

SUPPLEMENTARY MATERIAL

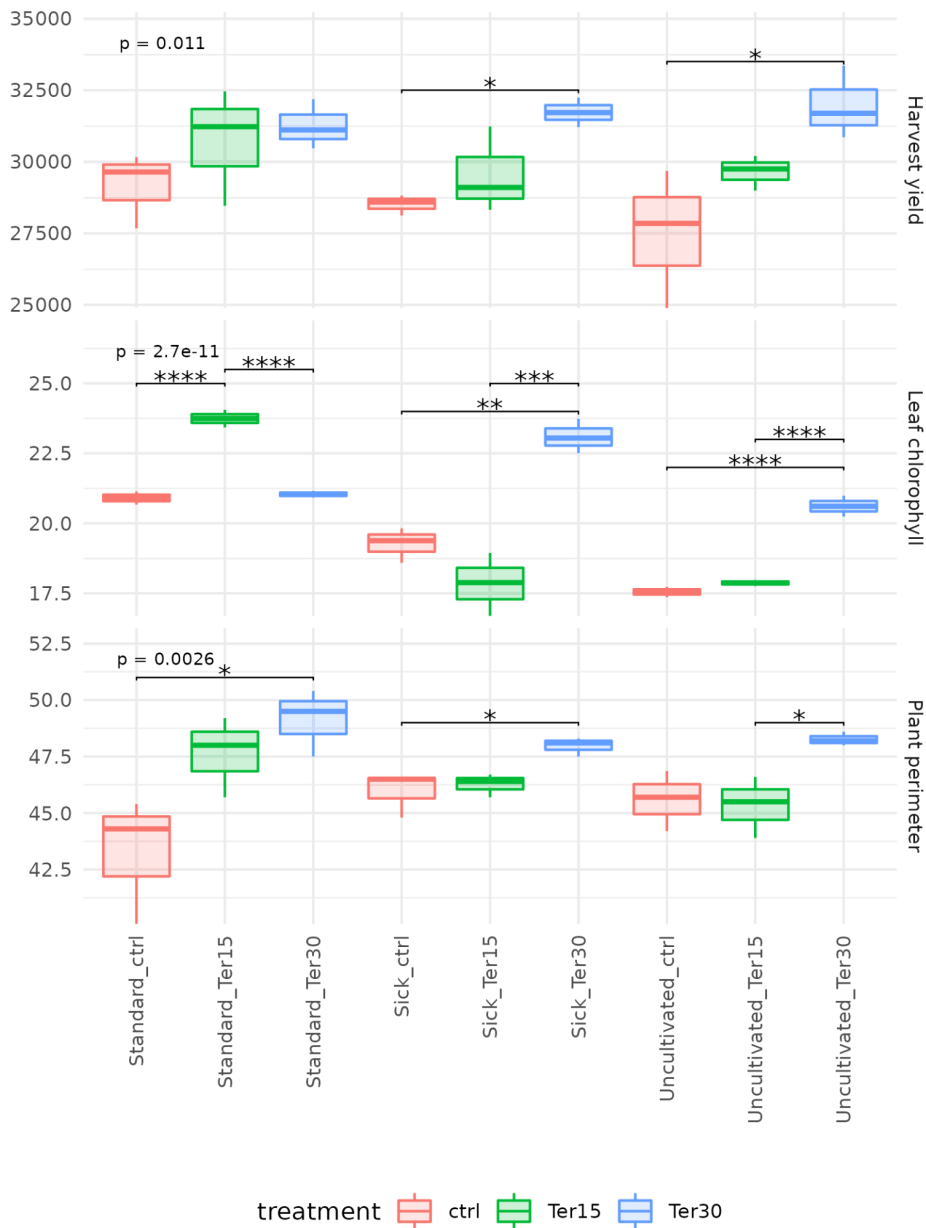


Figure S1 Harvest yield (kg/Ha), plant perimeter (cm) and leaf chlorophyll content (CCI) phenotype comparison among Terramin 15, Terramin 30 and the control condition. P- values shown in the top of the facets indicate the significance of ANOVA test. Significant differences between groups are indicated as follows: * (p-value < 0.05), ** (p-value < 0.005), *** (p-value < 0.0005), **** (p-value < 0.00005).

