Chapter 4

Results

Experiment 1: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on lychees cv. Kom flowering.

It was found that the application of $KClO_3$ at the concentrations of 1, 3 and 5 g/pot with PP333 reduced that the $KClO_3$ with PP333 treated trees had shorter flowering time after treatment than the untreated trees (control). The flowering time of the treated tree were 89.0-89.7 days after treatment (Table 2) while the untreated trees were 103 days after treatment. However, the only application of $KClO_3$: PP333 = 5:9 g/pot were flowering but the trees treated with $KClO_3$: PP333 = 5:5 and 5:7 g/pot did not flowering. The trees developed chlorate toxic symptoms, chlorosis and defoliation. The trees treated with $KClO_3$ 1 and 3 g/pot with PP333 had higher flowering percentage/tree than the untreated trees (control) and $KClO_3$ = 5 g/pot with PP333. The $KClO_3$ with PP333 treated trees had number of panicle/tree 6.2-10.5 panicle/tree while the untreated trees had 9 panicle/tree. Panicle lengths and widths of the treated trees were decreased. The panicle lengths and widths of the treated trees were 3.1-4.1 cm and 2.1-2.8 cm respectively while the panicle lengths and widths of the untreated trees were 7.4 and 3.8 cm respectively.

The application of PP333 at the concentrations of 5, 7 and 9 g/pot with $KClO_3$ reduced that the PP333 with $KClO_3$ treated trees had shorter flowering time after treatment than the untreated trees (control). The flowering time of the treated tree were 89.1-89.4 days after treatment while the untreated trees were 103 days after treatment. However, the application of PP333: $KClO_3$ = 9:5 g/pot were flowering but the trees treated with PP333: $KClO_3$ = 5:5 and 7:5 g/pot did not flowering due to the toxicity of chlorate. The trees treated with PP333 5, 7 and 9 g/pot with $KClO_3$ had higher flowering percentage/tree than the untreated trees. PP333 9 g/pot with $KClO_3$ had the highest flowering percentage/tree (42.9%). The PP333 with $KClO_3$ treated trees had number of panicle/tree 5.8-10.4 panicle/tree while the untreated trees had 9 panicle/tree. Panicle lengths and widths of the treated trees were decreased. The panicle lengths and widths of the treated trees were 3.8-5.3 cm and 2.3-2.9 cm

respectively while the panicle lengths and widths of the untreated trees were 7.4 and 3.8 cm respectively.

Table 2 Effect of $KClO_3$ and PP333 on flowering time, flowering percentage/tree, number of panicle/tree, panicle length and panicle width of lychee cv. Kom.

Treatment	flowering time (days after treatment)	flowering percentage/tree (%)	number of panicle/tree	panicle length (cm)	panicle width (cm)
Factor 1					
control	103.0a	14.3c	9.0ab	7.4a	3.8a
$KClO_3$ (1 g/pot)	89.0b	61.9a	8.8a	4.1c	2.7b
$KClO_3$ (3 g/pot)	89.7b	23.8b	8.5b	5.1b	2.8b
$KClO_3$ (5 g/pot)	89.7b	9.5c	14.0ab	3.2c	2.1c
	*	*	*	*	*
Factor 2					
control	103.0a	14.3c	9.0ab	7.4a	3.8a
PP333 (5 g/pot)	59.4b	28.6b	8.8a	4.5bc	2.9b
PP333 (7 g/pot)	59.6b	23.8b	8.5b	5.3b	2.9b
PP333 (9 g/pot)	89.3b	42.9a	14.0ab	3.8c	2.3c
	*	*	*	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Experiment 2: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on 2 years old lychees cv. Chakrapad flowering.

