

Appendices

APPENDIX - I

Vegetative Characteristics of coconut palm

Sl. No.	Height of Coconut palm	Length of leaf	Canopy diameter	Angle of leaf orientation
1	10.3	4.38	8.76	68.00
2	11.7	3.73	7.46	67.5
3	7.00	3.92	7.84	45.62
4	9.54	3.83	7.66	67.6
5	11.62	4.10	8.20	62.8
6	8.36	4.23	8.46	51.00
7	7.58	2.48	4.96	78.00
8	8.14	2.23	4.46	82.00
9	8.18	3.12	6.24	61.00
10	6.56	1.98	3.96	62.00
11	6.72	2.14	4.28	68.00
12	8.33	4.25	8.50	59.00
13	8.38	4.15	8.30	36.00
14	7.78	3.15	6.30	41.00
15	11.35	4.21	8.42	40.00
16	12.5	3.8	7.60	69.00
17	8.90	3.15	6.30	65.30
18	7.56	3.87	7.74	58.43
19	6.57	3.93	7.86	45.36
20	8.45	4.21	8.42	42.10
21	12.10	3.76	7.52	45.90
22	11.67	3.82	7.64	51.60
23	12.10	3.84	7.68	68.10
24	7.89	4.26	8.52	41.90
25	7.65	4.12	8.24	56.80
26	8.54	2.59	5.18	48.00
27	8.65	2.78	5.56	52.00
28	7.65	4.15	8.30	57.00
29	10.35	2.38	4.76	54.60
30	11.58	3.90	7.80	78.60

APPENDIX - II

CMR measurement of 40 mm diameter electrode

(R2, 3 and 4.5: Electrode with 40, 60 and 90 mm diameter respectively; H5-15: horizontal position of electrode – 5 to 15 mm in front of the nozzle; V6-10: Electrode potential ranging from 6 to 10 kV)

Sl. No.	Reading Combination	Nozzle Discharge, mL·s ⁻¹	Faraday Cage at 1 m Distance		Faraday Cage at 2 m Distance	
			Current (μA)	CMR, mC·Kg ⁻¹	Current (μA)	CMR, mC·Kg ⁻¹
1	R2H5V6	1.33	0.6	0.451	0.2	0.150
2	R2H5V7	1.33	1.7	1.278	0.4	0.301
3	R2H5V8	1.33	1.7	1.278	0.6	0.451
4	R2H5V9	1.33	1.6	1.203	0.6	0.451
5	R2H5V10	1.33	1.6	1.203	0.7	0.526
6	R2H10V6	1.33	1.2	0.902	1	0.752
7	R2H10V7	1.33	1.9	1.429	0.7	0.526
8	R2H10V8	1.33	2.1	1.579	0.6	0.451
9	R2H10V9	1.33	2.4	1.805	0.7	0.526
10	R2H10V10	1.33	3.7	2.782	1.4	1.053
11	R2H15V6	1.33	0.5	0.376	0.2	0.150
12	R2H15V7	1.33	1.7	1.278	0.5	0.376
13	R2H15V8	1.33	1.9	1.429	0.6	0.451
14	R2H15V9	1.33	2.3	1.729	0.6	0.451
15	R2H1V510	1.33	2.4	1.805	0.7	0.526

APPENDIX - III

CMR measurement of 60 mm diameter electrode

Sl. No.	Reading Combination	Nozzle Discharge, mL·s ⁻¹	Faraday Cage at 1 m Distance		Faraday Cage at 2 m Distance	
			Current (μA)	CMR, mC·Kg ⁻¹	Current (μA)	CMR, mC·Kg ⁻¹
1	R3H0V6	1.33	0.7	0.526	0.1	0.0751
2	R3H0V7	1.33	0.9	0.676	0.5	0.375
3	R3H0V8	1.33	1.1	0.827	0.7	0.526
4	R3H0V9	1.33	1.2	0.902	0.8	0.601
5	R3H0V10	1.33	1.3	0.977	0.8	0.601
6	R3H0.5V6	1.33	0.5	0.376	0.2	0.150
7	R3H0.5V7	1.33	0.9	0.677	0.6	0.451
8	R3H0.5V8	1.33	1.3	0.977	0.8	0.602
9	R3H0.5V9	1.33	1.4	1.053	0.9	0.677
10	R3H0.5V10	1.33	1.4	1.053	0.9	0.677
11	R3H1V6	1.33	0.5	0.376	0.2	0.150
12	R3H1V7	1.33	0.8	0.602	0.5	0.376
13	R3H1V8	1.33	1	0.752	0.8	0.602
14	R3H1V9	1.33	1.3	0.977	0.8	0.602
15	R3H1V10	1.33	1.3	0.977	0.9	0.677