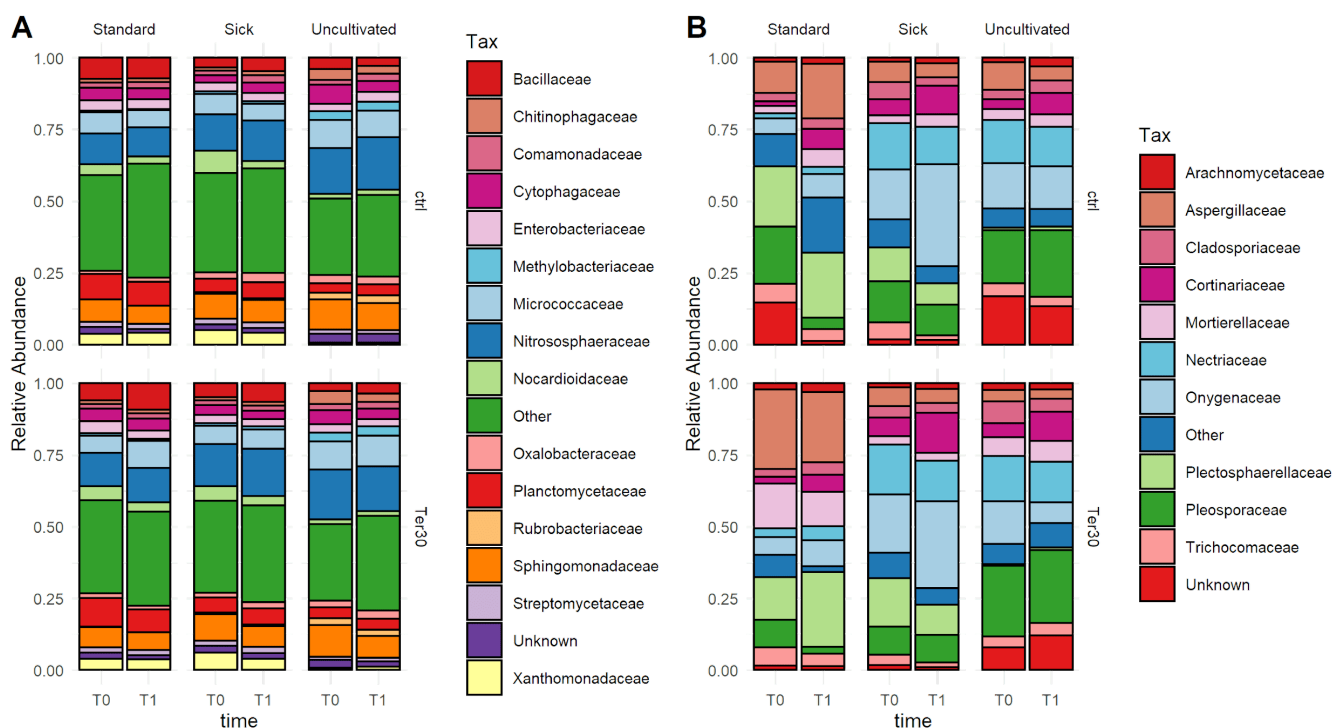
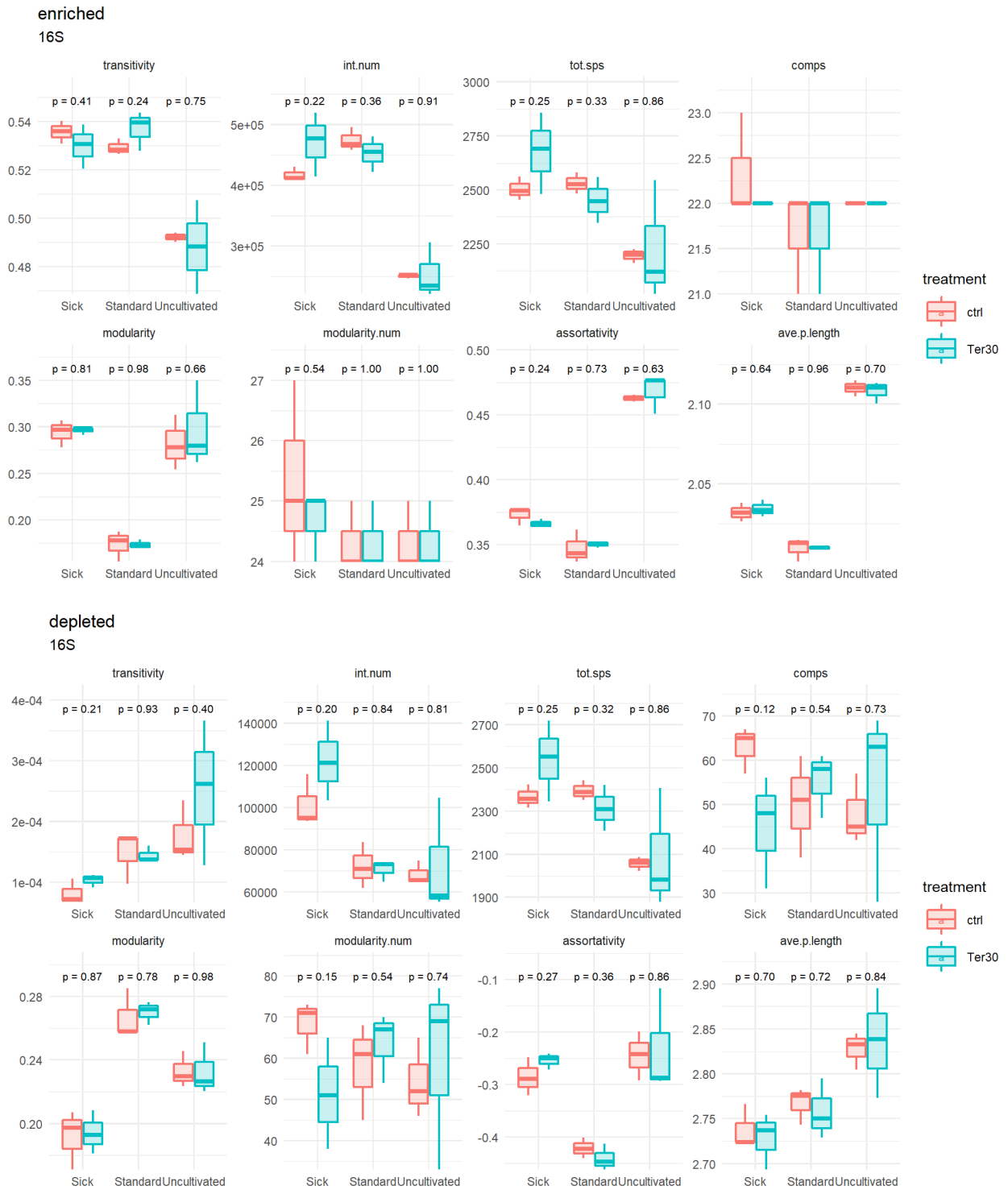