It was found that the treated trees, $KClO_3$: PP333 = 1.00:9.00, 1.67:8.33 and 1.25:8.75 g/pot, were flowered while the control did not flowering. The flowering times of the treated trees were 175.9, 175.0 and 174.3 day, respectively (Table 3 and Figure 8). For the flowering percentage, $KClO_3$: PP333 = 1.67:8.33 g/pot was 100% while the $KClO_3$: PP333 = 1.25:8.75 and 1.00:9.00 g/pot were 75% and 87.5%, respectively. Number of panicle per tree, $KClO_3$: PP333 = 1.67:8.33 g/pot was the highest, 9.0 panicles/ trees. The flowering percentages of $KClO_3$: PP333 = 1.00:9.00 g and 1.25:8.75 g/pot were 2.3 and 5.8 panicle/tree respectively. Panicle length of all treated trees were 4.7-5.2 cm. Panicle width of all treated trees were 2.8-2.9 cm.

Table 3 Effect of $KClO_3$ and PP333 on flowering time, flowering percentage/tree, number of panicle/tree, panicle length and panicle width of lychee cv. Chakrapad.

Treatment	flowering time (days after treatment)	flowering percentage/tree (%)	number of panicle/tree	panicle length (cm)	panicle width (cm)
control	0.0b	0.0b	0.0b	0.0b	0.0b
$KClO_3$:PP333(1.00:9.00 g/pot)	175.9a	87.5a	2.3b	4.7a	2.8a
$KClO_3$:PP333(1.25:8.75 g/pot)	174.3a	75.0a	5.8b	5.2a	2.9a
$KClO_3$:PP333(1.67:8.33 g/pot)	175.0a	100.0a	9.0a	5.1a	2.8a
	**	**	*	*	*

ab: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Experiment 3: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on 8 years old lychees cv. Chakrapad flowering.

It was found that the flowering time of all $KClO_3$: PP333 treated trees were shorter than the control (untreated trees). The flowering of $KClO_3$: PP333 treated trees were 163.4-163.8 days after treatment while the untreated trees (control) flowering time was 166 days after treatment (Table 4 and Figure 6). The flowering percentages of all of treated trees were higher than the control. The flowering percentages of $KClO_3$: PP333 = 70:630, 87.5:612.5 and 117:583 g/tree were 63, 53 and 53 % respectively while the untreated trees were 30%. However, the panicle length and width of the treatment trees did not significant difference from the untreated trees. The panicle lengths were 11.1 – 12.8 cm. The panicle widths were 6.7 – 7.4 cm.

Table 4 Effect of $KClO_3$ and PP333 on flowering time after treatment, percentage of flowering tree, number of panicle/tree, panicle length and panicle width of lychee cv. Chakrapad.

Treatment	flowering time (days after treatment)	number of flowering tree (%)	percentage of flowering/ tree (%)	panicle length (cm)	panicle width (cm)
control	166.0a	100.0	30.0b	11.1	6.7
$KClO_3$:PP333(70.0:630.0 g/tree)	163.8b	100.0	63.0a	11.8	7.4
$KClO_3$:PP333(87.5:612.5 g/tree)	163.8b	100.0	53.0a	12.8	6.9
$KClO_3$:PP333(117.0:583.0 g/tree)	163.4b	100.0	53.0a	12.8	7.2
	*	ns	*	ns	ns

ab: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Figure 6 Panicle of 8 years old lychee trees cv. Chakrapad

1 = control 2 = $KClO_3$:PP333(70.0:630 g/pot) 3 = $KClO_3$:PP333(87.5:612.5 g/pot) 4 = $KClO_3$:PP333(117.0:583.0 g/pot)

Experiment 4: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on 2 years old lychees cv. Hong Hauy off-season flowering at immature leaves stage.

