Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17918

THE ROLE OF *BACILLUS SUBTILIS* SPORES IN THE BIOGEOCHEMICAL CYCLE OF CALCIUM IN SOIL

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Bacteria are a key component of the critical zone, because of their role in the nutriment availability for the vegetation. There is still little knowledge on the direct role of bacteria on Ca storage/leaching in soils while it is an essential macronutrient for vegetation growth. In recent years, the Ca stable isotopes have shown their potential in understanding the Ca biogeochemical cycle. Preliminary studies highlighted that in presence of soil bacteria, the plant uptake of nutrients is increased due to the improvement of mineral dissolution. Additionally, Ca isotopes signatures of nutrient media also showed differences between growth experiments in the laboratory in the presence and absence of bacteria. The focus is now to verify if Ca adsorption and incorporation into/onto soil bacteria induce such isotopic fractionation. A previous in-lab study was carried out on *Pseudomonas aeruginosa* (Gram-negative bacterium) and the vegetative form of *Bacillus subtilis* (Gram-positive bacterium). This study showed that: i) no observable isotopic fractionations were induced during calcium/bacteria contact for all experimental parameters (pH, kinetic, optical density of bacteria, interaction time, dead/alive bacteria, etc.); ii) Ca was mainly stored in the bacterial wall compartments. Now, we sought to verify if the results were similar for *B. subtilis* spores. Altogether, results exhibited significant Ca isotopic differences between the spore and the sporulation medium ($\Delta^{44/40}Ca_{spores–sporulation\ medium}$ ranging from − 0.53‰ to −1.15‰). This implied that there was an isotopic fractionation during the sporulation process. However, no isotopic fractionation during Ca adsorption on spores was observed. These results suggest that: i) Ca storage in bacterial spores induces an isotopic fractionation; ii) Ca storage in soil bacteria, such as at least for *B. subtilis,* is likely to impact the Ca biogeochemical cycle when they sporulate.