheds, the results showed: (1) Compared with the natural restoration, artificial restoration was more effective in increasing the content of SOC and TN, but insignificantly effective in increasing the content of TP. (2) The ratios of soil C:N, C:P and N:P showed a decreasing trend with the soil depth increased at these two restoration modes. (3) in the 0 -60 cm soil layer, the soil quality using the artificial restoration mode was better than the natural restoration, especially for the soil layer beneath 20 cm. (4) The minimal data set on the soil quality evaluation in the study area included 5 indicators including SOC, CWHC, AK, SWC and AP. The minimal data set showed a linear relation with the total index data set ($y=0.829x+0.058, R^2=0.76$) and the minimal data set can reflect the soil quality more sensitively than the total indicators data set.

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