# Improving the Red Color and Fruit Quality of 'Kent' Mango Fruit by Pruning and Preharvest Spraying of Prohydrojasmon or Abscisic Acid

**Sudheeran Pradeep Kumar [1], Dalia Maurer [1], Oleg Feygenberg [1], Cliff Love [2] and Noam Alkan [1,*]**

[1] Department of Postharvest Science of Fresh Produce, Agricultural Research Organization (ARO), Volcani Center, PO. Box 15159, HaMaccabim Road 68, Rishon LeZion 7505101, Israel; pradeep@volcani.agri.gov.il (S.P.K.); daliam@volcani.agri.gov.il (D.M.); fgboleg@volcani.agri.gov.il (O.F.)

[2] Extension Service, Ministry of Agriculture and Rural Development, Rishon LeZion 7505101, Israel; cliff1love@gmail.com

* Correspondence: noamal@agri.gov.il; Tel.:+972-3-9683605 or +972-3-9683606; Fax: +972-3-9683220

**Supplementary file**

**Table S1.** Pre-harvest application of prohydrojasmon (PDJ) or Abscisic acid (ABA) on ripening parameters.

| | | | TSS | | | Acids | | | Firmness | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Control (Untreated) | PDJ | ABA | Control (untreated) | PDJ | ABA | Control (Untreated) | PDJ | ABA |
| Inside canopy | Opened trees | Harvest | 8.2±0.4a | 7.9±0.2a | 8.0±0.3a | 0.64±0.04a | 0.57±0.02ab | 0.64±0.06a | 120.6±5.1a | 114.9±8.3a | 121.5±4.8a |
| | | After cold Storage | 16.4±1.2a | 17.5±0.7a | 17.3±0.2a | 0.77±0.02a | 0.77±0.08a | 0.62±0.03ab | 69.2±13.2ab | 46.3±7.5b | 42.0±1.8b |
| | | After shelf Life | 17.3±0.2a | 17.4±0.3a | 16.7±0.7a | 0.32±0.01bc | 0.44±0.05ab | 0.28±0.03b | 14.2±1.0a | 12.4±1.2ab | 11.7±0.6ab |
| | Closed trees | After shelf Life | 16.1±0.3a | 15.4±0.3a | - | 0.33±0.03a | 0.24±0.01a | - | 20.9±1.2a | 15.9±0.8b | - |
| Outside canopy | Opened trees | Harvest | 7.6±0.2a | 8.5±0.6a | 8.1±0.2a | 0.47±0.07b | 0.61±0.05ab | 0.62±0.09ab | 112.3±2.8a | 122.1±8.4a | 124.0±4.5a |
| | | After cold Storage | 16.0±0.7a | 17.1±1.1a | 16.9±0.5a | 0.74±0.02ab | 0.78±0.08a | 0.64±0.03a | 81.0±7.9ab | 67.1±10.0ab | 94.8±7.1a |
| | | After shelf Life | 17.3±0.6a | 17.8±0.7a | 16.9±0.6a | 0.42±0.06ab | 0.46±0.04a | 0.28±0.00b | 14.0±1.6a | 12.9±0.6ab | 11.2±0.8b |
| | Closed trees | After shelf Life | 16.4±0.8a | 15.7±0.9a | - | 0.32±0.05a | 0.23±0.04a | - | 15.3±0.6b | 11.6±0.4b | - |

[1] Brix = percentage of TSS

[2] Acidity (percentage)

[3] Fruit firmness in Newton

[4] Different letters are significantly different within each time point ($p < 0.05$).


**Figure S1.** Representative picture of pruning results. Two 'Kent' mango orchards grown in the same area with 20 years old trees were pruned in two different manners, which lead to open and closed trees. (A) The orchard (open trees) was pruned to open the trees and fruit to sunlight by removing large branches. (B) The orchard (closed trees) was pruned by an automatic disc machine that pruned the trees to square shapes.

**A** Red Surface at Harvest (open trees)

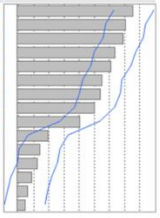
**Connecting Letters Report**

| Level | | Mean |
|---|---|---|
| Regular Sprayer(out) | A | 30.111111 |
| AirJets Sprayer (out) | A B | 28.348837 |
| control untreated(out) | B | 25.116279 |
| Regular Sprayer(in) | C | 11.304348 |
| AirJets Sprayer(in) | D | 6.790698 |
| control untreated (in) | D | 4.456522 |

Levels not connected by same letter are significantly different.

