Abstract

Input of available carbon and/or mineral fertilisation can accelerate mineralisation of soil organic matter i.e. priming effect. However, studies to priming effects in andic soils are absent despite their unique physicochemical and biological properties. Nutrients and ^{14}C labelled glucose were added to Andosols of Mt. Kilimanjaro from six ecosystems: (1) savannah (2) maize fields (3) lower montane forest (4) coffee plantation (5) grasslands and (6) *Chagga* homegardens. Carbon-dioxide production was measured for 60 days. Maximal and minimal mineralisation rates immediately after glucose additions were observed in lower montane forest with N + P ($9.1\% \pm 0.83\ d^{-1}$) and in savannah with N ($0.9\% \pm 0.17\ d^{-1}$), respectively. Land use significantly influenced glucose induced priming effect measured as additional CO_2 compared to unfertilised soil. Variations of the priming effect in land use without fertilisation are attributed to differences in microbial biomass content. Depending on land use, nutrient addition increased or decreased glucose induced priming effect. Maximal and minimal priming effect were observed in grassland soils ($0.171\ mg\ C\text{-}CO_2\ g^{-1}$ soil) with P and in soils under maize fields ($0.009\ mg\ C\text{-}CO_2\ g^{-1}$) fertilized with N, respectively. Microorganisms in *Chagga*homegarden soils incorporated the highest glucose percentage ($6.47\% \pm 1.16$), which was 3 times higher compared to grassland soils ($2.18\% \pm 0.39$). 50-60% of the ^{14}C input was retained in bulk soil. Land use and fertilisation (N and P) affected priming in Andosols. Andosols occurring at Mt. Kilimanjaro, especially those under the *Chagga*homegardens shows great potential for soil C sequestration.