#### TABLE OF CONTENTS

			page
Acknowled	lger	nent	iii
Abstract in	ı Tł	nai	iv
Abstract in	ı Er	nglish	vi
List of tab	le		xi
List of illus	stra	tions	xiv
Chapter 1	Inti	roduction	I
Chapter 2	Rev	view of Literature	3
	1.	The transition of flowering	73.5
		1.1 External factors of flowering	3
		1.2 Internal factors of flowering	4
		1.3 Genetics of flowering	10
	2.	Potassium chlorate and flowering of longan	11/
	3.	The roots	13
Chapter 3	Ma	terial and Methods	16
	1.	Materials	16
		1.1 Experimental plants	16
		1.2 Other apparatus	16
	2.	Experimental Design	3 (2 16 ) [ 1 ]
	3.	Methods	17
Chapter 4	Res	olts right by Chiang Mai	Uni26'ersity
	1.	Experiment 1: The concentration of potassium chlorate on flower Induction of longan	e r <sub>26</sub> v e d
	2.	Experiment 2: Root growth and development	27
	3.	Experiment 3: Root respiration	29

4. Experiment 4: Changes of the physiological aspects and some				
		essential su	bstances of roots, leaves and shoots	30
		4.1 The ph	ysiological aspects	30
		4.1.1	Photosynthetic rate and stomatal conductance	30
		4.1.2	Stomatal behaviors	30
		4.1.3	Electrolyte leakage	32
		4.2 Change	es of some essential substances and mineral nutrients	33
		4.2.1	The chlorophyll content and degradation	33
		4.2.2	Peroxidase activity	34
		4.2.3	Total non structural carbohydrate (TNC)	35
		4.2.4	Reducing sugar (RS)	36
		4.2.5	Total nitrogen, nitrate and C: N ratio	37
		4.2.6	Phosphorus	40
		4.2.7	Potassium	40
		4.2.8	Root hormones	41
		4.3 The co	rrelation of chemicals content between roots, leaves and	
		shoots		45
		4.3.1	The correlation between nitrogen, reducing sugar and	
			total non structural carbohydrate	45
		4.3.2	The correlation between nitrogen, phosphorus and	
			potassium	47
		4.3.3	The correlation between root hormones	50
Chapter 5	Dis	cussion		51
	1.	The concer	ntration of potassium chlorate on flower induction of	
		longan		51/ersity -
	2.	Root growth	h and development in hydroponics	52
	3.	Root respira	ation	53
	4.	Photosynthe	etic rate and stomatal conductance	53
	5.	Electrolyte l	leakage and peroxidase activity	54

6.	. Changes of some essential substances and mineral nutrients	55
	6.1 Carbohydrate, nitrogen, phosphorus and potassium	55
	6.2 Plant hormones	58
7.	. The correlation between chemicals	60
8.	Compare to natural condition	61
Chapter 6 Co	onclusions	63
References		66
Curriculum vi	itae	76
		796 × 796

## ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright<sup>©</sup> by Chiang Mai University -All rights reserved

### LIST OF TABLES

Table		Page
4.1	The concentration of potassium chlorate on flower induction of longan	26
4.2	Relative growth rate of longan roots treated with KClO <sub>3</sub> compared with	
	untreated plants six weeks in hydroponics	27
4.3	The root respiration rate of plants treated with potassium chlorate compared	
	with control	30
4.4	The photosynthetic rate and stomatal conductance (μ mol CO <sub>2</sub> m <sup>-2</sup> s <sup>-1</sup> ) of	
	longan leaves during the day for four weeks after applied KClO <sub>3</sub> compared	
	with control	31
4.5	Electrolyte leakage of longan leaves treated with KClO <sub>3</sub> compared with	
	control	32
4.6	Electrolyte leakage of longan roots treated with KClO <sub>3</sub> compared with	
	control	32
4.7	The chlorophyll a content of longan leaves treated with KClO <sub>3</sub> compared	
	with control	33
4.8	The chlorophyll b content of longan leaves treated with KClO <sub>3</sub> compared	
	with control	33
4.9	Total chlorophyll and chlorophyll degradation three consecutive days after	
	treatments 1ght by Chiang Mai Ur	nivaersity
4.10	Peroxidase activity (µM/min) of longan leaves treated with KClO <sub>3</sub> compared	
	with control	34
4.11	Peroxidase activity (μM/min) of longan root treated with KClO <sub>3</sub> compared	
	with control	35

