

# Iron minerals inhibit bacterial decomposers via a free-radical mechanism: Implications for soil carbon storage

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## Introduction

Natural minerals in soil can inhibit the growth of bacterial decomposers that protect organic carbon from decay. Here, using a series of cultivation experiments and biological, chemical as well as synchrotron-based spectral analyses, we indicated that Fe(III)-containing minerals inhibit bacterial decomposers via a free-radical mechanism.



**Figure 1.** Schematic of the bacterial inhibition by Fe(III)-containing minerals through a free-radical mechanism.

## Discussion

Surface Fe<sup>2+</sup> is produced from the reduction of Fe(III) on the surface of Fe(III)-containing minerals, promoting the production of HO<sup>·</sup> through the Fenton reaction or Fenton-like reaction. Oxidative damage of extracellular HO<sup>·</sup> may lead to bacterial inactivation, and protection of C from microbial degradation.

Unpublished works