**Ordered Differences Report**

| Level | - Level | Difference | Std Err Dif | Lower CL | Upper CL | p-Value |
|---|---|---|---|---|---|---|
| Regular Sprayer(out) | control untreated (in) | 25.65459 | 2.213934 | 21.2951 | 30.01411 | <.0001* |
| AirJets Sprayer (out) | control untreated (in) | 23.89232 | 2.239809 | 19.4818 | 28.30279 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 23.32041 | 2.251801 | 18.8863 | 27.75450 | <.0001* |
| AirJets Sprayer (out) | AirJets Sprayer(in) | 21.55814 | 2.277246 | 17.0739 | 26.04233 | <.0001* |
| control untreated(out) | control untreated (in) | 20.65976 | 2.239809 | 16.2493 | 25.07023 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 18.80676 | 2.213934 | 14.4472 | 23.16629 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 18.32558 | 2.277246 | 13.8414 | 22.80977 | <.0001* |
| AirJets Sprayer (out) | Regular Sprayer(in) | 17.04449 | 2.239809 | 12.6340 | 21.45497 | <.0001* |
| control untreated(out) | Regular Sprayer(in) | 13.81193 | 2.239809 | 9.4015 | 18.22241 | <.0001* |
| Regular Sprayer(in) | control untreated (in) | 6.84783 | 2.201736 | 2.5123 | 11.18333 | 0.0021* |
| Regular Sprayer(out) | control untreated(out) | 4.99483 | 2.251801 | 0.5607 | 9.42892 | 0.0274* |
| Regular Sprayer(in) | AirJets Sprayer(in) | 4.51365 | 2.239809 | 0.1032 | 8.92413 | 0.0449* |
| AirJets Sprayer (out) | control untreated(out) | 3.23256 | 2.277246 | -1.2516 | 7.71675 | 0.1570 |
| AirJets Sprayer(in) | control untreated (in) | 2.33418 | 2.239809 | -2.0763 | 6.74465 | 0.2983 |
| Regular Sprayer(out) | AirJets Sprayer (out) | 1.76227 | 2.251801 | -2.6718 | 6.19636 | 0.4346 |



**B** Red Surface at Shelf life (open trees)

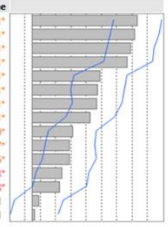
**Connecting Letters Report**

| Level | | Mean |
|---|---|---|
| AirJets Sprayer (out) | A | 31.279070 |
| Regular Sprayer(out) | A | 30.657895 |
| control untreated(out) | B | 21.842105 |
| Regular Sprayer(in) | C | 15.370370 |
| AirJets Sprayer(in) | D | 8.292683 |
| control untreated (in) | D | 6.666667 |

Levels not connected by same letter are significantly different.

**Ordered Differences Report**

| Level | - Level | Difference | Std Err Dif | Lower CL | Upper CL | p-Value |
|---|---|---|---|---|---|---|
| AirJets Sprayer (out) | control untreated (in) | 24.61240 | 2.804103 | 19.0861 | 30.13874 | <.0001* |
| Regular Sprayer(out) | control untreated (in) | 23.99123 | 2.890512 | 18.2946 | 29.68787 | <.0001* |
| AirJets Sprayer (out) | AirJets Sprayer(in) | 22.98639 | 2.768006 | 17.5312 | 28.44159 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 22.36521 | 2.855508 | 16.7376 | 27.99286 | <.0001* |
| AirJets Sprayer (out) | Regular Sprayer(in) | 15.90870 | 3.113769 | 9.7721 | 22.04533 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 15.28752 | 3.191806 | 8.9971 | 21.57795 | <.0001* |
| control untreated(out) | control untreated (in) | 15.17544 | 2.890512 | 9.4788 | 20.87208 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 13.54942 | 2.855508 | 7.9218 | 19.17707 | <.0001* |
| AirJets Sprayer (out) | control untreated(out) | 9.43696 | 2.823384 | 3.8726 | 15.00131 | 0.0010* |
| Regular Sprayer(out) | control untreated(out) | 8.81579 | 2.909221 | 3.0823 | 14.54930 | 0.0027* |
| Regular Sprayer(in) | control untreated (in) | 8.70370 | 3.174763 | 2.4469 | 14.96054 | 0.0066* |
| Regular Sprayer(in) | AirJets Sprayer(in) | 7.07769 | 3.142926 | 0.8836 | 13.27178 | 0.0253* |
| control untreated(out) | Regular Sprayer(in) | 6.47173 | 3.191806 | 0.1813 | 12.76216 | 0.0438* |
| AirJets Sprayer(in) | control untreated (in) | 1.62602 | 2.836444 | -3.9641 | 7.21610 | 0.5671 |
| AirJets Sprayer (out) | Regular Sprayer(out) | 0.62118 | 2.823384 | -4.9432 | 6.18552 | 0.8261 |