Table		Page
4.12	Total non structural carbohydrates of roots, leaves and shoots of plants	
	treated with KClO <sub>3</sub> compared with control	35
4.13	The reducing sugar content of root, leaf and shoot of plants treated with	50
	KClO <sub>3</sub> and untreated plants, four weeks after treatment	36
4.14	The percentage of nitrogen of roots, leaves and shoots of treated plants	
	compared with control	37
4.15	Percentage of nitrate content of roots, leaves and shoots of untreated and	<b>3</b>
	treated plants	39
4.16	The C: N ratio of roots, leaves and shoots in treated and untreated plant	39
4.17	The percentage of phosphorus of roots, leaves and shoots treated with KClO <sub>3</sub>	
	compared with control	405
4.18	Potassium content of roots, leaves and shoots treated with KClO <sub>3</sub> compared	
	with control	41
4.19	IAA and auxin-like substances content (µ g g TW) in root of plants treated	
	with KClO <sub>3</sub> compared with control by IAA bioassay	42
4.20	IAA and auxin-like substances ((µ g g <sup>-1</sup> FW) of roots treated with KClO <sub>3</sub>	
	compared with control, measured by spectrophotometer	42
4.21	Gibberellin and GA-like substances content (µ g g <sup>-1</sup> FW) of roots treated with	
	KClO <sub>3</sub> compared with control	43
4.22	Cytokinin and cytokinin-like substances content (ng g <sup>-1</sup> FW) of roots treated	
	with KClO <sub>3</sub> compared with control	43
4.23	Ethylene content (ppm ) of root treated with KClO <sub>3</sub> compared with control	44
4.24	The correlation coefficients of TN, RS and TNC between roots, leaves and	
	shoots of untreated plants	45
4.25	The correlation coefficients of TNC, RS and TN between roots, leaves and	
	shoots of treated plants	46
4.26	The correlation coefficients of N, P and K between roots, leaves and shoots	
	of untreated plants	48

Table		Page
4.27	The correlation coefficients of N, P and K between roots, leaves and shoots	
	of treated plants	49
4.28	The correlation of root hormones of treated and untreated plants	50
6.1	Effect of KClO <sub>3</sub> on physiology of longan plants during flower induction	
	period, 2 weeks after treatments	63
6.2	Effect of KClO <sub>3</sub> on some essential substances and mineral nutrients of longan	
	plants during flower induction period, 2 weeks after treatments	64

# ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright<sup>©</sup> by Chiang Mai University -All rights reserved

#### LIST OF ILLUSTRATIONS

Figure		Page
4.1	The shoots of plants treated with potassium chlorate 0, 0.05, 0.10 and 0.15	
	g/pot, five weeks after treatments	27
4.2	Root relative growth rate of untreated plants compared with plants treated	
	with KClO <sub>3</sub>	28
4.3	Roots of controlled plants compared with plants treated with 250 ppm of	202
	KClO <sub>3</sub> at 1, 3 and 5 weeks after treatments	28
4.4	The terminal bud of longan 14, 16 and 18 days after treated with 0.05 g	,
	KCIO <sub>3</sub>	29
4.5	Shoots of longan four weeks after treated with KClO <sub>3</sub>	29
4.6	The stomata of longan	31
4.7	The TNC, RS and TN content of roots, leaves and shoots after applied	
	potassium chlorate compared with control	38
4.8	Hormones content of longan root treated with KClO <sub>3</sub> compared with control	44
4.9	Model of N, RS and TNC content of plant treated and untreated with KClO <sub>3</sub>	
	four weeks after treatments	47
4.10	Model of N, P and K content of plant treated and untreated with KClO <sub>3</sub> four	
	weeks after treatment	49
		iversity -