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APPENDICES

Appendix A Table 3.1 ANOVA data for the effect of seaweed extracts types and ratios on the germination, fresh mass and radicle length of tomato seedlings in a growth chamber

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Mean Germination Time	0.725965	72.67368	3.210360	4.417500	Treatment	5.41	0.0002
Germination index	0.969193	11.30386	1.790407	15.83889	Treatment	3.0171	<.0001
Speed of germination	0.981541	14.50422	0.074536	0.513889	Treatment	0.1256	<.0001
Fresh mass	0.742130	26.44139	0.025927	0.09805	Treatment	0.0437	<.0001
Radicle length	0.924474	18.23436	1.412150	7.744444	Treatment	2.3797	<.0001

*Coefficient of variation; **Root MSE = Root Mean Squared Error; ***LSD = Least significant difference

Appendix A Table 3.2 ANOVA data for the effect of nursery application of seaweed extracts, silicon and *Trichoderma harzianum* and arbuscular mycorrhizal fungi mixture on growth and yield aspects of tomato seedlings

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Plant height	0.093723	6.500249	0.722611	11.11667	Treatment	0.8432	0.7593
Root length	0.035124	13.40788	1.557102	11.61333	Treatment	1.8169	0.9817
Dry shoot mass	0.059805	11.17777	0.097179	0.869396	Treatment	0.1134	0.9180
Dry root mass	0.089089	11.58737	0.022144	0.191104	Treatment	0.0258	0.7844
Total biomass	0.046634	9.376077	0.099484	1.061042	Treatment	0.1161	0.9583

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 3.3 ANOVA data for the effect of nursery application of seaweed extracts , silicon and *Trichoderma harzianum* and arbuscular mycorrhizal fungi mixture on *Verticillium* wilt incidence, dry matter content and yield of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Disease index (10 weeks)	0.129008	69.73124	12.94386	18.56250	Treatment	10.65	0.1048
Disease symptom (10 weeks)	0.233449	37.78520	32.27486	85.41667	Treatment	26.555	0.0080
Disease index (20 weeks)	0.066507	26.78781	15.02908	56.10417	Treatment	12.365	0.3822
Dry shoot mass	0.198544	11.97295	9.003341	75.19738	Treatment	15.584	0.7726
Dry root mass	0.008126	34.26967	5.266435	15.36763	Treatment	9.1156	1.0000
Plant biomass	0.137444	12.39081	11.22174	90.56500	Treatment	19.424	0.9100
Yield	0.651384	12.13971	0.540950	4.456042	Treatment	0.6312	<.0001

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 4.1 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on mycorrhizal and *Trichoderma* root colonisations of 6-week old tomato seedlings

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
% <i>Trichoderma</i> (2008)	0.978167	11.59883	7.302967	62.96296	T	4.903	<.0001
					M	4.903	0.8707
					T×M	8.9262	0.2530
% mycorrhiza (2008)	0.584845	70.44750	3.848521	5.462963	T	2.5838	0.5192
					M	2.5838	<.0001
					T×M	4.4406	0.8877
% <i>Trichoderma</i> (2009)	0.884715	26.09832	16.23896	62.22222	T	10.902	<.0001
					M	10.902	0.3719
					T×M	14.114	0.8515
% mycorrhiza (2009)	0.385690	79.93650	6.883421	8.611111	T	4.6213	0.9953
					M	4.6213	<.0001
					T×M	3.9176	0.8073

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 4.2 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on plant growth variables of 6-week old tomato seedlings during 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Shoot length	0.965695	3.879521	0.933905	24.07269	T	0.627	<.0001
					M	0.627	<.0001
					T×M	1.1196	<.0001
Root length	0.835116	6.926261	1.992455	28.76667	T	1.3377	<.0001
					M	1.3377	<.0001
					T×M	2.3918	<.0001
Stem diameter	0.895701	2.778196	0.146550	5.275000	T	0.0984	<.0001
					M	0.0984	<.0001
					T×M	0.1775	<.0001
Dry shoot mass	0.498647	25.03747	2.138246	8.540185	T	1.4355	0.0002
					M	1.4355	0.0364
					T×M	2.5404	0.0045
Dry root mass	0.436730	24.64911	0.592948	2.405556	T	0.3981	0.0003
					M	0.3981	0.3004
					T×M	0.6462	0.0224

