

TABLE OF CONTENT

VALIDATION.....	iii
DECLARATION OF AUTHENCITY	iv
ACKNOWLEDGEMENT.....	v
TABLE OF CONTENT.....	vi
LIST OF FIGURE.....	viii
LIST OF TABLES.....	x
ABSTRACT.....	1
INTISARI	2
CHAPTER I.....	3
INTRODUCTION	3
1.1. Background	3
1.2. Objective	3
1.3. Expected from this research	4
CHAPTER II.....	5
LITERATURE REVIEW	5
2.1. Potassium in the soil.....	5
2.2. Role of potassium in the plant.....	6
2.3. Low potassium tolerance of plant	7
2.4. High potassium tolerance of plant.....	8
2.5. Lupine.....	8
2.6. The role of root exudate of lupine.....	9
2.7. The effect of nutrients from the soil and plants on root exudates.....	10
CHAPTER III	12
RESEARCH METHODOLOGY.....	12
3.1. Time and location.....	12
3.2. Materials and equipments.....	12
3.3. Research design.....	13
3.3.1. Plant material and growth condition.....	13
3.3.2. Measurement of biomass and potassium concentration.....	14
3.3.3. Root exudate collection.....	15

3.3.4. Preparation of root exudates for metabolome analysis.....	16
3.3.5. Metabolome analysis	16
3.3.6. Statistical analysis.....	18
CHAPTER IV	19
RESULTS AND DISCUSSION.....	19
4.1. Results.....	19
4.1.1. Shoot root fresh weight and dry weight.....	19
4.1.2. Root length.....	21
4.1.3. Shoot and root K concentration	22
4.1.4. Number of metabolite detected under potassium level.....	24
4.1.5. Changed of metabolite under potassium level.....	40
4.2. Discussion	52
4.2.1. Lupine growth under low K.....	52
4.2.2. Lupine growth under high K.....	54
4.2.3. Metabolome analysis	55
CHAPTER V	59
CONCLUSION AND SUGGESTION.....	59
5.1. Conclusion.....	59
5.2. Suggestion	59
REFERENCE.....	60