**C** Red Surface at Harvest (Closed trees)

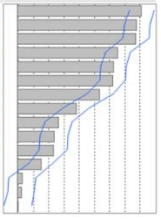
**Connecting Letters Report**

| Level | | Mean |
|---|---|---|
| AirJets Sprayer (out) | A | 34.255319 |
| Regular Sprayer(out) | B | 27.900000 |
| control untreated(out) | C | 11.969697 |
| control untreated (in) | D | 2.285714 |
| AirJets Sprayer(in) | D | 2.000000 |
| Regular Sprayer(in) | D | 0.833333 |

Levels not connected by same letter are significantly different.

**Ordered Differences Report**

| Level | - Level | Difference | Std Err Dif | Lower CL | Upper CL | p-Value |
|---|---|---|---|---|---|---|
| AirJets Sprayer (out) | Regular Sprayer(in) | 33.42199 | 1.677140 | 30.1179 | 36.72606 | <.0001* |
| AirJets Sprayer (out) | AirJets Sprayer(in) | 32.25532 | 1.763485 | 28.7811 | 35.72950 | <.0001* |
| AirJets Sprayer (out) | control untreated (in) | 31.96960 | 1.763485 | 28.4954 | 35.44379 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 27.06667 | 1.653225 | 23.8097 | 30.32363 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 25.90000 | 1.740757 | 22.4706 | 29.32941 | <.0001* |
| Regular Sprayer(out) | control untreated (in) | 25.61429 | 1.740757 | 22.1849 | 29.04369 | <.0001* |
| AirJets Sprayer (out) | control untreated(out) | 22.28562 | 1.793853 | 18.7516 | 25.81963 | <.0001* |
| Regular Sprayer(out) | control untreated(out) | 15.93030 | 1.771515 | 12.4403 | 19.42031 | <.0001* |
| control untreated(out) | Regular Sprayer(in) | 11.13636 | 1.837371 | 7.5166 | 14.75611 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 9.96970 | 1.916511 | 6.1940 | 13.74535 | <.0001* |
| control untreated(out) | control untreated (in) | 9.68398 | 1.916511 | 5.9083 | 13.45964 | <.0001* |
| AirJets Sprayer (out) | Regular Sprayer(out) | 6.35532 | 1.604722 | 3.1939 | 9.51673 | <.0001* |
| control untreated (in) | Regular Sprayer(in) | 1.45238 | 1.807734 | -2.1090 | 5.01374 | 0.4225 |
| AirJets Sprayer(in) | Regular Sprayer(in) | 1.16667 | 1.807734 | -2.3947 | 4.72802 | 0.5193 |
| control untreated (in) | AirJets Sprayer(in) | 0.28571 | 1.888116 | -3.4340 | 4.00543 | 0.8799 |



**D** Red Surface at Shelf life (Closed trees)

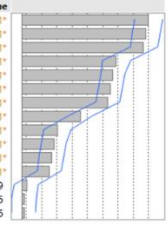
**Connecting Letters Report**

| Level | | Mean |
|---|---|---|
| AirJets Sprayer (out) | A | 37.962963 |
| Regular Sprayer(out) | B | 27.826087 |
| control untreated(out) | C | 11.250000 |
| AirJets Sprayer(in) | D | 3.488372 |
| control untreated (in) | D | 2.840909 |
| Regular Sprayer(in) | D | 2.142857 |

Levels not connected by same letter are significantly different.

