**Captions of the supplementary Data**

Figure S1 shows the sketch of the soil columns for the incubation experiment.

Table S1 shows soil organic carbon, microbial biomass C and the total addition of C at different layers.

Table S2 shows the results of ANOVA to test the effects of incubation time on the assimilation proportion of PLFAs on DO13C.



Figure S1 The sketch of the soil columns for the incubation experiment.

Table S1 Characteristics of soil samples from different layers. Values are means (SD) (*n* = 3).

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Topsoil  (0-10cm) | Midsoil  (10-30cm) | Subsoil  (30-60cm) |
| SOC (mg g-1) | 75.31(1.38) | 34.49(0.62) | 17.23(0.20) |
| Microbial biomass C (μg g-1 soil) | 513.65(68.05) | 96.11(24.85) | 12.62(2.20) |
| Total addition of C (mg) | 25.11(0.14) | 19.99(0.19) | 6.79(0.07) |

Table S2 Results of ANOVA to test the effects of incubation time on the proportion of DOC-C in soil microbial PLFAs. Bold numbers represent significant differences.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Microbial community | Response variable | 0-10 cm | | 10-30 cm | | 30-60 cm | |
| *F*  value | *P*  value | *F* value | *P* value | *F* value | *P* value |
| GP | 16:1ω7c | 1.41 | 0.29 | 0.79 | 0.59 | 0.71 | 0.65 |
| 17:0 cy | 3.60 | **0.03** | 0.97 | 0.48 | 0.62 | 0.71 |
| 19:0 cy | 2.50 | 0.09 | 4.64 | **0.01** | 3.52 | **0.03** |
| GN | i15:0 | 1.19 | 0.37 | 2.15 | 0.11 | 1.75 | 0.98 |
| a15:0 | 1.07 | 0.42 | 1.01 | 0.46 | 1.44 | 0.27 |
| i16:0 | 2.13 | 0.13 | 1.20 | 0.36 | 0.33 | 0.91 |
| i17:0 | 4.25 | **0.02** | 5.95 | **< 0.01** | 0.69 | 0.66 |
| a17:0 | 1.68 | 0.21 | 1.71 | 0.19 | 0.67 | 067 |
| B | 15:0 | 1.92 | 0.16 | 0.17 | 0.98 | 0.83 | 0.57 |
| 16:0 | 5.88 | **0.01** | 0.36 | 0.89 | 2.24 | 0.10 |
| 18:0 | 0.71 | 0.63 | 1.20 | 0.36 | 0.74 | 0.63 |
| F | 16:1ω5c | 1.76 | 0.20 | 1.60 | 0.22 | 1.04 | 0.44 |
| 18:2ω6c | 2.18 | 0.15 | 1.15 | 0.39 | 0.17 | 0.98 |
| AC | 10Me16:0 | 0.70 | 0.64 | 0.05 | 1.00 | 0.40 | 0.87 |
| 10Me17:1ω7c | 3.06 | **0.05** | 1.05 | 0.44 | 0.37 | 0.89 |
| 10Me18:0 | 0.17 | 0.97 | 0.61 | 0.72 | 0.38 | 0.88 |

GP: Gram-positive bacteria, GN: Gram-negative bacteria, B: bacteria including GP and GN, F: fungi, AC: actinomycetes.