It was found that $KClO_3$: PP333 treatments at immature leaf stage (15 days 0ld leaf) could not induce off-season flowering. In the following flowering season, all of the trees flowered normally. $KClO_3$: PP333 in all treated concentrations did not affect on flowering time (days after treatment), flowering percentage/tree (%), number of panicle/tree, panicle length and width (Table 5). All of the treated trees flowered at 203.5-209.8 days after treatment while the untreated trees (control) flowered at 205.8 days after treatment. The flowering percentages of treated trees were between 14.5-38.8 % while the untreated trees (control) were 18.5 %. The panicle/tree of the treated trees were 12.8-18.3 panicles/tree while the untreated trees (control) were 8.5 panicles/tree. The panicle length of the treatment trees were 6.9-10.8 cm while the untreated trees (control) were 8.1 cm. The panicle width of the treated trees were 3.0-6.6 cm while the untreated trees (control) were 4.5 cm.

Table 5 Effect of $KClO_3$ and PP333 on flowering time after treatment, flowering percentage, number of panicle/tree, panicle length and panicle width of lychee cv. Hong Hauy.

Treatment	flowering time (days after treatment)	flowering percentage (%)	number of panicle/tree	panicle length (cm)	panicle width (cm)
control	205.8	18.5	8.5	8.1	4.5
$KClO_3$:PP333(20:180 g/tree)	209.8	14.5	12.8	6.9	3.0
$KClO_3$:PP333(25:175 g/tree)	209.8	14.8	12.3	9.7	3.7
$KClO_3$:PP333(33:167 g/tree)	203.5	38.8	18.3	10.8	6.6
	ns	ns	ns	ns	ns

Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Experiment 5: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on 2 years old lychees cv. Hong Hauy off-season flowering at mature leaves stage.

It was found that $KClO_3$: PP333 treatments at mature leaf stage (45 days old leaf) could not induce off-season flowering. However, all of the trees flowered normally in the following flowering season. All of the $KClO_3$: PP333 treated concentrations did not affect on flowering time (days after treatment), flowering percentage/tree (%), number of panicle/tree, panicle length and width (Table 6). All of the treated trees flowered at 202.3-206.5 days after treatment while the untreated trees (control) flowered at 201.3 days after treatment. The flowering percentages of treated trees were 40.0-62.5 % while the untreated trees (control) were 62.5 %. The number of panicle/tree of all treated trees was 15.8-27.0 panicles/tree while the untreated trees (control) were 24.5 panicles/tree. The panicle length, the treated trees were 11.6-14.4 cm while the untreated trees (control) were 13.9 cm. The panicle widths of all of the treated trees were 5.3-7.7 cm while the untreated trees (control) were 6.7 cm.

Table 6 Effect of $KClO_3$ with PP333 on flowering time, flowering percentage, number of panicle/tree, panicle length and panicle width of lychee cv. Hong Hauy.

Treatment	flowering time (days after treatment)	flowering percentage (%)	number of panicle/tree	panicle length (cm)	panicle width (cm)
control	201.3	62.5	24.5	13.9	6.7
$KClO_3$:PP333(20:180 g/tree)	202.3	62.5	27.0	14.4	7.7
$KClO_3$:PP333(25:175 g/tree)	206.8	40.0	15.8	14.2	6.4
$KClO_3$:PP333(33:167 g/tree)	206.8	47.5	19.8	11.6	5.3
	ns	ns	ns	ns	ns

Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Experiment 6: Effect of potassium chlorate ($KClO_3$) with paclobutrazol (PP333) on 14 years old lychees cv. Hong Hauy off-season flowering.

It was found that $KClO_3$: PP333 treatments could not induce off-season flowering on the 14 years old lychee. However, $KClO_3$: PP333 treatments did not affect leaf flushing percentage and size of the leaves. But all of the treated trees tended to have fewer leaf flushing percentage and smaller leaf size than the untreated (Table 7). The leaf flushing percentages of treated trees were at the concentration of $KClO_3$: PP333 = 100:900, 125:875 and 167:833 g/tree had leaf length were 10.9, 10.5 and 9.4 cm respectively while the untreated (control) were 76.3 – 80.0% while the control (untreated) was 81.3%. But the number of new shoots which grew from the old shoot of the treated and untreated trees did not significant differences. They were 2.3 – 2.5 new shoots/old shoot. For leaf length, the lengths of compound leaves of the treated trees were 94 – 10.9 cm while the control were 11.8 cm. For leaf width, the widths of the compound leaves of treated trees were 2.9 - 3.2 cm while control were 4.1 cm.