**Ordered Differences Report**

| Level | - Level | Difference | Std Err Dif | Lower CL | Upper CL | p-Value |
|---|---|---|---|---|---|---|
| AirJets Sprayer (out) | Regular Sprayer(in) | 35.82011 | 1.968976 | 31.9411 | 39.69912 | <.0001* |
| AirJets Sprayer (out) | control untreated (in) | 35.12205 | 1.951387 | 31.2777 | 38.96642 | <.0001* |
| AirJets Sprayer (out) | AirJets Sprayer(in) | 34.47459 | 1.959996 | 30.6133 | 38.33591 | <.0001* |
| AirJets Sprayer (out) | control untreated(out) | 26.71296 | 1.988144 | 22.7962 | 30.62974 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 25.68323 | 1.703571 | 22.3271 | 29.03938 | <.0001* |
| Regular Sprayer(out) | control untreated (in) | 24.98518 | 1.683210 | 21.6691 | 28.30121 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 24.33771 | 1.693184 | 21.0020 | 27.67340 | <.0001* |
| Regular Sprayer(out) | control untreated(out) | 16.57609 | 1.725690 | 13.1764 | 19.97581 | <.0001* |
| AirJets Sprayer (out) | Regular Sprayer(out) | 10.13688 | 1.935187 | 6.3244 | 13.94932 | <.0001* |
| control untreated(out) | Regular Sprayer(in) | 9.10714 | 1.763497 | 5.6329 | 12.58135 | <.0001* |
| control untreated(out) | control untreated (in) | 8.40909 | 1.743836 | 4.9736 | 11.84456 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 7.76163 | 1.753465 | 4.3072 | 11.21607 | <.0001* |
| AirJets Sprayer(in) | Regular Sprayer(in) | 1.34551 | 1.731701 | -2.0661 | 4.75708 | 0.4379 |
| control untreated (in) | Regular Sprayer(in) | 0.69805 | 1.721950 | -2.6943 | 4.09041 | 0.6856 |
| AirJets Sprayer(in) | control untreated (in) | 0.64746 | 1.711675 | -2.7247 | 4.01958 | 0.7056 |



**E** Nonparametric Comparisons For Each Pair Using Wilcoxon Method

| q* | Alpha |
|---|---|
| 1.95996 | 0.05 |

Red Intensity at Harvest (open trees)

| Level | - Level | Score Mean Difference | Std Err Dif | Z | p-Value |
|---|---|---|---|---|---|
| Regular Sprayer(out) | control untreated (in) | 38.6640 | 5.409630 | 7.14726 | <.0001* |
| control untreated(out) | control untreated (in) | 38.6200 | 5.400638 | 7.15102 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 32.7746 | 5.315335 | 6.16605 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 32.4524 | 5.304120 | 6.11833 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 28.4430 | 5.433280 | 5.23496 | <.0001* |
| Regular Sprayer(in) | control untreated (in) | 14.5870 | 5.199117 | 2.80566 | 0.0050* |
| Regular Sprayer(in) | AirJets Sprayer(in) | 6.7184 | 5.175268 | 1.29818 | 0.1942 |
| Regular Sprayer(out) | control untreated(out) | 3.7778 | 5.336048 | 0.70797 | 0.4790 |
| Regular Sprayer(out) | AirJets Sprayer (out) | -5.9576 | 5.329188 | -1.11792 | 0.2636 |
| control untreated (in) | AirJets Sprayer(in) | -7.6977 | 4.976798 | -1.54672 | 0.1219 |
| control untreated(out) | AirJets Sprayer (out) | -10.1189 | 5.311577 | -1.90506 | 0.0568 |
| Regular Sprayer(in) | control untreated(out) | -27.4539 | 5.420116 | -5.06518 | <.0001* |
| Regular Sprayer(in) | AirJets Sprayer (out) | -29.4267 | 5.388511 | -5.46101 | <.0001* |
| AirJets Sprayer(in) | AirJets Sprayer (out) | -32.5692 | 5.258491 | -6.19364 | <.0001* |
| control untreated (in) | AirJets Sprayer (out) | -37.6833 | 5.348988 | -7.04493 | <.0001* |

**F** Nonparametric Comparisons For Each Pair Using Wilcoxon Method

| q* | Alpha |
|---|---|
| 1.95996 | 0.05 |

Red Intensity at Shelf life (open trees)

