

Supplementary Material

Pesticide translocation using nonpressurized and pressurized endotherapeutic treatments in coconut palms

Jordana A. Ferreira, Joana M. S. Ferreira, Aline de H. N. Maia, Paulo M. P. Lins, Carla B. G. Bottoli

Table S1. Morphological characteristics of the coconut palms used in the **pressurized** or **nonpressurized** endotherapy treatments.

Endotherapy treatment	Time after application (days)	Replication (palm tree)	Characteristics of the coconut palms			
			Number of bunches	Number of leaves	Stem length	Stem thickness
Pressurized	2	1	15	22	200	70
		2	13	23	208	64
		3	16	22	228	71
	15	1	16	20	180	75
		2	13	21	210	86
		3	11	20	210	68
	30	1	11	18	212	80
		2	18	22	210	81
		3	13	22	200	76
	45	1	18	21	203	74
		2	8	21	213	66
		3	19	20	200	67
	2	1	15	22	180	64
		2	8	20	227	70
		3	10	20	200	80
Nonpressurized	15	1	12	19	183	61
		2	16	22	193	63
		3	15	23	210	69
	30	1	14	22	215	63
		2	13	18	200	74
		3	18	20	224	71
	45	1	13	21	210	60
		2	13	20	222	68
		3	14	21	215	72

Table S2. Nominal significance level (p-value) of the F-tests used to compare the concentration means of the studied pesticides between the treatments pressurized and non-pressurized application at 50 and 100 cm above the application point and the average of the concentrations for both heights, at each measurement time.

Pesticide	Time (days)	F-test* p-value for each response variable		
		Concentration at 50 cm	Concentration at 100 cm	Mean concentration
Carbofuran	2	0,011	0,275	0,063
	15	0,202	0,267	0,210
	30	0,036	0,425	0,078
	45	0,344	0,210	0,193
Cyproconazole	2	0,761	0,633	0,679
	15	0,444	0,616	0,486
	30	0,385	0,577	0,473
	45	0,905	0,474	0,758
Difenoconazole	2	0,874	0,722	0,757
	15	0,572	0,834	0,685
	30	0,296	0,826	0,383
	45	0,435	0,072	0,299
Imidacloprid	2	0,737	0,437	0,612
	15	0,161	0,186	0,170
	30	0,533	0,230	0,364
	45	0,816	0,229	0,824
Thiabendazole	2	0,708	0,153	0,388
	15	0,266	0,696	0,299
	30	0,376	0,411	0,528
	45	0,661	0,734	0,677
Thiamethoxam	2	0,073	0,330	0,004
	15	0,274	0,413	0,293
	30	0,397	0,795	0,607
	45	0,750	0,942	0,838

* F-test with 1 and 16 degrees of freedom (DF) of the numerator and denominator of the F statistic, respectively. Nominal significance values (p-values) inferior to 0.10 (in red) indicate a significant difference between treatments in the respective measurement times and height above the mixture application point.

Table S3. The mean concentration (n=3 plants) of the studied pesticides and respective standard errors in the treatments pressurized (P) and non-pressurized (NP) at 50 and 100 cm above the application point for each measurement time.

Pesticide (i.a.)	Time (days)	Treatment	Mean pesticide concentration at two heights (n=3)			
			(µg kg ⁻¹)			
			50cm	S.E.*	100 cm	S.E.
Carbofuran	2	P	6756.0	a	1492.3	2126.7
		NP	2472.7	b	93.7	1660.3
	15	P	2407.6		905.8	1346.9
		NP	1058.0		457.0	625.0
	30	P	2354.5	a	771.1	942.7
		NP	470.3	b	279.7	574.0
	45	P	280.7		108.1	196.6
		NP	167.7		41.5	118.0
	2	P	1136.0		281.4	662.0
		NP	1038.0		146.3	517.0
Cyproconazole	15	P	4688.5		2380.0	2068.9
		NP	2598.1		1188.8	1540.7
	30	P	2110.9		471.3	1405.0
		NP	1678.0		114.8	1133.0
	45	P	470.9		227.2	349.6
		NP	500.0		74.6	420.7
	2	P	6192.0		1688.3	3858.0
		NP	5803.3		1729.5	2665.7
	15	P	6928.6		4543.3	1606.8
		NP	4087.0		1915.5	1888.7
Difenoconazole	30	P	7669.9		3241.6	1698.8
		NP	4155.0		257.6	1482.3
	45	P	2006.7		1113.1	480.2
		NP	3012.0		579.8	1161.3
	2	P	540.0		360.3	408.0
		NP	403.7		172.8	242.7
	15	P	1755.5		877.5	1195.9
		NP	429.5		214.0	358.0
	30	P	577.1		57.0	515.7
		NP	438.3		209.9	305.0
Imidaclopride	45	P	134.3		67.8	63.0
		NP	116.7		31.0	105.0
	2	P	540.0		360.3	408.0
		NP	403.7		172.8	242.7
	15	P	1755.5		877.5	1195.9
		NP	429.5		214.0	358.0

* Standard error of the estimated mean concentration; means followed by different letters in the columns within each pesticide, treatment and time are significantly different by the ANOVA's F test at the 0.05 significance level.

Table S3 (continuation). The mean concentration (n=3 plants) of the studied pesticides and respective standard errors in the treatments pressurized (P) and non-pressurized (NP) at 50 and 100 cm above the application point for each measurement time.

