

Bull Kelp Extract Adventitious Root Bioassays: Trial Comparisons

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Evaluation of Data



- Standard Deviation of the collected data is presented in Table 1 as a way to evaluate variability between trials. Standard Deviation is a measure of how dispersed data is in relation to the mean and quantifies the variance or dispersion of a set of values.
- Percent Difference is presented in Table 2 as a way to illustrate the difference between results. Percent Difference refers to the difference between two numbers expressed as a percentage. This is the ratio of the difference in their values to their average, multiplied by 100.
- This provides a standardized way to quantify the magnitude of difference between results.



Result Comparisons



Table 1: Standard deviation between results for each adventitious root trial.

	Test Product (Bull Kelp Extract)				Commercial Control (Rockweed Extract)				Water Control			
	Trial 1	Trial 2	Trial 3	St.Dev	Trial 1	Trial 2	Trial 3	St.Dev	Trial 1	Trial 2	Trial 3	St.Dev
Root Count	20.17	24.17	19.17	2.64	18.71	20.33	19.04	0.86	17.54	18.21	15.29	1.53
Root FW	0.224	0.234	0.156	0.04	0.206	0.223	0.156	0.03	0.146	0.176	0.106	0.03
Root DW	0.012	0.013	0.012	0.00	0.012	0.013	0.012	0.00	0.011	0.013	0.011	0.00
Root Length (cm)	43.28	43.15	21.32	12.64	34.61	40.32	18.45	11.34	28.37	32.26	16.67	8.12
Root SA (cm2)	10.14	10.95	6.49	2.38	8.70	9.99	5.64	2.23	6.35	7.54	4.37	1.60
Root Diam (mm)	0.753	0.809	0.986	0.12	0.810	0.795	0.989	0.11	0.723	0.752	0.850	0.07
Root Volume (cm3)	0.191	0.222	0.159	0.03	0.175	0.199	0.138	0.03	0.114	0.142	0.092	0.02
Tips	45.8	22.3	17.1	15.28	40.7	24.3	16.6	12.28	43.3	18.1	16.4	15.06
Forks	141.4	111.4	75.1	33.22	108.8	86.3	77.5	16.16	59.0	60.0	38.5	12.13

- Table 1 suggests that there was some variability between trial results. This is expected as there can be fluctuations in growth room environmental conditions such as temperature and humidity. Overall the water control shows the lowest amount of variability, while the Test Product shows the highest level of variability between trials.
- In general, there was little variability between trials for fresh weight, dry weight, root diameter, and root volume.
- The highest variability in trial results for all treatments was found in number of tips and number of forks. The Test Product showed the highest variability when evaluating number of forks.



Result Comparisons



Table 2(a): Percent Difference comparing difference between Test Product and Controls.

	Average Root Count	% Diff. over Water Control	% Diff. over Comm.	Average Root FW	% Diff. over Water Control	% Diff. over Comm.	Average Root DW	% Diff. over Water Control	% Diff. over Comm.	Average Root Length (cm)	% Diff. over Water Control	% Diff. over Comm.	Average Root SA (cm2)	% Diff. over Water Control	% Diff. over Comm.
GW Test Product Trial 1	20.167	13.923	7.503	0.224	42.350	8.582	0.012	8.026	2.806	43.279	41.628	22.267	10.136	45.958	15.264
Commercial Control Trial 1	18.708	4.246	-	0.206	21.497	-	0.012	3.452	-	34.607	12.791	-	8.698	19.798	-
Water Control Trial 1	17.542	-	-	0.146	-	-	0.011	-	-	28.366	-	-	6.348	-	-
GW Test Product Trial 2	24.167	28.122	17.228	0.234	28.436	4.990	0.013	3.679	3.841	43.153	28.878	6.779	10.951	36.840	9.196
Commercial Control Trial 2	20.333	11.027	-	0.223	23.529	-	0.013	-0.162	-	40.324	22.208	-	9.988	27.880	-
Water Control Trial 2	18.208	-	-	0.176	-	-	0.013	-	-	32.264	-	-	7.544	-	-
GW Test Product Trial 3	19.174	22.528	0.692	0.156	38.254	0.494	0.012	5.880	1.474	21.315	24.480	14.404	6.486	38.994	13.952
Commercial Control Trial 3	19.042	21.845	-	0.156	37.778	-	0.012	4.408	-	18.451	10.165	-	5.640	25.387	-
Water Control Trial 3	15.292	-	-	0.106	-	-	0.011	-	-	16.666	-	-	4.369	-	-

Table 2(b): Percent Difference comparing difference between Test Product and Controls (continued).

	Average Root Diam (mm)	% Diff. over Water Control	% Diff. over Comm.	Average Root Volume (cm3)	% Diff. over Water Control	% Diff. over Comm.	Average Tips	% Diff. over Water Control	% Diff. over Comm.	Average Forks	% Diff. over Water Control	% Diff. over Comm.
GW Test Product Trial 1	0.753	4.172	-7.270	0.191	50.356	8.288	45.750	5.522	11.765	141.417	82.245	26.078
Commercial Control Trial 1	0.810	7.479	-	0.175	26.466	-	40.667	-4.213	-	108.792	36.005	-
Water Control Trial 1	0.723	-	-	0.114	-	-	43.292	-	-	59.000	-	-
GW Test Product Trial 2	0.809	7.207	1.680	0.222	44.042	11.100	22.250	20.433	-8.774	111.417	59.990	25.416
Commercial Control Trial 2	0.795	5.528	-	0.199	33.350	-	24.292	29.077	-	86.292	35.944	-
Water Control Trial 2	0.752	-	-	0.142	-	-	18.125	-	-	60.000	-	-
GW Test Product Trial 3	0.986	14.732	-0.360	0.159	52.942	13.845	17.083	4.234	2.719	75.083	64.417	-3.114
Commercial Control Trial 3	0.989	15.090	-	0.138	39.827	-	16.625	1.515	-	77.458	67.194	-
Water Control Trial 3	0.850	-	-	0.092	-	-	16.375	-	-	38.500	-	-

Result Comparisons



- Selected results from the above tables have been shared in previous reports.
- Results generally suggest the Test Product has a greater % Diff. over the Water Control than the Commercial Product, this is also reflected in results for % Diff. over the Commercial Control.
- These results illustrate that on average, the Test Product had greater responses in adventitious root growth and morphology when compared to the Commercial Product and the Water Control.
- Differences which are statistically significant are presented in separate reports.



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