Table 7 Effect of $KClO_3$ with PP333 on leaf flushing percentage, number of new shoot/old shoot, leaf length and leaf width of lychee cv. Hong Hauy.

Treatment	leaf flushing percentage (%)	number of new shoot/old shoot	leaf length (cm)	leaf width (cm)
control	81.3	2.4	11.8a	4.1a
$KClO_3$:PP333(100:900 g/tree)	76.3	2.3	10.9b	3.2b
$KClO_3$:PP333(125:875 g/tree)	80.0	2.5	10.5b	3.1b
$KClO_3$:PP333(167:833 g/tree)	77.5	2.4	9.4b	2.9b
	ns	ns	*	*

ab: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

In the following flowering season, it was found that all potassium chlorate ($KClO_3$) with paclobutrazol (PP333) treatments did not affect flowering time (days after treated), flowering percentage/tree (%), number of panicle/shoot, panicle length and width (Table 8). All of the treated trees flowered at 196.0-212.0 days after treatment while the untreated trees (control) flowered at 184.0 days after treatment. Flowering percentage of treated trees were 50.0-68.8 % while the untreated trees (control) were 82.5 %. Number of panicle/shoot of treated trees was 3.6-4.1 panicles/shoot while the untreated trees (control) were 3.3 panicles/shoot. The panicle lengths of treated trees were 19.4-21.9 cm while the untreated trees (control) were 22.6 cm. The panicle widths of the treated trees were 12.2-13.5 cm while the untreated trees (control) were 12.7 cm.

Table 8 Effect of $KClO_3$ with PP333 on flowering time, flowering percentage/tree, number of panicle/tree, panicle length and panicle width of lychee cv. Hong Hauy.

Treatment	flowering time (days after treatment)	flowering percentage (%)	number of panicle/ shoot	panicle length (cm)	panicle width (cm)
control	184.0	82.5	3.3c	22.6	12.7
$KClO_3$:PP333(100:900 g/tree)	196.0	50.0	3.6cb	19.9	12.2
$KClO_3$:PP333(125:875 g/tree)	204.0	70.0	4.1a	21.9	13.5
$KClO_3$:PP333(167:833 g/tree)	212.0	68.8	3.9b	19.4	12.4
	ns	ns	*	ns	ns

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Experiment 7: Effect of potassium chlorate ($KClO_3$) and paclobutrazol (PP333) on 14 years old lychees cv. Hong Hauy on-season flowering.

It was found that leaf flushing percentage, number of new shoot/old shoot of treatment trees did not significant difference from the untreated trees. The leaf flushing percentages of the treated trees were 83.8 -86.3% while the untreated trees were 86.3%. The number of new shoot/old shoot of treated trees was 2.5 – 2.8 new shoots/old shoot while the untreated trees were 2.8 new shoots/old shoot. Leaf length of $KClO_3$: PP333 =167:833 g/tree were shorter than the $KClO_3$: PP333 = 125:875, 100:900 g/tree and the untreated trees (control) (Table 9). The leaf length of the treated trees at the concentration of $KClO_3$: PP333 = 167:833 g/tree were 9.5 cm while the $KClO_3$: PP333 = 125:875, 100:900 g/tree and the untreated (control) were 10.3, 10.9 and 11.7 cm respectively. Leaf widths of the treated trees were less than the untreated (control). The leaf widths of the treated trees were 2.9 – 3.1 cm while the untreated (control) were 4.2 cm.

Table 9 Effect of $KClO_3$ and PP333 on leaf flushing percentage, number of new shoot/old shoot, leaf length and leaf width of lychee cv. Hong Hauy.