Pesticide (i.a.)	Time (days)	Treatment	Mean pesticide concentration at two heights (n=3)			
			(µg kg ⁻¹)			
			50cm	S.E.*	100 cm	S.E.
Thiabendazole	2	P	374.0	253.6	354.0	183.1
		NP	271.0	93.3	75.0	32.3
	15	P	1333.5	613.0	164.7	73.5
		NP	533.4	324.9	127.0	59.8
	30	P	1004.7	365.3	71.1	34.1
		NP	560.0	324.4	147.7	83.9
	45	P	62.4	56.0	17.1	17.1
		NP	34.3	28.3	10.7	7.2
Thiamethoxam	2	P	1550.0	a 496.0	692.0	343.0
		NP	581.3	b 89.7	330.0	109.1
	15	P	1415.9	717.0	322.6	186.7
		NP	526.1	319.0	155.7	68.1
	30	P	355.8	114.7	80.5	37.3
		NP	218.0	109.0	99.3	61.1
	45	P	21.3	21.3	16.7	16.7
		NP	14.0	7.1	15.0	15.0

* Standard error of the estimated mean concentration; means followed by different letters in the columns within each pesticide, treatment and time are significantly different by the ANOVA's F test at the 0.05 significance level.

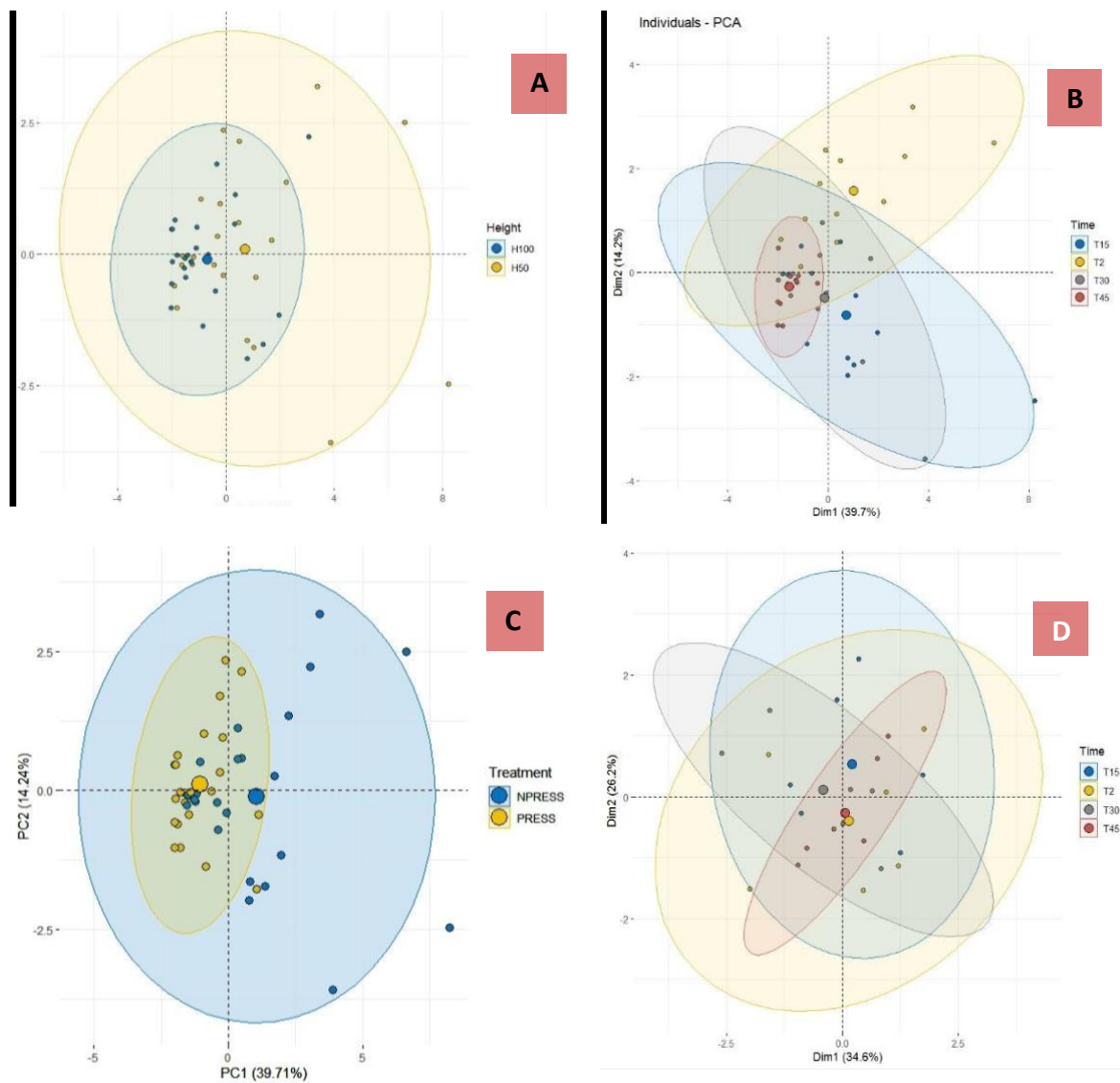


Figure S1 - Results of PCA based on sets of variables related to the pesticide's mixture applied to coconut palm trees via pressurized or non-pressurized endotherapy, namely: concentrations of carbofuran, 3-OH-carbofuran, cyproconazole, difenoconazole, imidacloprid, thiabendazole, thiamethoxam, and spiroticlofen (A, B, and C) or, considering the mixture variables; the plant variables, as the number of bunches, leaves, length and stem thickness (D). The PCAs (Dimensions (Dim) 1 and 2) highlight groups formed by different heights (50 or 100 cm) above the mixture injection point, (A) sampled times (2, 15, 30, or 45 days) (B), or endotherapeutic treatments (pressurized or nonpressurized) (C and D).