Chapter 6

Conclusion

The effect of potassium chlorate on the physiology of a longan root was observed for four consecutive weeks after treatments on the following parameters; photosynthetic rate, stomatal conductance, chlorophyll content and degradation, root respiration, electrolyte leakage, peroxidase activity, carbohydrate, mineral nutrients, auxin-, cytokinin- and gibberellin-like substances and ethylene concentration. The studies were conducted at the Department of Horticulture, Faculty of Agriculture, Chiang Mai University during August 2000 to January 2002. The results were summarized as follows:

1. Effect of potassium chlorate on the physiology and some essential substances during flower induction period (Table 6.1 and Table 6.2).

Table 6.1 Effect of $KClO_3$ on physiology of longan plants during flower induction period, 2 weeks after treatments

	Physiological aspects	Untreated plants	Treated plants	Sign. Differ.
1	Photosynthetic rate and stomatal conductance	High in the morning but decline in the afternoon	High in the morning but decline in the afternoon	-
2	Root relative growth rate	Increase	Increase	NS
3	Root respiration rate	Week 1 - high Week 2 - low	Week 1 - high Week 2 - low	NS
4	Electrolyte leakage of leaves and roots	Stable	Stable	NS

NS means non significant difference

Table 6.2 Effect of $KClO_3$ on content of some essential substances and mineral nutrients of longan plants during flower induction period, 2 weeks after treatments

	Essential substances	Untreated plants	Treated plants	Sign. Differ.
1	Chlorophyll a and b	Week 1 - high Week 2 - decline	Week 1 - high Week 2 - decline	NS
2	Peroxidase activity of leaves and roots	Decline in leaves, but increase in root	Decline in leaves, but increase in root	NS
3	Total non structural carbohydrate (TNC)			
	• Roots TNC	Low	High	* (1st week)
	• Leaves TNC	Stable	Stable	NS
	• Shoots TNC	Low	High	** (2nd week)
4	Reducing sugar (RS)			
	• Roots RS	High	Low	** (1st week)
	• Leaves RS	Stable	Stable	NS
	• Shoots RS	Low	High	* (2nd week)
5	Nitrogen (N)			
	• Roots, leaves and shoots N	Low in shoots, high in leaves, stable in roots	Low in shoots, high in leaves, stable in roots	NS
	• Roots NO_3^-	Low	High	* (2nd week)
6	Phosphorus (P)	High in shoots, stable in leaves and roots	High in shoots, stable in leaves and roots	NS
7	Potassium (K)	Stable in shoots and roots , decline in leaves	Stable in shoots and roots , decline in leaves	NS
8	Root auxin	Low	High	* (2nd week)
	Root cytokinin	Low	High	* (2nd week)
	Root gibberellin	Increase	Increase	NS
	Root ethylene	Increase	High increase	* (2nd week)

*, ** means treatments have significant difference at α= 0.05 and 0.01 by Lsd.

2. The correlation of some essential substances and mineral nutrients.

   2.1 The correlation between TNC, RS and N found that shoot N, RS and TNC of treated plants have negative correlation to N, RS and TNC of leaf and root, while N of root, leave and shoot of untreated plants have positive correlation.

   2.2 The correlation between N, P and K found that N of shoot has positive correlation with N, P and K of root of treated plants but has negative correlation with N and K of root of untreated plant.

   2.3 The correlation between root hormones found high positive correlation between cytokinin and ethylene of untreated plants but the treated plants found high negative correlation between auxin and other root hormones and high positive correlation between cytokinin, gibberellin and ethylene.

It was concluded that potassium chlorate can induce flowering of longan. It may due to the changing content of some essential substances such as total non structural carbohydrate, reducing sugar, auxin and cytokinin of roots signal flowering gene of shoot.