



Relationship between carbon and nitrogen mineralization in a subtropical soil

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In most soils, more than 90% nitrogen is bonded with carbon in organic forms. This indicates that carbon mineralization should be closely coupled with nitrogen mineralization, showing a positive correlation between carbon and nitrogen mineralization. To test this hypothesis above, we conducted an incubation using a subtropical soil for 10 days at 15 °C and 25 °C. ¹³C-labeled glucose and ¹⁵N-labeled ammonium or nitrate was used to separate CO₂ and mineral N released from mineralization of soil organic matter and added glucose or inorganic nitrogen. Phospholipid fatty acid (PLFA) and four exoenzymes (i.e. β -1,4- Glucosaminidase, chitinase, acid phosphatase, β -1,4-N- acetyl glucosamine glycosidase) were also analyzed to detect change in microbial activities during the incubation. Our results showed that CO₂ release decreased with increasing nitrogen mineralization rates. Temperature did not change this relationship between carbon and nitrogen mineralization. Although some changes in PLFA and the four exoenzymes were observed, these changes did not contribute to changes in carbon and nitrogen mineralization. These findings indicates that carbon and nitrogen mineralization in soil are more complicated than as previously expected. Future investigation should focus on why carbon and nitrogen mineralization are coupled in a negative correlation not in a positive correlation in many soils for a better understanding of carbon and nitrogen transformation during their mineralization.