APPENDIX - IV

CMR measurement of 90 mm diameter electrode

Sl. No.	Reading Combination	Nozzle Discharge, mL·s ⁻¹	Faraday Cage at 1 m Distance		Faraday Cage at 1.5 m Distance		Faraday Cage at 1.5 m Distance	
			Current (μA)	CMR, mC·Kg ⁻¹	Current (μA)	CMR, mC·Kg ⁻¹	Current (μA)	CMR, mC·Kg ⁻¹
1	R4.5H0V6	1.33	0.7	0.526				
2	R4.5H0V7	1.33	0.8	0.601				
3	R4.5H0V8	1.33	1.2	0.902				
4	R4.5H0V9	1.33	1.2	0.902				
5	R4.5H0V10	1.33	1.4	1.052				
6	R4.5H0.5V6	1.33	0.5	0.375				
7	R4.5H0.5V7	1.33	3.3	2.481				
8	R4.5H0.5V8	1.33	3.4	2.556	2	1.503	0.7	
9	R4.5H0.5V9	1.33	4.6	3.458	2.3	1.729	1.1	
10	R4.5H0.5V10	1.33	4.8	3.609	2.6	1.954	1.2	
11	R4.5H1V6	1.33	0.4	0.300				
12	R4.5H1V7	1.33	0.6	0.451				
13	R4.5H1V8	1.33	0.9	0.676				
14	R4.5H1V9	1.33	0.9	0.676				
15	R4.5H1V10	1.33	0.9	0.676				

APPENDIX - V

Spray deposition by Spectrophotometry

Sample	Height position	Mean Absorbance at 427 nm	T _{cl} , g·L ⁻¹	Spray deposition, d in mg·L ⁻¹
Tank solution	-	1.107	10	-
Blank	-	0.063	0	-
Developed prototype with ESS ON	Lower	0.289	1.76	3.52
	Middle	0.188	0.98	1.95
	Top	0.170	0.84	1.67
Developed prototype with ESS OFF	Lower	0.227	1.28	2.56
	Middle	0.154	0.71	1.42
	Top	0.099	0.28	0.56
ROCKER SPRAYER	Lower	0.197	1.04	2.08
	Middle	0.139	0.59	1.18
	Top	0.089	0.20	0.41

APPENDIX - VI (a)

ANOVA Table for percentage coverage of spray droplets

Tests of Between-Subjects Effects

Dependent Variable: Coverage

Source	Type III Sum				
	of Squares	df	Mean Square	F	Sig.
Corrected Model	7567.434 ^a	8	945.929	446.544	.000
Intercept	13104.546	1	13104.546	6186.253	.000
Sprayertype	1172.059	2	586.029	276.646	3.06E-14
Heightlocation	4155.113	2	2077.556	980.750	4.25E-19
Sprayertype * Heightlocation	2240.263	4	560.066	264.390	1.01E-15
Error	38.130	18	2.118		
Total	20710.110	27			
Corrected Total	7605.564	26			

a. R Squared = .995 (Adjusted R Squared = .993)

APPENDIX - VI (b)
Multiple Comparisons

Dependent Variable: Coverage

Tukey HSD

		(J)	Mean	95% Confidence Interval		
(I)	Sprayertype	Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
ESSON	ESSOFF	15.5311*	.68611	.000	13.7801	17.2822
	CONVENTIONAL	3.9667*	.68611	.000	2.2156	5.7177
ESSOFF	ESSON	-15.5311*	.68611	.000	-17.2822	-13.7801
	CONVENTIONAL	-11.5644*	.68611	.000	-13.3155	-9.8134
CONVENTIONAL	ESSON	-3.9667*	.68611	.000	-5.7177	-2.2156
	ESSOFF	11.5644*	.68611	.000	9.8134	13.3155

Dependent Variable: Coverage

Tukey HSD

(I)	(J)	Mean	Std. Error	Sig.	95% Confidence Interval	
Heightlocation	Heightlocation	Difference (I-J)	Error		Lower Bound	Upper Bound
LOWER	MIDDLE	21.5178*	.68611	.000	19.7667	23.2688
	UPPER	29.3400*	.68611	.000	27.5889	31.0911
MIDDLE	LOWER	-21.5178*	.68611	.000	-23.2688	-19.7667
	UPPER	7.8222*	.68611	.000	6.0712	9.5733
UPPER	LOWER	-29.3400*	.68611	.000	-31.0911	-27.5889
	MIDDLE	-7.8222*	.68611	.000	-9.5733	-6.0712

Based on observed means.