| Level | - Level | Score Mean Difference | Std Err Dif | Z | p-Value |
|---|---|---|---|---|---|
| Regular Sprayer(out) | control untreated (in) | 32.0054 | 4.997755 | 6.40395 | <.0001* |
| control untreated(out) | control untreated (in) | 29.4615 | 4.988832 | 5.90550 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 27.0010 | 5.069981 | 5.32565 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 24.7154 | 5.071913 | 4.87300 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 15.7361 | 4.942518 | 3.18383 | 0.0015* |
| Regular Sprayer(in) | control untreated (in) | 15.4581 | 4.866814 | 3.17622 | 0.0015* |
| Regular Sprayer(in) | AirJets Sprayer(in) | 11.2604 | 4.965573 | 2.26769 | 0.0233* |
| Regular Sprayer(out) | control untreated(out) | 3.2213 | 4.952788 | 0.65041 | 0.5154 |
| control untreated (in) | AirJets Sprayer(in) | -3.4772 | 4.847889 | -0.71726 | 0.4732 |
| Regular Sprayer(out) | AirJets Sprayer (out) | -3.5692 | 5.025854 | -0.71016 | 0.4776 |
| control untreated(out) | AirJets Sprayer (out) | -7.3834 | 5.062319 | -1.45851 | 0.1447 |
| Regular Sprayer(in) | control untreated(out) | -13.0353 | 4.965695 | -2.62508 | 0.0087* |
| Regular Sprayer(in) | AirJets Sprayer (out) | -18.7052 | 5.080485 | -3.68178 | 0.0002* |
| AirJets Sprayer(in) | AirJets Sprayer (out) | -29.7073 | 5.194477 | -5.71902 | <.0001* |
| control untreated (in) | AirJets Sprayer (out) | -34.1300 | 5.132604 | -6.64964 | <.0001* |

**G** Nonparametric Comparisons For Each Pair Using Wilcoxon Method

| q* | Alpha |
|---|---|
| 1.95996 | 0.05 |

Red Intensity at Harvest (Closed trees)

| Level | - Level | Score Mean Difference | Std Err Dif | Z | p-Value |
|---|---|---|---|---|---|
| Regular Sprayer(out) | Regular Sprayer(in) | 45.3648 | 5.353153 | 8.47440 | <.0001* |
| Regular Sprayer(out) | control untreated (in) | 43.7527 | 5.440093 | 8.04264 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 43.5586 | 5.446712 | 7.99723 | <.0001* |
| Regular Sprayer(out) | control untreated(out) | 31.9275 | 5.414774 | 5.89637 | <.0001* |
| control untreated(out) | control untreated (in) | 27.7773 | 4.917452 | 5.64871 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 26.2029 | 4.926880 | 5.31836 | <.0001* |
| control untreated (in) | AirJets Sprayer(in) | -1.9773 | 3.827448 | -0.51660 | 0.6054 |
| Regular Sprayer(in) | control untreated (in) | -4.0720 | 3.241437 | -1.25622 | 0.2090 |
| Regular Sprayer(in) | AirJets Sprayer(in) | -6.1891 | 3.451825 | -1.79299 | 0.0730 |
| Regular Sprayer(out) | AirJets Sprayer (out) | -10.9796 | 5.524915 | -1.98728 | 0.0469* |
| Regular Sprayer(in) | control untreated(out) | -32.3851 | 4.770586 | -6.78850 | <.0001* |
| control untreated(out) | AirJets Sprayer (out) | -35.7718 | 5.332935 | -6.70771 | <.0001* |
| AirJets Sprayer(in) | AirJets Sprayer (out) | -43.3968 | 5.338609 | -8.12887 | <.0001* |
| control untreated (in) | AirJets Sprayer (out) | -43.5198 | 5.330229 | -8.16472 | <.0001* |

**H** Nonparametric Comparisons For Each Pair Using Wilcoxon Method

| q* | Alpha |
|---|---|
| 1.95996 | 0.05 |

Red Intensity at Shelf life (Closed trees)

| Level | - Level | Score Mean Difference | Std Err Dif | Z | p-Value |
|---|---|---|---|---|---|
| Regular Sprayer(out) | control untreated (in) | 43.4338 | 5.361629 | 8.10086 | <.0001* |
| Regular Sprayer(out) | Regular Sprayer(in) | 42.4160 | 5.262992 | 8.05929 | <.0001* |
| Regular Sprayer(out) | AirJets Sprayer(in) | 41.8453 | 5.339780 | 7.83652 | <.0001* |
| Regular Sprayer(out) | control untreated(out) | 36.9239 | 5.278605 | 6.99501 | <.0001* |
| control untreated(out) | control untreated (in) | 25.4764 | 5.056094 | 5.03875 | <.0001* |
| control untreated(out) | AirJets Sprayer(in) | 21.4015 | 5.016924 | 4.26585 | <.0001* |
| Regular Sprayer(in) | control untreated (in) | -0.0233 | 4.434057 | -0.00526 | 0.9958 |
| control untreated (in) | AirJets Sprayer(in) | -4.4341 | 4.643921 | -0.95482 | 0.3397 |
| Regular Sprayer(in) | AirJets Sprayer(in) | -4.5502 | 4.559012 | -0.99807 | 0.3182 |
| Regular Sprayer(out) | AirJets Sprayer (out) | -9.0560 | 4.886922 | -1.85312 | 0.0639 |
| Regular Sprayer(in) | control untreated(out) | -26.7942 | 4.905115 | -5.46250 | <.0001* |
| control untreated(out) | AirJets Sprayer (out) | -40.2097 | 5.195328 | -7.73959 | <.0001* |
| Regular Sprayer(in) | AirJets Sprayer (out) | -42.6271 | 5.169979 | -8.24512 | <.0001* |
| AirJets Sprayer(in) | AirJets Sprayer (out) | -42.9540 | 5.254361 | -8.17493 | <.0001* |
| control untreated (in) | AirJets Sprayer (out) | -44.1556 | 5.276216 | -8.36879 | <.0001* |

