

UNIVERSITI TEKNOLOGI MARA

**THE EFFECTS OF
VARIOUS PACLOBUTRAZOL
CONCENTRATIONS ON THE
GROWTH, YIELD AND BETA-
CAROTENE CONTENT OF SWEET
POTATO [*Ipomoea batatas* (L.) Lam.]
var. VITATO GROWN ON
SANDY SOIL**

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ABSTRACT

The orange-flesh sweet potato cultivar known as VitAto was introduced by the Malaysian Agricultural Research and Development Institute (MARDI) in 2007. VitAto' storage root is high in β -carotene content, vitamin C, vitamin E and anthocyanin. It is a recommended crop under East Coast Economic Region (ECER) to replace tobacco cultivation on beach ridges interspersed with swales (BRIS) soil in Kelantan and Terengganu. The VitAto storage root is marketed in three grades based on sizes; big (A), medium (B) and small (C). Bigger sizes or better grades fetch higher price. However, most VitAto farmers cultivated on BRIS soil generally obtained low yield with majority of storage roots consisted of grades B and C only. To overcome this problem, a plant growth regulator paclobutrazol (PBZ) at various concentrations were given as an additional input to the existing inorganic fertilization practice in VitAto cultivation. Two experiments were conducted on sandy soil at MARDI Rawang Station, Selangor from November 2012 to June 2013. Both experiments used a randomized complete block design (RCBD) with four replications. These experiments utilized PBZ at various concentrations as additional input to the existing standard inorganic fertilization practice as recommended by MARDI. The standard NPK inorganic fertilizer was given at 28, 35 and 49 while soil drenching PBZ solution was given at 20, 40 and 60 days after planting (DAP) in both experiments. In the first experiment, high PBZ concentrations were used; 0 (control), 100, 200, 300 and 400 ppm while in the second experiment, low PBZ concentrations were used; 0 (control), 10, 20, 40 and 80 ppm. The effectiveness of PBZ at selected concentrations were compared to the existing recommended inorganic fertilization practice (control) based on several aspects such as growth and development, yield, mineral nutrients and β -carotene content. The results showed that the best PBZ concentrations which positively influenced most of parameters measured was the 10 ppm PBZ treatment. At the maturity stage, this treatment increased storage root number, fresh weight, dry mass and β -carotene content, by 40%, 41%, 31% and 13% if compared to control respectively. Similarly, this treatment increased storage root nitrogen (N), phosphorus (P) and potassium (K) concentrations by 2%, 42% and 30 % respectively and contents by 42%, 82% and 141% respectively. The 10 ppm PBZ also increased plant total N, P and K contents by 56%, 70% and 79% higher than control treatment. The 10 ppm PBZ increased the yield by increasing the plant total dry mass production and K nutrient content. High total dry mass production ensured enough assimilate that could be translocated to the storage root primarily at the final growth stage from storage root bulking to maturity stages. High K nutrient content increased the assimilate translocation from the shoot to the storage root. It can be concluded that the K nutrient increased the sink strength of storage root organ to attract greater assimilate. The application of 10 ppm PBZ probably the best option to be used as a supplement to the recommended inorganic fertilization practice for VitAto cultivation on sandy soil.

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TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF PLATES	xx
LIST OF SYMBOLS	xxi
LIST OF ABBREVIATIONS	xxvi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of Study	1
1.1.1 Sweet Potato	1
1.1.2 VitAto as a New Sweet Potato Variety in Malaysia	1
1.1.3 Paclobutrazol	3
1.1.4 The Storage Root as a Main Component of Sweet Potato	3
1.1.5 Beta-Carotene Content in Sweet Potato	4
1.2 Problem Statement	4
1.3 Objectives of the Study	5
1.4 Research Question	5
1.5 Scope of Study	6
1.6 Limitation of the Study	6
1.7 Significance of the Study	6
1.8 Hypotheses	6
1.9 Conceptual Framework	7
CHAPTER TWO: LITERATURE REVIEW	8
2.1 Sweet Potato	8

2.1.1	Background	8
2.1.2	Sweet Potato Production Ranking in the World, South-East Asia and Malaysia	9
2.1.3	Botanical Description of Sweet Potato	11
	a) The Root System	12
	b) Leaves	12
	c) Stem	13
	d) The Flower	13
	e) Fruit and Seed	14
2.2	VitAto	14
2.2.1	Morphological Description of VitAto	15
2.2.2	Advantages of VitAto	15
	a) Economic Perspective	15
	b) Nutritional Perspective	15
2.2.3	The Potential of VitAto Flour Industry	16
2.2.4	Area of Cultivation	16
2.3	Beach Ridges Interspersed with Swales (BRIS) and Sandy Tin-Tailing Soil	17
2.3.1	Origin and Area Covered	17
2.3.2	Physical, Chemical and Biological Characteristics	18
2.3.3	Utilization for Agricultural Purpose	19
2.4	Plant Growth Regulator	19
2.4.1	Paclobutrazol	20
2.4.2	The Effect of Paclobutrazol on Various Crop Species	20
	a) Crop Coverage	20
	b) General Effects of Paclobutrazol on Growth and Development	21
	c) The Low Versus High Concentrations Effects of Paclobutrazol	21
2.4.3	The General Effects of Triazole Compounds on Crop Species	26
	a) The Effects of Triazole Compounds on Plant Hormone	26
	b) The Effect of Triazole Compound on Plant Photosynthetic Pigment Composition	26
2.5	Source and Sink	26
2.5.1	Dry Mass Production and Partitioning	27