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 4.3 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on plant growth variables of 6-week old tomato seedlings during 2009 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Shoot length	0.478276	11.56668	2.969061	25.66907	T	1.9933	0.0009
					M	1.9933	0.0670
					T×M	3.5086	0.0028
Root length	0.333797	16.23070	4.529839	27.90907	T	3.0412	0.0460
					M	3.0412	0.1920
					T×M	5.3833	0.0235
Stem diameter	0.317632	9.606278	0.470601	4.898889	T	0.3159	0.0098
					M	0.3159	0.0351
					T×M	0.5737	0.4943
Dry shoot mass	0.385323	13.34916	1.278182	9.575000	T	0.8581	<.0001
					M	0.8581	0.5292
					T×M	1.4567	0.4131
Dry root mass	0.207262	13.14408	0.350411	2.665926	T	0.2353	0.0149
					M	0.2353	0.8601
					T×M	0.4082	0.6988

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 4.4 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on macronutrient shoot content of 6-week old tomato seedlings during 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Nitrogen (N)	0.720602	4.722166	0.213914	4.530000	T	0.2119	0.0143
					M	0.2119	0.0003
					T×M	0.3845	0.1124
Phosphorus (P)	0.468206	13.16453	0.081035	0.615556	T	0.0803	0.6978
					M	0.0803	0.0123
					T×M	0.1458	0.4604
Potassium (K)	0.401253	8.121039	0.228352	2.811852	T	0.2262	0.0648
					M	0.2262	0.6723
					T×M	0.3928	0.3396
Calcium (ca)	0.305944	11.86191	0.507470	4.278148	T	0.5026	0.3635
					M	0.5026	0.1442
					T×M	0.9119	0.8283
Magnesium (mg)	0.280578	12.09942	0.130270	1.076667	T	0.129	0.2593
					M	0.129	0.3427
					T×M	0.2343	0.7653
Sulphur (s)	0.629200	10.74485	0.177409	1.651111	T	0.1757	0.0615
					M	0.1757	0.0055
					T×M	0.3183	0.0807

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 4.5 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on micronutrient shoot content of 6-week old tomato seedlings during 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Copper (Cu)	0.237408	31.58935	3.615109	11.44407	T	3.5803	0.7363
					M	3.5803	0.2109
					T×M	6.3401	0.8090
Zinc (Zn)	0.654105	11.14818	3.377485	30.29630	T	3.345	0.0686
					M	3.345	0.0163
					T×M	5.8544	0.0125
Manganese (Mn)	0.646686	10.91927	2.624669	24.03704	T	2.5994	0.0696
					M	2.5994	0.0152
					T×M	4.5644	0.0168
Molybdenum (Mo)	0.293211	11.98164	1.731081	14.44778	T	1.7144	0.2328
					M	1.7144	0.9932
					T×M	3.1029	0.3991

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 5.1 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on yield and yield components of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Number of fruit/plant	0.036930	14.05521	19.99093	142.2315	T	9.3494	0.5404
					M	9.3494	0.3464
					T×M	15.334	0.9810
Total yield	0.059925	17.24880	1.321450	7.661111	T	0.618	0.3827
					M	0.618	0.1459
					T×M	1.0337	0.9783
Marketable yield/plant	0.066497	23.00017	1.367446	5.945370	T	0.6395	0.3780
					M	0.6395	0.1033
					T×M	1.1085	0.9788

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 5.2 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on fruit size of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Extra-large fruit	0.081515	16.05886	7.219349	44.95556	T	3.3764	0.8905
					M	3.3764	0.0382
					T×M	5.7112	0.7711
Large fruit	0.056502	23.31973	7.152033	30.66944	T	3.3449	0.2097
					M	3.3449	0.5877
					T×M	5.8641	0.7927
Medium fruit	0.187827	33.50834	4.692719	14.00463	T	2.1947	0.3587
					M	2.1947	0.0032
					T×M	3.8269	0.0798
Small fruit	0.033262	33.83728	3.495266	10.32963	T	1.6347	0.4999
					M	1.6347	0.8199
					T×M	2.9095	0.8061

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 5.3 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on phytochemical content of tomato fruit