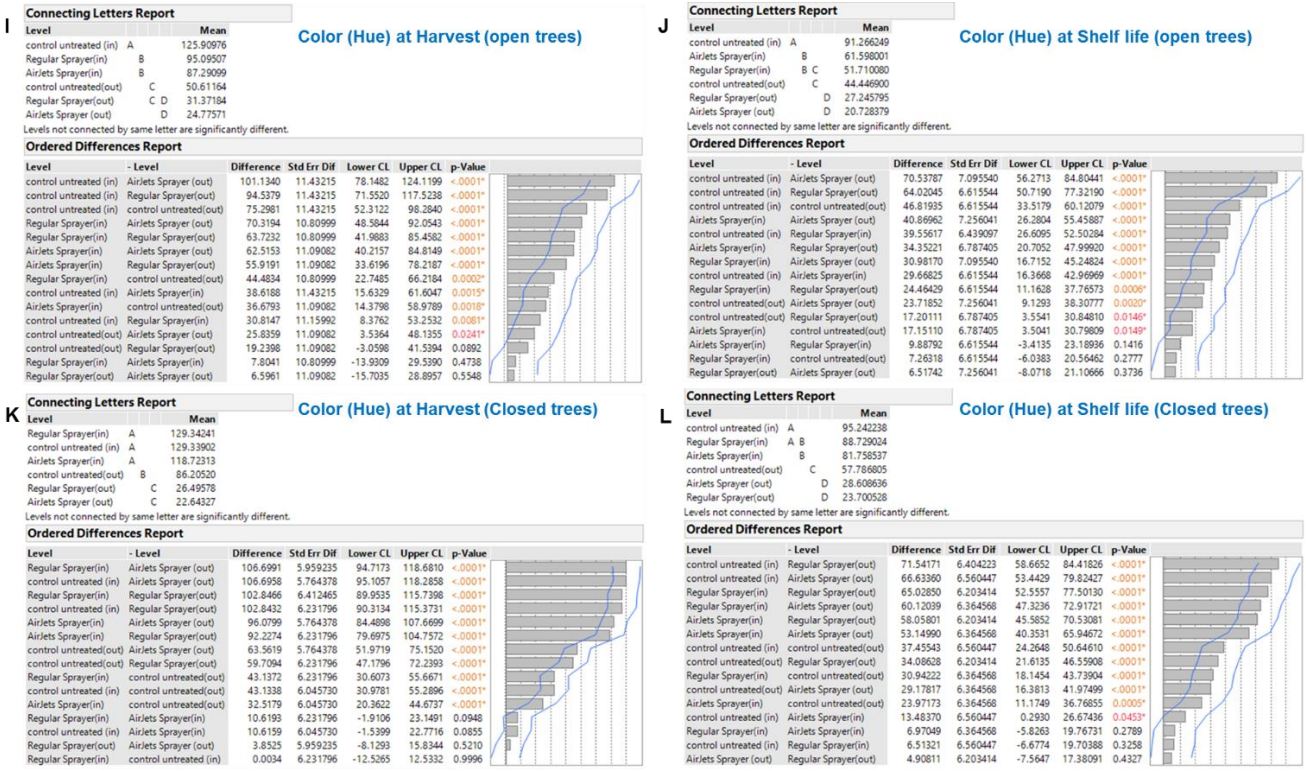



**Figure S2.** Detailed statistics of the effect of PDJ applied with different sprayers on color parameters in 'Kent' mango fruit presented in Figure 2. Treatments labeled by different letters are significantly ($p < 0.05$) different within each time point, according to the Tukey–Kramer LSD test (A–D and I–L) or with non-parametric analysis (E–H).


