

Effect of pre-harvest chemical treatments on post-harvest disease control and quality enhancement in banana fruits

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Electronic Supplementary Material (ESM)

The authors are fully responsible for both the content and the formal aspects of the electronic supplementary material. No editorial adjustments were made.

Table S1. Weather data recorded during 2021–2022 at ICAR-NRCB farm

Year	Month	Temperature (°C)		Relative humidity (%)	Rainfall (mm)
		maximum	minimum		
2021	May	37.87	27.46	62.80	73.50
	June	37.30	27.03	57.20	165.90
	July	35.48	26.22	60.29	81.60
	August	35.03	26.19	63.41	134.40
	September	36.06	25.6	67.46	110.60
	October	32.54	25.93	78.66	273.00
	November	29.33	24.70	86.80	465.6
	December	30.16	22.48	78.96	23.10
2022	January	28.94	20.66	68.65	0.00
	February	30.20	18.71	70.56	8.20
	March	33.79	20.00	66.275	65.20
	April	35.23	22.59	68.34	81.40
	May	35.22	23.04	63.74	119.20

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Table S2. Effect of pre-harvest chemicals on post-harvest fruit quality at ripening stage in banana (cv. 'Grand Nain')

Treatment	Pulp peel ratio	Moisture content (%) [*]	TSS (Brix)	Acidity (%) [*]	Total sugar (%) [*]	Total starch (%)
T1	2.923 ^a	78.788 (62.576) ^a	17.273 ^c	0.258 (2.908) ^c	14.170 (22.113) ^c	1.248 (6.413) ^b
T2	2.513 ^b	79.110 (62.803) ^b	17.883 ^b	0.270 (2.977) ^{bc}	14.553 (22.425) ^b	1.760 (7.595) ^a
T3	2.490 ^b	81.620 (64.614) ^c	17.800 ^b	0.300 (3.140) ^a	14.238 (22.168) ^{bc}	1.270 (6.471) ^b
T4	2.393 ^c	82.153 (65.010) ^d	20.690 ^a	0.283 (3.047) ^b	16.803 (24.198) ^a	0.993 (5.717) ^c
CD (0.05)	0.030	0.125	0.313	0.090	0.263	0.599
CV	0.761	0.127	1.102	1.932	0.750	5.936

TSS – total soluble solids; CD – critical difference; CV – coefficient of variation; ^{*}values in parentheses are arcsine transformed, and in the columns followed by the same letters are not significantly different at $P = 0.05$

Table S3. Analysis of chemical residues in fruit and central core stem of banana (cv. 'Grand Nain')

Sample	Sample type	Bleaching powder	Cartap hydrochloride 4%GR	Carbendazim 50% WP	Petroleum mineral oil	Mancozeb 63% + Carbendazim 12% WP	Trifloxystrobin 25% + Tebuconazole 50% WG	Propiconazole 25% EC	Mono-Crotophos 36%SL	Imida-cloprid 17.8 SL
T1H1	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T1H2	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T1H3	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T1S1	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T1S2	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
T1S3	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1H1	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1H2	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1H3	fruit	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1S1	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1S2	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C1S3	stem	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

^{*}T1 – treatment 1 (all chemicals applied); H1 – first hand; H2 – middle hand; H3 – bottom hand; C1 – control; S1 – central core stem top portion; S2 – central core stem middle portion; S3 – central core stem bottom portion; each treatment contains mean of three replications; BDL – below detectable limit