Treatment	leaf flushing percentage (%)	number of new shoot/ old shoot	leaves length (cm)	leaves width (cm)
control	86.3	2.8	11.7a	4.2a
$KClO_3$:PP333(100:900 g/tree)	85.0	2.5	10.9ab	3.2b
$KClO_3$:PP333(125:875 g/tree)	86.3	2.8	10.3bc	3.1b
$KClO_3$:PP333(167:833 g/tree)	83.8	2.8	9.5c	2.9b
	ns	ns	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Flowering time of $KClO_3$:PP333 treated trees were shorter than the untreated trees. The flowering time of treated trees was 36.5 – 38.5 days after treatment while the untreated were 45.5 days after treatment (Table 10 and Figure 7). However, flowering percentages of treated trees did not differ from untreated trees. The flowering percentages of all treatments were 72.5 - 90.0%. Panicle length and width did not affect by $KClO_3$ with PP333 treatments. Panicle lengths of both treated and untreated trees were 18.0 -23.5 cm. Panicle widths of the treated and untreated trees were 9.3 – 12.3 cm.

Table 10 Effect of $KClO_3$ and PP333 on flowering time , flowering percentage/tree, panicle length and panicle width of lychee cv. Hong Hauy.

Treatment	flowering time (days after treatment)	Flowering percentage/tree (%)	panicle length (cm)	panicle width (cm)
control	45.5a	81.3	20.8	12.3
$KClO_3$:PP333(100:900 g/tree)	38.5b	72.5	18.0	9.3
$KClO_3$:PP333(125:875 g/tree)	36.5b	83.8	23.5	11.3
$KClO_3$:PP333(167:833 g/tree)	38.5b	90.0	22.3	11.8
	*	ns	ns	ns

