

Interactive comment on “Carbon turnover in cell compartments and microbial groups in soil” by Anna Gunina et al.

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I have revised ms CARBON TURNOVER IN CELL COMPARTMENTS AND MICROBIAL GROUPS IN SOIL by Gunina et al. To reveal the contribution of particular microbial groups to C utilization and C turnover within the microbial cells, the fate of ^{13}C -labeled glucose was studied under field conditions in this work. The ^{13}C was traced in cytosolic substances, amino sugars and phospholipid fatty acids (PLFA) at intervals of 3, 10 and 50 days after glucose addition. The strong and positive site of this manuscript is the combination of ^{13}C labeling with the subsequent analysis of several microbial cell compartments and biomarkers as a unique approach to understanding C partitioning within microbial cells and the microbial communities in soil. This knowledge is crucial for both assessing C fluxes and their recycling in soil, and studying the contribution of C from microbial residues to SOM. There are some weaknesses of the manuscript, but

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they do not affect too much on the paper quality. Below I have included general and specific comments regarding all sections, and after all I recommend to authors revise, clarify and substitute some information through the whole text. To conclude, I think present manuscript may be published in Biogeoscience journal.

General comments

Materials and methods: There is no information on bulk density of the soil in the paper. Provide this information, as it is not clear how you calculated soil mass in cylinder. Check all links to figures, equations and tables and present them whether in full text or shortened form (fig, eq., etc), but the same through the whole manuscript.

Specific comments

L 180 – 183 I recommend to change “due to” in “Due to fumigation–extraction technique allows.” for “As fumigation–extraction technique allows. ...”

L 186 Revise sentence: In After organic C concentration were measured → After organic C concentrations were measured OR After organic C concentration was measured

L 295 Clarify if it was 50th day of experiment or after 50 days in the sentence “ ^{13}C in amino sugars increased two fold during the 50 day experiment ($p < 0.05$)”

L 301-302 Paraphrase the sentence, as it is difficult to read: “The enrichment was the highest in PLFAs (Fig. 2) and was 5–8 times lower in the cytosolic pool. The ^{13}C enrichment in amino sugars was the lowest (Fig. 2) “

L 427- 429 Substitute “we used agricultural soil” on “we conduct experiment on agricultural soil”. In your paper you wrote about field experiment, not incubation one with agricultural soil. It is not correct “to use” soil in this situation.

L 450-451 Revise sentence “However, replacement of PLFAs C by glucose derived ^{13}C is only a proxy of microbial activity and only partly confirms the real mechanisms.”

L 486-487 What long-term sampling points mean? Maybe, you suggest conducting long-term experiment for turnover time calculation? Or add sampling points to existing experiment?

L 526- 527 Substitute “our the site” on “experimental site or site” in “the environmental conditions of our the site, namely, long-term agricultural use. . .”

Tables

L 809 It will be better to write “Data present mean of three replicates” instead of “Data present mean of three time points”.

Figures

L 887 It is difficult to read graphs for Ac. Expand the space between Ac and second scale for VAM and Fungi.

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