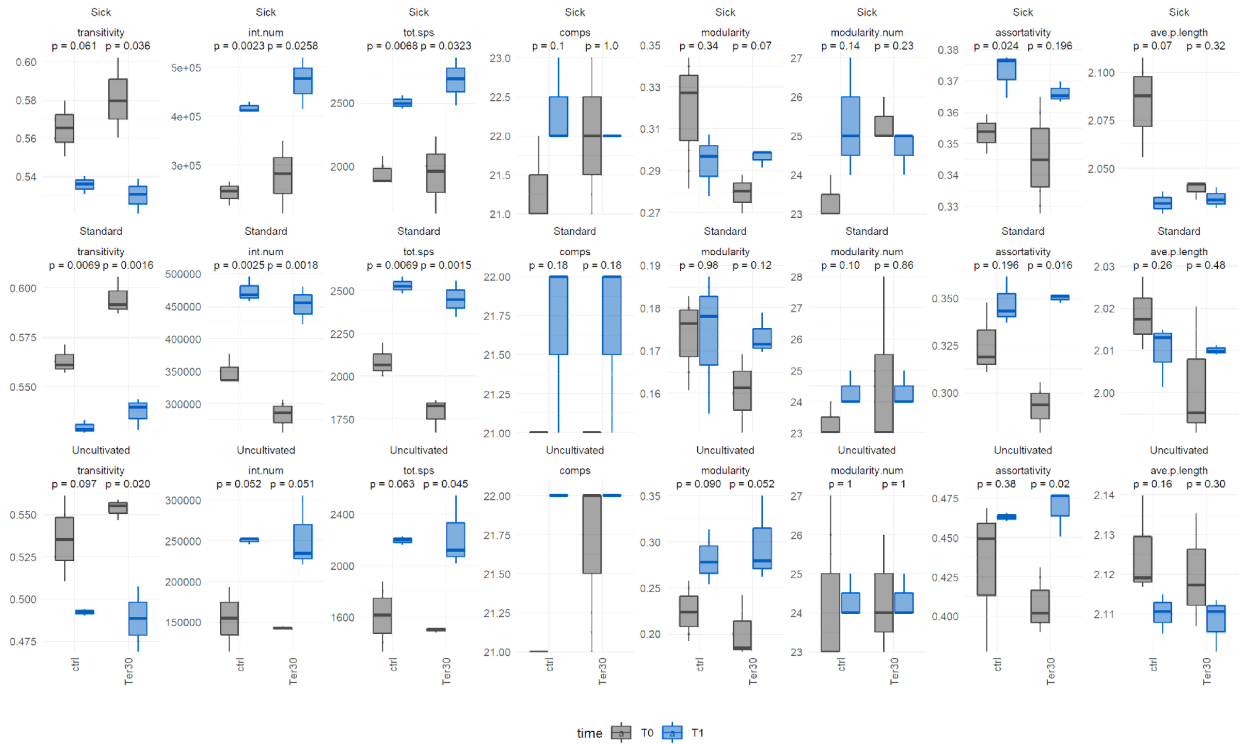