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Antioxidant activity	0.200505	2.015294	0.101804	5.051593	T	0.1008	0.5130
					M	0.1008	0.3624
					T×M	0.1737	0.9090
Lycopene content	0.665776	13.95257	2.110372	15.12533	T	2.0901	0.0229
					M	2.0901	0.0129
					T×M	3.779	0.0203
Vitamin C	0.390852	13.47633	3.294215	24.4444	T	3.2625	0.0837
					M	3.2625	0.4523
					T×M	5.5715	0.4120

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 5.4 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on chemical content of tomato fruit

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Calcium (Ca)	0.555556	15.11858	0.017638	0.116667	T	0.0182	0.0458
					M	0.0182	0.0534
					T×M	0.0315	0.1296
Phosphorus (P)	0.432130	15.87560	0.055976	0.352593	T	0.581	0.5762
					M	0.581	0.0839
					T×M	0.1007	0.1908
Potassium (K)	0.632363	15.01586	0.253268	1.686667	T	0.2508	0.0678
					M	0.2508	0.00340
					T×M	0.3197	0.1097
Magnesium (Mg)	0.391724	13.46578	0.019052	0.141481	T	0.0189	0.0446
					M	0.0189	0.1643
					TXM	0.0344	0.9965

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.1 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on dry matter content and root colonisation of field-grown tomato during 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
% Mycorrhizal root colonisation	0.874483	39.25276	4.494441	11.45000	Treatment	6.0259	<.0001
% <i>Trichoderma</i> root colonisation	0.989399	9.657312	4.900024	50.73900	Treatment	6.5697	<.0001
Dry shoot mass	0.634377	10.17165	2.862860	28.14550	Treatment	3.8384	0.0009
Dry root mass	0.258629	8.047310	0.415120	5.158500	Treatment	0.5566	0.1770

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.2 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on yield and yield components of field-grown tomato during 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Number of fruit/plant	0.059656	7.211939	10.55107	146.3000	Treatment	14.146	0.7979
Early yield/plant	0.534623	24.16640	0.539032	2.230500	Treatment	0.7227	0.0056
Total yield/plant	0.294686	8.120264	0.699723	8.617000	Treatment	0.9382	0.1244
Marketable yield/plant	0.312807	12.29304	0.815828	6.636500	Treatment	1.0938	0.1032

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.3 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on fruit size of field-grown in the 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Extra-large fruit	0.194879	23.25455	7.873992	33.86000	Treatment	10.557	0.3116
Large fruit	0.653966	17.47355	5.358265	30.66500	Treatment	7.1841	0.0006
Medium fruit	0.453247	36.41466	7.960245	21.86000	Treatment	10.673	0.0191
Small fruit	0.104865	20.71346	2.818067	13.60500	Treatment	3.7783	0.6093

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.4 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on vitamin C and TSS content of field-grown tomato in the 2008 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Vitamin C	0.622369	8.519432	2.254810	26.46667	Treatment	4.2455	0.0418
TSS	0.256167	7.652184	0.399061	5.215000	Treatment	0.535	0.1811

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.5 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on dry matter content and root colonisation of field-grown tomato during 2009 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
% Mycorrhizal root colonisation	0.933758	27.42382	3.016621	11.00000	Treatment	4.0445	<.0001
% <i>Trichoderma</i> root colonisation	0.993127	8.222172	3.535534	43.00000	Treatment	4.7403	<.0001
Dry shoot mass	0.655587	8.538775	2.697271	31.58850	Treatment	3.6164	0.0006
Dry root mass	0.248172	6.047684	0.313724	5.187500	Treatment	0.4206	0.1952

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.6 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on yield and yield components of field-grown tomato during 2009 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Number of fruit/plant	0.103643	8.590151	11.77710	137.1000	Treatment	15.79	0.6142
Early yield/plant	0.505769	13.10260	0.275155	2.100000	Treatment	0.3689	0.0089
Total yield/plant	0.341703	5.261477	0.446226	8.481000	Treatment	0.5983	0.0756
Marketable yield/plant	0.524508	7.015642	0.449703	6.410000	Treatment	0.6029	0.0066

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.7 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on fruit size of field-grown tomato in the 2009 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Extra-large fruit	0.452195	16.26688	5.930093	36.45500	Treatment	7.9507	0.0194
Large fruit	0.454103	15.05578	4.129800	27.43000	Treatment	5.537	0.0189
Medium fruit	0.164893	41.05721	8.463738	20.61450	Treatment	11.348	0.3963
Small fruit	0.257538	16.45699	2.550833	15.50000	Treatment	3.42	0.1788

