

**Table S2:** Test results (ANOVA) showing the effect of oil dosage and nutrient additions on soil respiration characteristics

| <b>Total CO<sub>2</sub> release</b> | Degrees of freedom | Sum of Squares | Mean Squares | F value | P value |
|-------------------------------------|--------------------|----------------|--------------|---------|---------|
| Sample                              | 2                  | 2710           | 1355         | 0.32    | 0.732   |
| Dosage                              | 3                  | 3722991        | 1240997      | 293.22  | <0.001  |
| Nutrients                           | 1                  | 196465         | 196465       | 46.42   | <0.001  |
| Dosage x nutrients                  | 2                  | 355331         | 177665       | 41.98   | <0.001  |
| Residuals                           | 12                 | 50788          | 4232         |         |         |
| <b>Oil-C Mineralization</b>         | Degrees of Freedom | Sum of Squares | Mean Squares | F value | P value |
| Sample                              | 2                  | 126.5          | 63.3         | 1.941   | 0.205   |
| Dosage                              | 2                  | 2577.4         | 1288.7       | 39.544  | <0.001  |
| Nutrients                           | 1                  | 661.7          | 661.7        | 20.304  | 0.002   |
| Dosage x nutrients                  | 1                  | 39.9           | 39.9         | 1.225   | 0.301   |
| Residuals                           | 8                  | 260.7          | 32.6         |         |         |
| <b>Priming</b>                      | Degrees of Freedom | Sum of Squares | Mean Squares | F value | P value |
| Sample                              | 2                  | 7.86           | 3.928        | 4.592   | 0.047   |
| Dosage                              | 2                  | 39.85          | 19.925       | 23.294  | <0.001  |
| Nutrients                           | 1                  | 11.63          | 11.632       | 13.599  | 0.006   |
| Dosage x nutrients                  | 1                  | 13.31          | 13.312       | 15.564  | 0.004   |
| Residuals                           | 8                  | 6.84           | 0.855        |         |         |