Figure S2 Relative abundance at family level of the archaeal and bacterial (Panel A) and fungal microbiota (Panel B), before and after treatment with Terramin 30 and control condition in standard, sick and uncultivated soil types.





A 16S - enriched



B 16S - depleted

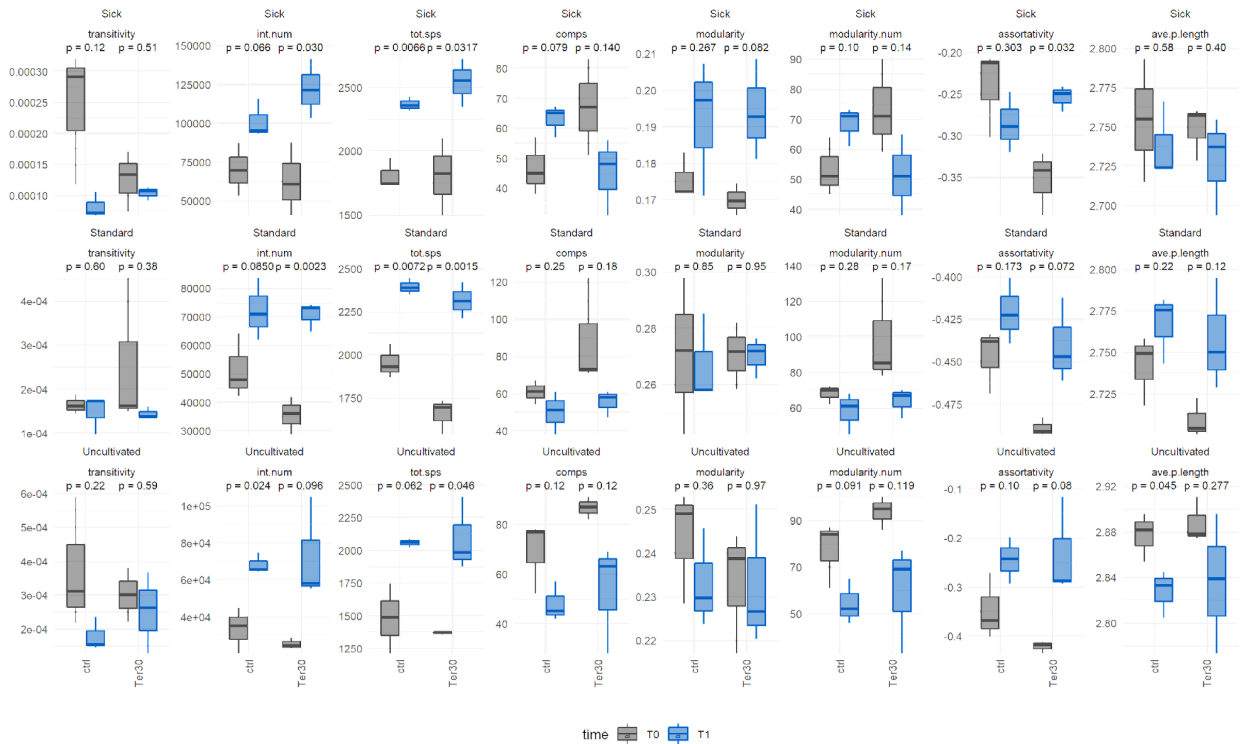
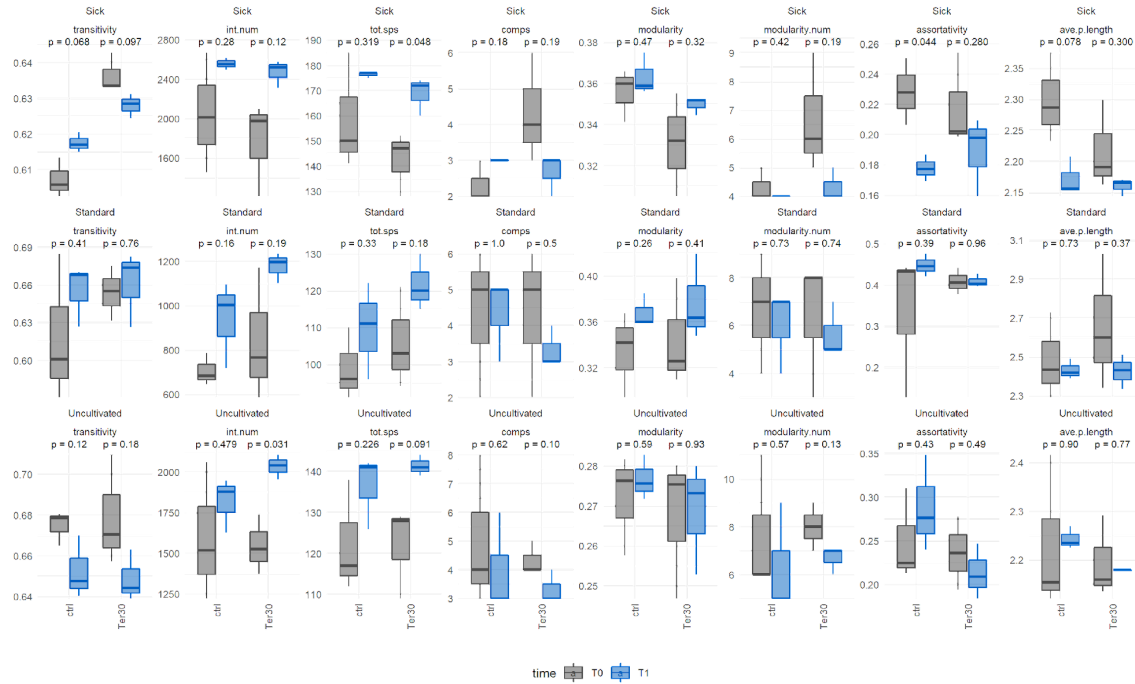


Figure S5 Network properties comparison before and after treatment for Terramin 30 and control conditions for 16S marker. P-values represent the resulting pairwise statistical significance level between conditions.