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 6.8 ANOVA data for the effect of *Trichoderma harzianum* and arbuscular mycorrhizal fungi on vitamin C and TSS content of field-grown tomato in the 2009 growing season

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Vitamin C	0.538281	5.847494	1.444818	24.70833	Treatment	2.7204	0.0887
TSS	0.554595	3.275484	0.182428	5.569500	Treatment	0.2446	0.0040

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 7.1 ANOVA data for the effect of arbuscular mycorrhizal and biochar on plant growth variables of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Plant length	0.067380	4.391962	6.554472	149.2379	M	5.5817	0.6391
					B	5.5817	0.5227
					M×B	9.1552	0.3832
Root length	0.197528	7.662864	4.611671	60.18208	M	3.9273	0.2982
					B	3.9273	0.0690
					M×B	5.9005	0.7669
Dry shoot mass	0.355480	9.935326	1.116110	11.23375	M	0.9505	0.0113
					B	0.9505	0.1034
					M×B	1.1361	0.5661
Dry root mass	0.259325	12.61466	0.255209	2.023113	M	0.2173	0.6213
					B	0.2173	0.0235
					M×B	0.3441	0.3999
Plant biomass	0.316595	8.331453	1.104489	13.25686	M	0.9406	0.0137
					B	0.9406	0.2606
					M×B	1.7852	0.4398

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 7.2 ANOVA data for the effect of arbuscular mycorrhizal fungi and biochar on yield and yield components of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Marketable fruit/plant	0.088033	23.07987	16.38132	70.97667	M	13.95	0.2141
					B	13.95	0.7032
					M×B	13.95	0.7176
Early yield/plant	0.033810	28.02373	0.480490	1.714583	M	0.4092	0.5897
					B	0.4092	0.5394
					M×B	0.3011	0.9231
Marketable yield/plant	0.038824	17.39789	1.097807	6.310000	M	0.9349	0.3906
					B	0.9349	0.9181
					M×B	1.0408	0.8717
Total yield/plant	0.048388	16.85298	1.236587	7.337500	M	1.0531	0.3563
					B	1.0531	0.7374
					M×B	1.810	0.9221

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 7.3 ANOVA data for the effect of arbuscular mycorrhizal fungi and biochar on macronutrient shoot content of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Nitrogen (N)	0.087236	3.867294	0.157528	4.073333	M	0.1341	0.3887
					B	0.1341	0.4922
					M×B	0.1860	0.4312
Phosphorus (P)	0.470272	18.72597	0.066087	0.352917	M	0.0563	0.0742
					B	0.0563	0.0241
					M×B	0.0840	0.0094
Potassium (K)	0.287723	9.048491	0.245591	2.714167	M	0.2091	0.7679
					B	0.2091	0.0275
					M×B	0.2819	0.1418
Calcium (Ca)	0.039899	23.10564	0.456818	1.977083	M	0.389	0.5887
					B	0.389	0.4911
					M×B	0.5773	0.8496
Magnesium (Mg)	0.012466	2.33402	0.069893	0.566667	M	0.0595	0.9540
					B	0.0595	0.6453
					M×B	0.0887	0.8627

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference

Appendix A Table 7.4 ANOVA data for the effect of arbuscular mycorrhizal fungi and biochar on micronutrient shoot content of tomato

Variable	R-square	*CV	**R-MSE	Mean	Source	***LSD	Pr > F
Zinc (Zn)	0.132388	18.99885	6.784173	35.70833	M	5.7773	0.2316
					B	5.7773	0.2544
					M×B	8.2857	0.6998
Copper (Cu)	0.254335	35.70015	79.78983	223.5000	M	67.948	0.0616
					B	67.948	0.7165
					M×B	95.157	0.1119
Manganese (Mn)	0.240130	23.42686	32.54382	138.9167	M	27.714	0.0922
					B	27.714	0.7015
					M×B	38.592	0.0966
Sodium (Na)	0.033167	13.08201	389.0425	2973.875	M	331.31	0.9269
					B	331.31	0.5860
					M×B	489.36	0.5493

*Coefficient of variation

**Root MSE = Root Mean Squared Error

***LSD = Least significant difference