ab: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

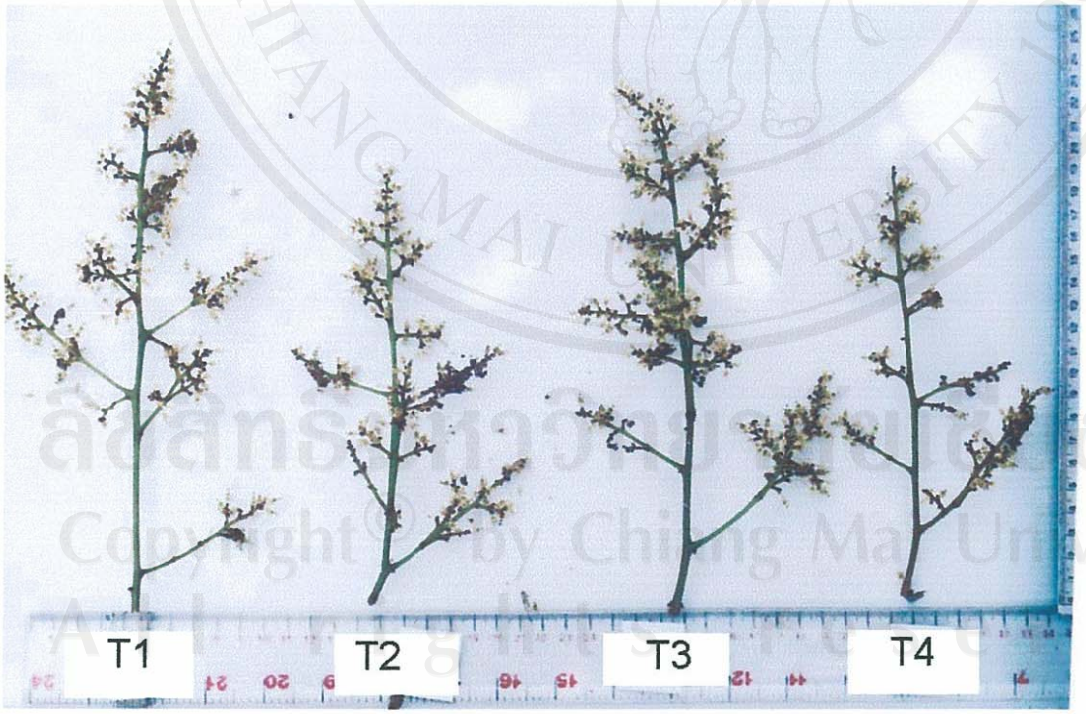

Figure 7 Panicle of 14 years old lychee trees cv. Hong Huay

1 = control 2 = $KClO_3$:PP333(100:900 g/pot) 3 = $KClO_3$:PP333(125:875 g/pot) 4 = $KClO_3$:PP333(167:833 g/pot)

Effects of potassium chlorate and paclobutrazole on the some hormonal changes in leaves and shoots of lychee cv. Hong Huay

The IAA leaf-diffusate in lychee cv. Hong Huay leaves did not affect by $KClO_3$:PP333 treatments. The IAA leaf-diffusate of the leaves was 0.14 – 0.18 ng/2 leaves/20h at the 2nd week after treatment (Tabe 11). At 4th week after treatment, the IAA leaf-diffusate was 0.16 – 0.25 ng/2 leaves/20h. However, The changes of IAA leaf-diffusate patterns tended to decreased in the 2nd week and increased in the 4th week after treatment.

Table 11 Effect of $KClO_3$ and PP333 on IAA leaf-diffusate content of lychee cv. Hong Hauy.

Treatment	IAA leaf-diffusate (ng/2 leaves/20h)		
	week(s) after treatment		
	0	2	4
control	0.33	0.15	0.23
$KClO_3$:PP333(100:900 g/tree)	0.25	0.18	0.16
$KClO_3$:PP333(125:875 g/tree)	0.25	0.14	0.25
$KClO_3$:PP333(167:833 g/tree)	0.24	0.17	0.18
	ns	ns	ns

Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Gibberellin-like substances contents in lychee shoots of treated and untreated trees before treating were 0.0034 – 0.0036 g/g FW. In second week after treatment, the gibberellin-like substances contents decreased in all treatments. The gibberellin-like substances contents of treated trees tended to decrease more than the untreated trees. The gibberellin-like substances content of $KClO_3$:PP333 = 125:875 and 167:833

g/tree were 0.0017 and 0.0024 g/g FW (Table 12) while the $KClO_3$:PP333 = 100:900 g/tree and untreated trees were 0.0027 and 0.0032 g/g FW. In the forth week after treatment, the gibberellin-like substances contents still decreased in all treatments. The gibberellin-like substances contents of $KClO_3$:PP333 = 125:875 and 167:833 g/tree were 0.0003 and 0.0005 g/g FW while the $KClO_3$:PP333 = 100:900 g/tree and untreated trees were 0.0006 and 0.0008 g/g FW.

Table 12 Effect of $KClO_3$ and PP333 on GA-like substances content (g/g FW) of shoots of lychee cv. Hong Hauy.

Treatment	GA-like substances (g/g FW)		
	week(s) after treatment		
	0	2	4
control	0.0036	0.0032a	0.0008a
$KClO_3$:PP333(100:900 g/tree)	0.0034	0.0027ab	0.0006ab
$KClO_3$:PP333(125:875 g/tree)	0.0036	0.0017c	0.0003c
$KClO_3$:PP333(167:833 g/tree)	0.0036	0.0024b	0.0005bc
	ns	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Cytokinin-like substances contents in lychee shoots of treated and untreated trees before treating were 0.0495 – 0.0548 ng/g FW. In second week after treatment, the cytokinin-like substances contents increased in all treatments. The cytokinin-like substances contents of treated trees tended to increase more than the untreated trees. The cytokinin-like substances content of $KClO_3$:PP333 = 125:875 and 100:900 g/tree were 0.0731 and 0.0625 ng/g FW (Table 13) while the $KClO_3$:PP333 = 167:833 g/tree and untreated trees were 0.0569 and 0.0502 ng/g FW. In the forth week after treatment, the cytokinin -like substances contents still increased. The cytokinin-like

substances contents of $KClO_3$:PP333 treated trees were higher than the untreated trees. Cytokinin-like substances contents of the treated trees were 0.0614 – 0.0773 ng/g FW while the untreated trees was 0.0531 ng/g FW.