✗ Denotes firmness measurement points

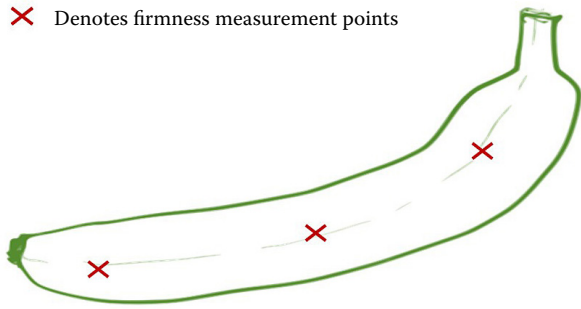


Figure S1. Firmness measurement points for banana fruit

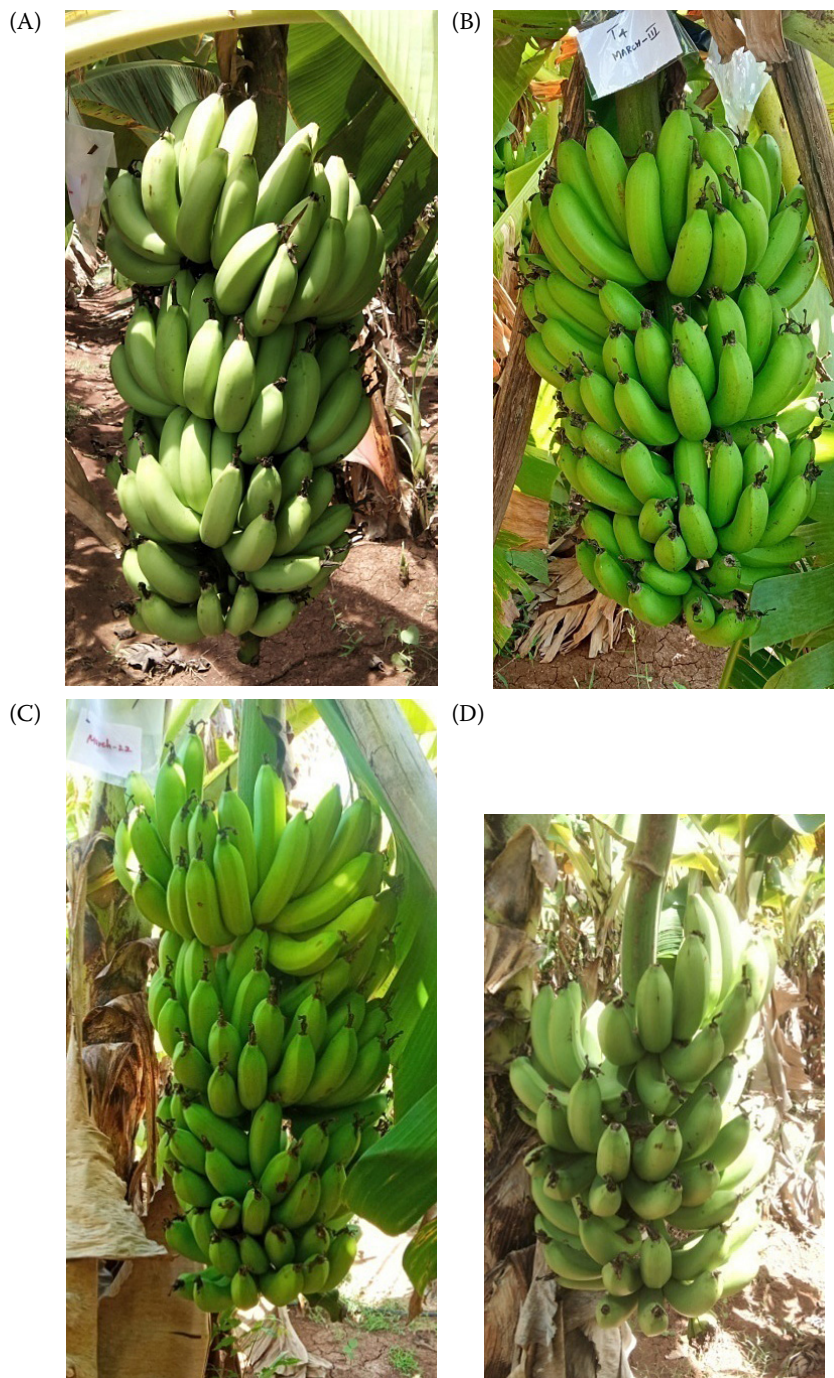


Figure S2. Bunches at maturity in different treatments: (A) T1, (B) T2, (C) T3 and (D) T4



Figure S3. Premature ripening of bunches in control; observations on the first day (A), second day (B) and third day (C)