A ITS - enriched



B ITS - depleted

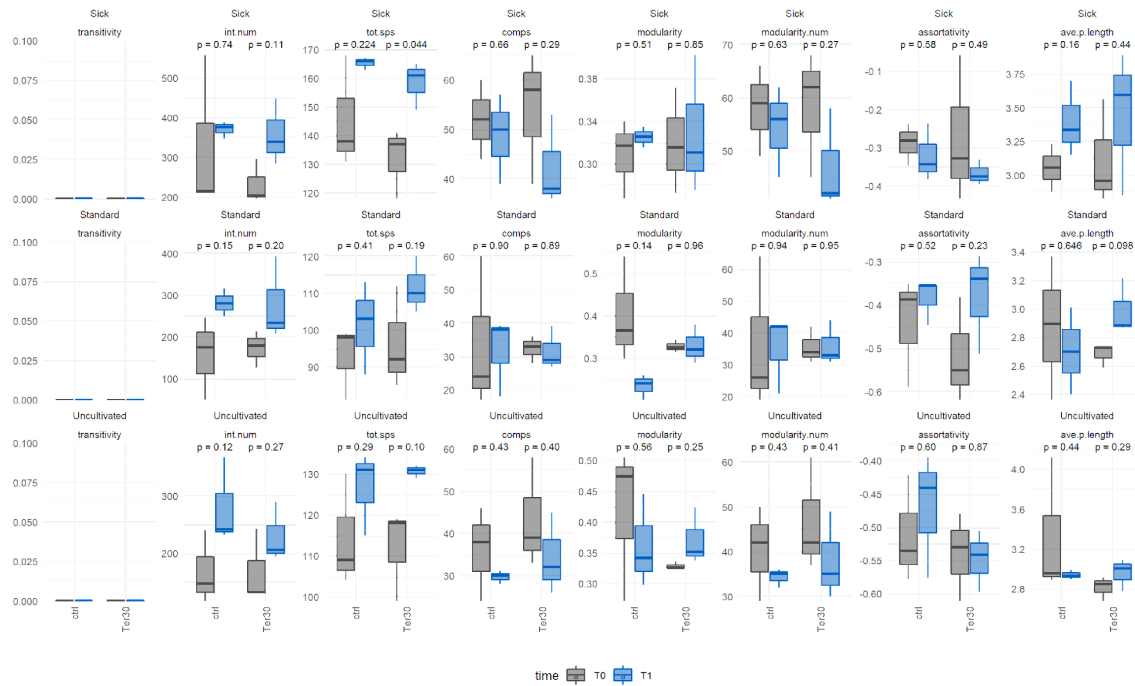


Figure S6 Network properties comparison before and after treatment for Terramin 30 and control conditions for ITS marker. P-values represent the resulting pairwise statistical significance level between conditions.

Table S1 Physicochemical characteristics of standard, sick and uncultured soils

Soil type	Standard	Sick	Uncultured
% Sand	55.06	53.42	47.42
% Loam	21.57	25.14	31.06
% Clay	23.37	21.44	21.51
Texture	Sandy clay loam	Sandy clay loam	Loam
pH (extract 1:2.5)	8.62	9.09	9.12
C.E. (dS/m) (extract 1:5)	0.31	0.23	0.19
Na (meq/100 g)	0.59	0.60	0.70
K (meq/100 g)	0.96	1.69	0.96
Ca (meq/100 g)	8.52	7.31	8.35
Mg (meq/100 g)	2.26	2.07	3.37
%M.O. total	1.19	1.22	0.78
% M.O. Oxidable	0.91	0.94	0.60
%N.total	0.09	0.08	0.05
%C total	0.69	0.71	0.45
C/N	7.71	8.96	8.99
P (mg/Kg)	114.80	109.80	32.20
% CaCO ₃ Total	29.00	33.00	35.00
% CaCO ₃ active	10.84	11.82	13.30
Cl ⁻ (meq/100 g)	0.40	0.20	0.09
SO ₄ -2 (meq/100g)	0.16	0.09	0.06
Fe (mg/Kg)	6.29	3.14	2.64
Mn (mg/Kg)	5.63	2.59	3.10
Cu (mg/Kg)	7.75	2.27	1.54
Zn (mg/Kg)	13.54	1.74	0.72
B (mg/Kg)	1.19	1.12	1.05
NO ₃ ⁻ (mg/kg)	< 10	< 10	< 10

Table S2 Physicochemical composition of Terramin ® Pro biostimulant

pH	7.2
density (g/ml)	1.20 g/ml
Total nitrogen	6.0% (w/w)
Organic nitrogen	6.0% (w/w)
L- α -amino acids	18.0% (w/w)
Organic matter	40.0% (w/w)
Aminogram (g/100)	
ASP	8.75
SER	6.01
GLU	16.5
GLY	9.11
HIS	2.75
ARG	4.96
THR	8.08
HYP	0.45
ALA	8.56
PRO	5.69
CIS	0.88
TYR	1.45
VAL	6.53
MET	0.48
LYS	10.81
ILE	1.97
LEU	2.87
PHE	3.88
TRP	0.22

Table S3 Permanova test comparing the variance at the beginning and at the end of the experiment (time) in all (general) and in each soil type.