Table 13 Effect of $KClO_3$ and PP333 on cytokinin-like substances content (ng/g FW) of shoots of lychee cv. Hong Hauy.

Treatment	Cytokinin-like substances (ng/g FW)		
	week(s) after treatment		
	0	2	4
control	0.0495	0.0502c	0.0531c
$KClO_3$:PP333(100:900 g/tree)	0.0548	0.0625b	0.0614b
$KClO_3$:PP333(125:875 g/tree)	0.0541	0.0731a	0.0773a
$KClO_3$:PP333(167:833 g/tree)	0.0499	0.0569bc	0.0623b
	ns	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Ethylene contents in leaves did not affect by $KClO_3$:PP333 treatments. The ethylene contents of the leaves were 4.2835 – 5.3090 ppm before treatment (Table 14). The ethylene contents of the leaves tended to increase during the study. Except the treatment of $KClO_3$:PP333 = 100:900 g/tree which the ethylene content tended to stable. At the 2nd week after treatment. The ethylene contents were 4.1735 – 5.8025 ppm. At 4th week after treatment, the ethylene content increased to 4.2580 -7.5950 ppm.

Table 14 Effect of $KClO_3$ and PP333 on ethylene content of shoots of lychee cv. Hong Hauy.

Treatment	Ethylene (ppm)		
	week(s) after treatment		
	0	2	4
control	4.4055	5.3013	6.0990
$KClO_3$:PP333(100:900 g/tree)	4.2835	4.1735	4.2580
$KClO_3$:PP333(125:875 g/tree)	5.3090	5.8025	7.5950
$KClO_3$:PP333(167:833 g/tree)	4.7210	4.8737	5.4480
	ns	ns	ns

Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Total non-structural carbohydrate (TNC) in leaves decreased during the study. The TNC contents in treated and untreated trees did not differ during the first 2 weeks after treatment. TNC contents of the leaves before treating (0 week) were 25.61 – 26.13 mg/g DW (Table 15). At 2nd week after treatment, TNC contents in leaves decreased to 16.16 – 18.39 mg g^{-1}DW. At 4th week after treatment, the TNC content of untreated trees was the highest (17.66 mg/g DW). The TNC contents of $KClO_3$:PP333 = 100:900, 125:875 and 167:833 g/tree were 16.85, 15.74 and 15.01 mg/g DW, respectively.

Table 15 Effect of $KClO_3$ and PP333 on total non-structural carbohydrate of leaves of lychee cv. Hong Hauy.

Treatment	TNC (mg/g DW)		
	week(s) after treatment		
	0	2	4
control	26.13	17.08	17.66a
$KClO_3$:PP333(100:900 g/tree)	25.73	17.29	16.85b
$KClO_3$:PP333(125:875 g/tree)	25.61	16.16	15.74c
$KClO_3$:PP333(167:833 g/tree)	25.89	18.39	15.01d
	ns	ns	*

abcd: Means in the same column followed by different letters were significant differences by LSD (P <0.05)

Total non-structural carbohydrate (TNC) contents in shoots of lychee increased during the study. However, TNC contents of untreated trees were higher than the treated trees after the treatment. Before treating (0 week), TNC contents of the shoots were 15.95-16.29 mg/g FW (Table 16). In 2nd week after treatment, TNC contents in all treatments increased. The untreated trees had the highest TNC content, 26.35 mg/g FW. TNC contents of treated trees were 24.13 – 24.56 mg/g FW. At 4th week after treatment, the shoot TNC contents in all treatments still increased. But the untreated trees had the smallest increasing. The shoot TNC content of the untreated trees was the lowest, 26.67 mg/g DW while the shoot TNC contents of $KClO_3$:PP333 = 100:900, 125:875 and 167:833 g/tree were 29.13, 28.66 and 29.41 mg/g DW respectively.