The error term is Mean Square(Error) = 2.118.

*. The mean difference is significant at the .05 level.

APPENDIX -VII (a)

ANOVA Table for percentage coverage of droplet density

Tests of Between-Subjects Effects

Dependent Variable: Dropdensity

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	57908.440 ^a	8	7238.555	24.102	.000
Intercept	300833.333	1	300833.333	1001.693	.000
Sprayertype	49059.082	2	24529.541	81.677	9.35E-10
Heightlocation	5347.749	2	2673.874	8.903	0.002
Sprayertype * Heightlocation	3501.609	4	875.402	2.915	.051
Error	5405.847	18	300.325		
Total	364147.620	27			
Corrected Total	63314.287	26			

a. R Squared = .915 (Adjusted R Squared = .877)

APPENDIX -VII (b)

Multiple Comparisons

Dependent Variable: Dropdensity

Tukey HSD

		95% Confidence				
(I)		Mean			Interval	
Sprayertyp	(J)	Difference			Lower	Upper
e	Sprayertype	(I-J)	Std. Error	Sig.	Bound	Bound
ESSON	ESSOFF	65.7889*	8.16938	.000	44.9393	86.6385
	CONVENTIONAL	103.1111*	8.16938	.000	82.2615	123.9607
ESSOFF	ESSON	-65.7889*	8.16938	.000	-86.6385	-44.9393
	CONVENTIONAL	37.3222*	8.16938	.001	16.4726	58.1718
CONVENTIONAL	ESSON	-103.1111*	8.16938	.000	-123.9607	-82.2615
	ESSOFF	-37.3222*	8.16938	.001	-58.1718	-16.4726

Dependent Variable: Dropdensity

Tukey HSD

		95% Confidence				
(I)	(J)	Mean			Interval	
Heightlocation	Heightlocation	Difference			Lower	Upper
		(I-J)	Std. Error	Sig.	Bound	Bound
LOWER	MIDDLE	18.1778	8.16938	.094	-2.6718	39.0274
	UPPER	34.4556*	8.16938	.001	13.6060	55.3052
MIDDLE	LOWER	-18.1778	8.16938	.094	-39.0274	2.6718
	UPPER	16.2778	8.16938	.143	-4.5718	37.1274
UPPER	LOWER	-34.4556*	8.16938	.001	-55.3052	-13.6060
	MIDDLE	-16.2778	8.16938	.143	-37.1274	4.5718

Based on observed means.

The error term is Mean Square(Error) = 300.325.

*. The mean difference is significant at the .05 level.

APPENDIX - VIII (a)

ANOVA Table for percentage coverage of spray deposition

Tests of Between-Subjects Effects

Dependent Variable: Deposition

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.196 ^a	8	.150	67.453	.000
Intercept	4.347	1	4.347	1961.129	.000
Sprayertype	.316	2	.158	71.387	3.14E-09
Heightlocation	.831	2	.416	187.447	2.9E-13
Sprayertype * Heightlocation	.049	4	.012	5.491	0.00522
Error	.040	18	.002		
Total	5.583	27			
Corrected Total	1.236	26			

a. R Squared = .968 (Adjusted R Squared = .953)

APPENDIX - VIII (b)
Multiple Comparisons

Dependent Variable: Deposition

Tukey HSD

(I)	(J)	Mean		95% Confidence Interval		
Heightlocati on	Heightlocati on	Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
ESSON	ESSOFF	.1469*	.02219	.000	.0902	.2035
	CONVENTI ONAL	.2647*	.02219	.000	.2080	.3213
ESSOFF	ESSON	-.1469*	.02219	.000	-.2035	-.0902
	CONVENTI ONAL	.1178*	.02219	.000	.0611	.1744
CONVENTI ONAL	ESSON	-.2647*	.02219	.000	-.3213	-.2080
	ESSOFF	-.1178*	.02219	.000	-.1744	-.0611

Dependent Variable: Deposition

Tukey HSD

(I)	(J)	Mean		95% Confidence Interval		
Heightlocati on	Heightlocati on	Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
LOWER	MIDDLE	.2747*	.02219	.000	.2180	.3313
	UPPER	.4236*	.02219	.000	.3669	.4802
MIDDLE	LOWER	-.2747*	.02219	.000	-.3313	-.2180
	UPPER	.1489*	.02219	.000	.0922	.2055
UPPER	LOWER	-.4236*	.02219	.000	-.4802	-.3669
	MIDDLE	-.1489*	.02219	.000	-.2055	-.0922

Based on observed means.

The error term is Mean Square(Error) = .001.

*. The mean difference is significant at the .05 level.