	Soil type	factor	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)	% Variance explained
16S	general	time	1	0.72	0.72	16.27	0.17	0.001	17%
		soiltype	2	2.11	1.06	23.77	0.50	0.001	50%
		Residuals	32	1.42	0.04	-	0.33	-	-
		Total	35	4.26	-	-	1.00	-	-
	Standard	time	1	0.29	0.29	6.70	0.40	0.005	40%
		Residuals	10	0.44	0.04	-	0.60	-	-
		Total	11	0.73	-	-	1.00	-	-
	Sick	time	1	0.27	0.27	7.16	0.42	0.002	42%
		Residuals	10	0.38	0.04	-	0.58	-	-
		Total	11	0.65	-	-	1.00	-	-
	Uncultivated	time	1	0.42	0.42	12.00	0.55	0.002	55%
		Residuals	10	0.35	0.03	-	0.45	-	-
		Total	11	0.76	-	-	1.00	-	-
ITS	general	time	1	0.49	0.49	4.87	0.07	0.002	7%
		soiltype	2	3.51	1.76	17.36	0.48	0.001	48%
		Residuals	32	3.24	0.10	-	0.45	-	-
		Total	35	7.24	-	-	1.00	-	-
	Standard	time	1	0.30	0.30	2.00	0.17	0.019	17%
		Residuals	10	1.50	0.15	-	0.83	-	-
		Total	11	1.80	-	-	1.00	-	-
	Sick	time	1	0.23	0.23	6.27	0.39	0.005	39%
		Residuals	10	0.36	0.04	-	0.61	-	-
		Total	11	0.59	-	-	1.00	-	-
	Uncultivated	time	1	0.33	0.33	3.31	0.25	0.004	25%
		Residuals	10	1.01	0.10	-	0.75	-	-
		Total	11	1.35	-	-	1.00	-	-

Table S4 Permanova test comparing after treatment (T1) after Terramin 30 and control conditions (treatment) in all (general) and in each soil type.

	soil type	factor	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)	% Variance explained
16 S	general	treatment	1	0.04	0.04	1.00	0.02	0.34	-
		soiltype	2	1.19	0.59	13.89	0.65	0.001	65%
		Residuals	14	0.60	0.04	-	0.33	-	-
		Total	17	1.83	-	-	1.00	-	-
	Standard	treatment	1	0.05	0.05	0.87	0.18	0.5	-
		Residuals	4	0.25	0.06	-	0.82	-	-
		Total	5	0.31	-	-	1.00	-	-
	Sick	treatment	1	0.05	0.05	1.82	0.31	0.2	-
		Residuals	4	0.11	0.03	-	0.69	-	-
		Total	5	0.16	-	-	1.00	-	-
	Uncultivated	treatment	1	0.04	0.04	1.31	0.25	0.2	-
		Residuals	4	0.13	0.03	-	0.75	-	-
		Total	5	0.17	-	-	1.00	-	-
IT S	general	treatment	1	0.06	0.06	0.72	0.02	0.579	-
		soiltype	2	2.04	1.02	13.39	0.65	0.001	65%
		Residuals	14	1.07	0.08	-	0.34	-	-
		Total	17	3.17	-	-	1.00	-	-
	Standard	treatment	1	0.06	0.06	0.46	0.10	1	-
		Residuals	4	0.48	0.12	-	0.90	-	-
		Total	5	0.54	-	-	1.00	-	-
	Sick	treatment	1	0.02	0.02	0.94	0.19	0.5	-
		Residuals	4	0.10	0.03	-	0.81	-	-
		Total	5	0.13	-	-	1.00	-	-
	Uncultivated	treatment	1	0.06	0.06	0.58	0.13	1	-
		Residuals	4	0.40	0.10	-	0.87	-	-
		Total	5	0.46	-	-	1.00	-	-