Table 16 Effect of $KClO_3$ and PP333 on total non-structural carbohydrate of shoots of lychee cv. Hong Hauy.

Treatment	TNC (mg/g DW)		
	week(s) after treatment		
	0	2	4
control	16.29	26.35a	26.67c
$KClO_3$:PP333(100:900 g/tree)	15.95	24.13b	29.13ab
$KClO_3$:PP333(125:875 g/tree)	16.19	24.23b	28.96b
$KClO_3$:PP333(167:833 g/tree)	15.97	24.56b	29.41a
	ns	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

Reducing sugar (RS) contents in leaves decreased during the study. RS content of the untreated tended to higher than the treated trees. Before treating (0 week), RS contents of all the treatments were 9.18-9.25 mg/g DW (Table 17). At 2nd week after treatment, RS contents of all treatments decreased. The RS contents of untreated trees and $KClO_3$:PP333 = 125:875 g/tree were 8.17 and 8.16 mg/g DW respectively while $KClO_3$:PP333 = 100:900 and 167:833 g/tree were 8.08 and 8.09 respectively. At 4th week after treatment, the RS contents in leaves still decreased. The RS content of untreated trees were the highest, 7.98 mg/g DW. The RS contents of $KClO_3$:PP333 = 100:900, 125:875 and 167:833 g/tree were 6.97, 7.23 and 6.98 mg/g DW, respectively.

Table 17 Effect of $KClO_3$ and PP333 on reducing sugar (RS) content in leaves of lychee cv. Hong Hauy.

Treatment	RS (mg/g DW)		
	week(s) after treatment		
	0	2	4
control	9.25	8.17a	7.98a
$KClO_3$:PP333(100:900 g/tree)	9.21	8.08b	6.97c
$KClO_3$:PP333(125:875 g/tree)	9.18	8.16a	7.23b
$KClO_3$:PP333(167:833 g/tree)	9.23	8.09b	6.98c
	ns	*	*

abc: Means in the same column followed by different letters were significant differences by LSD(P <0.05)

The RS contents in shoots increased during the study. Before treating (0 week), the shoot RS content of all treatments did not differ. The shoot RS contents were 14.47-15.09 mg/g DW (Table 18). At 2nd week after treatment, the shoot RS content of untreated trees was the highest, 20.57 mg/g DW. The shoot RS contents of treated trees also increased as in the untreated. The shoot RS contents of $KClO_3$:PP333 = 100:900, 125:875 and 167:833 g/tree were 19.92, 19.66 and 20.08 mg/g DW respectively. At 4 weeks after treatment, the shoot RS contents in all treatments still increased. But the untreated trees had the smallest increasing. The shoot RS content of the untreated trees was the lowest, 21.67 mg/g DW while the shoot RS contents of $KClO_3$:PP333 = 100:900, 125:875 and 167:833 g/tree were 24.19, 22.75 and 23.57 mg/g DW respectively.

Table 18 Effect of $KClO_3$ and PP333 on reducing sugar (RS) content in shoots of lychee cv. Hong Hauy.

Treatment	RS (mg/g DW)		
	week(s) after treatment		
	0	2	4
control	15.09	20.57a	21.67d
$KClO_3$:PP333(100:900 g/tree)	14.81	19.92c	24.19a
$KClO_3$:PP333(125:875 g/tree)	14.47	19.66d	22.75c
$KClO_3$:PP333(167:833 g/tree)	14.58	20.08b	23.57b
	ns	*	*

abcd: Means in the same column followed by different letters were significant differences by LSD (P <0.05)