**Figure S3.** Detailed statistics of the effect of PDJ on chlorophyll, or anthocyanin, or flavonoids in 'Kent' mango fruit grown inside or outside the tree canopy, and presented in Figure 3. Treatments labeled by different letters are significantly ($p < 0.05$) different according to the Tukey–Kramer LSD test.

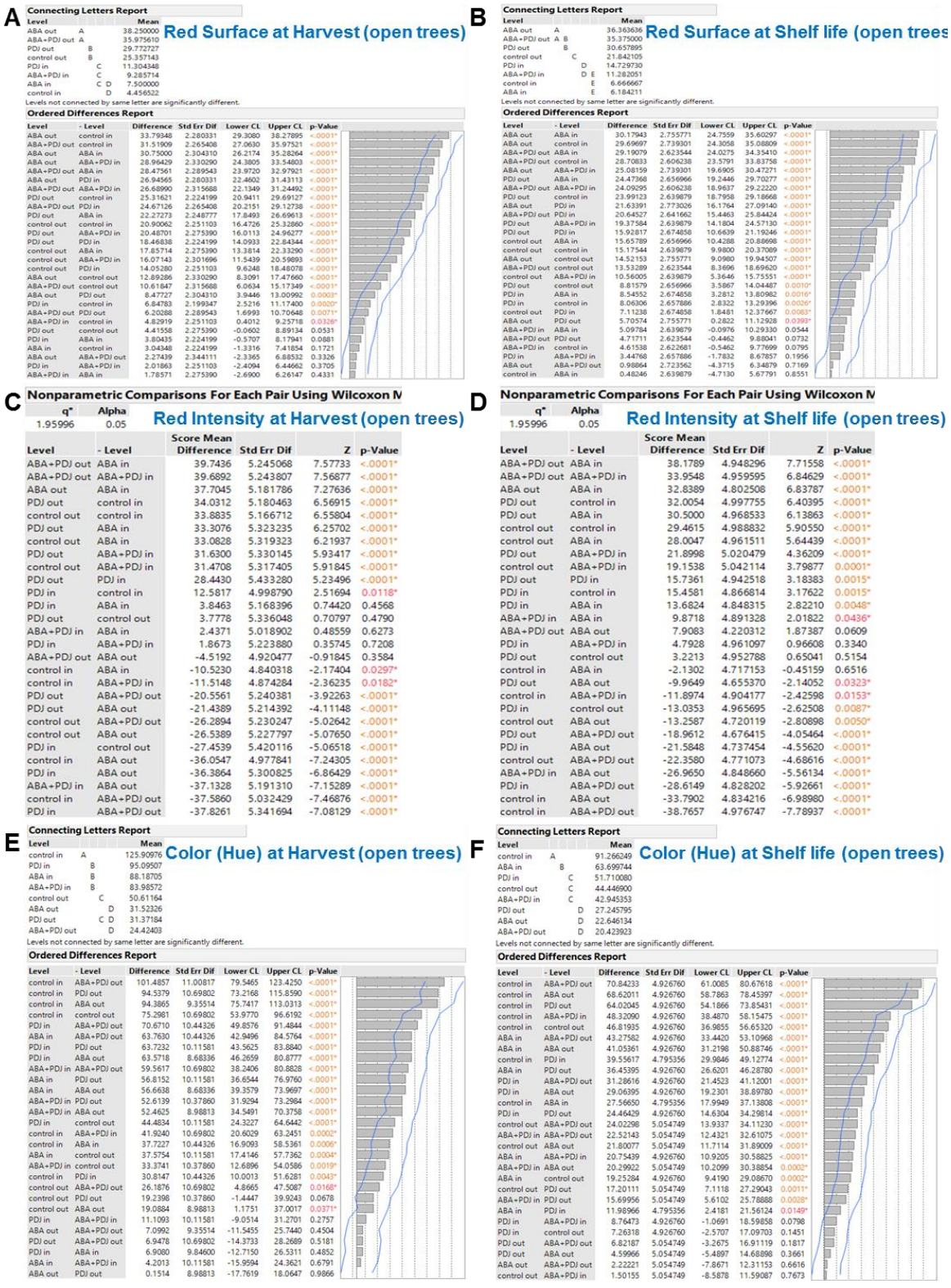



**Figure S4.** Detailed statistics of the effect of PDJ or ABA or their combination on color parameters in 'Kent' mango fruit grown inside or outside the tree canopy, and presented in Figure 5. Treatments labeled by different letters are significantly ($p < 0.05$) different according to the Tukey–Kramer LSD test (A, B, E, F) or non-parametric analysis (C, D).