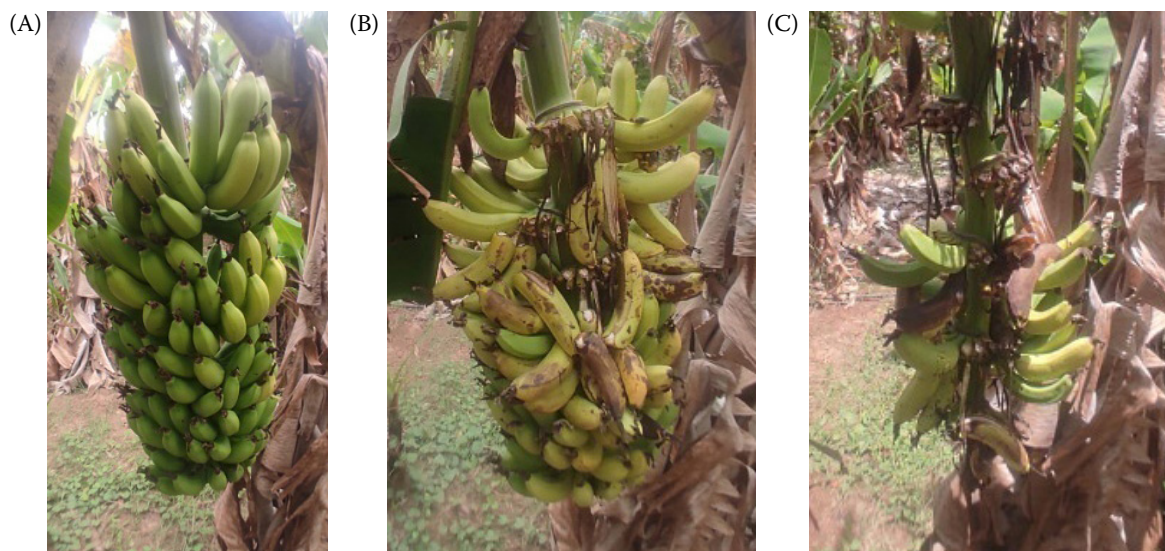


Figure S4. Fruit shattering in bunches of control; observations on the first day (A), second day (B) and third day (C)

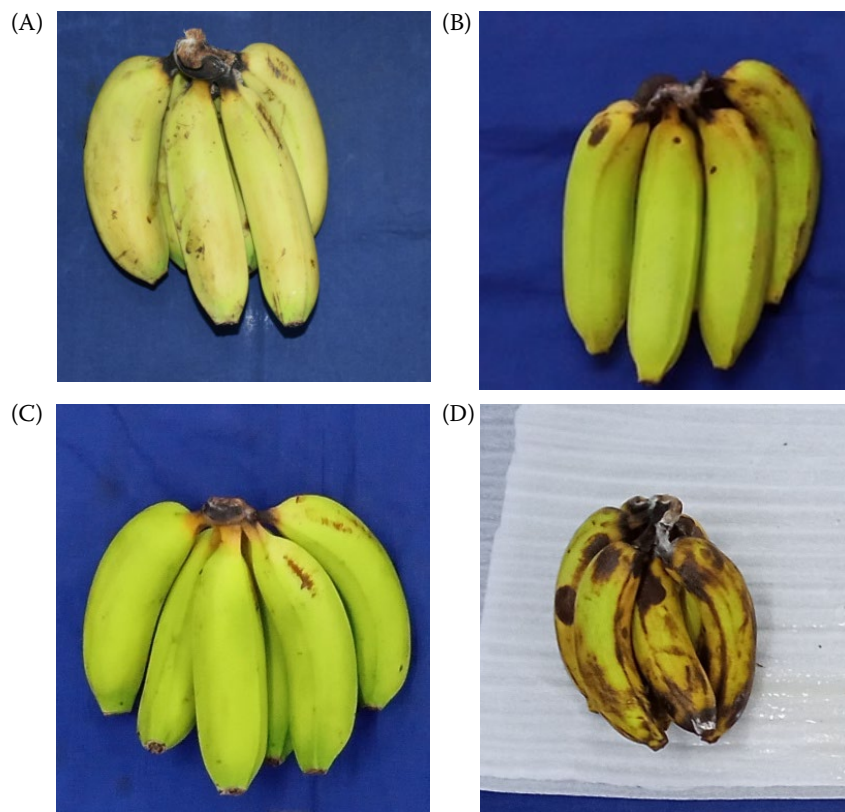


Figure S5. Shelf life and post-harvest diseases observed in fruits of different treatments on the 8th day of storing at room temperature: (A) T1; (B) T2; (C) T3; (D) T4