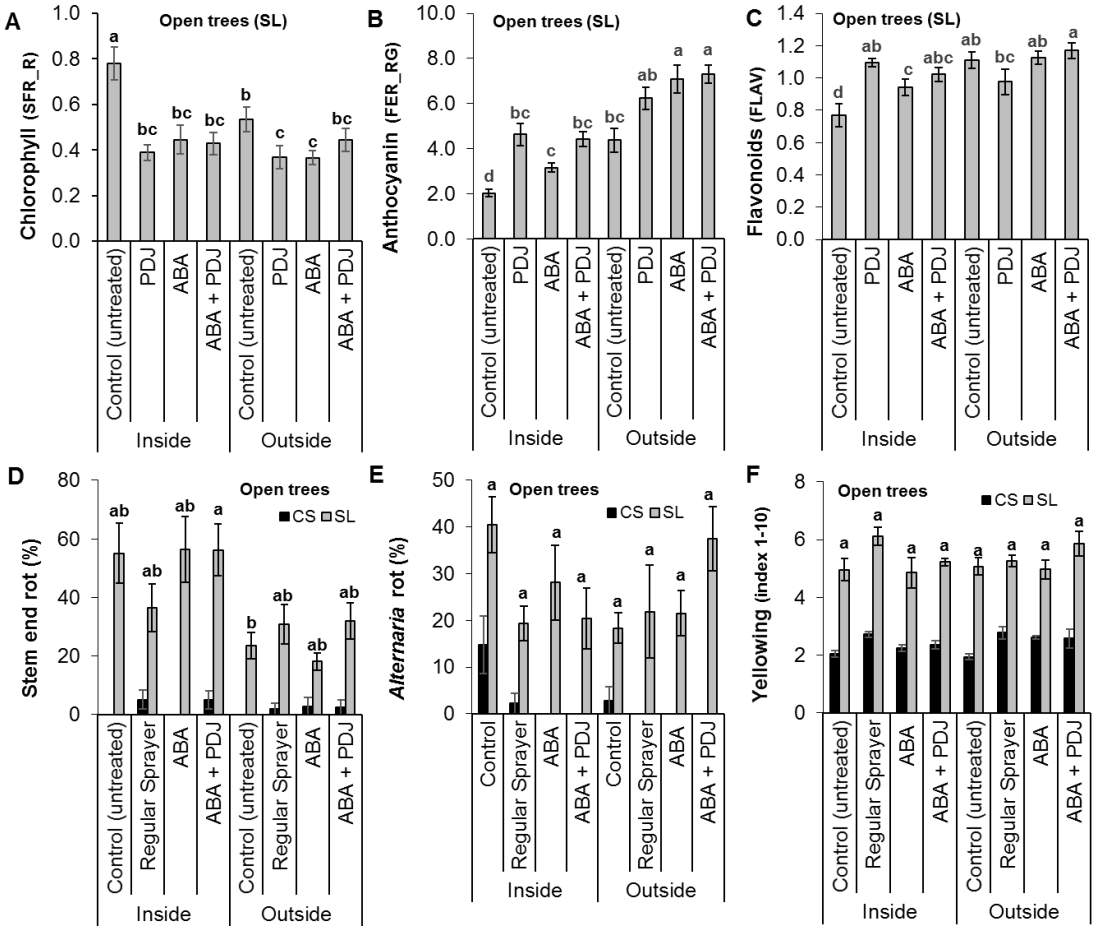



**Figure S5.** Effect of pre-harvest treatments of prohydrojasmon (PDJ) or Abscisic acid (ABA) and their combination of color parameters and postharvest disease incidence in 'Kent' mango fruit from open trees. (A) Chlorophyll quantification by multiplex. (B) Anthocyanin quantification by multiplex. (C) Flavonoids quantification by multiplex. (D) Stem-end rot incidence (percentage) after cold storage (CS) and additional shelf life (SL). (E) Side decay incidence (percentage) after cold storage and shelf life (SL). (F) Yellowing index (1–10). Values are mean ± SE (n = 40). Different letters indicate significant differences ($p < 0.05$), according to the Tukey–Kramer LSD test.