UNIVERSITI TEKNOLOGI MARA

OPTIMIZATION OF SELECTED PLANT GROWTH REGULATORS ON CALLUS INDUCTION OF *Oryza sativa* L. VAR. MR 219

SITI NUR ADILA BINTI HAMZAH

MSc

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Siti Nur Adila Binti Hamzah
Student I.D. No	:	2015139781
Programme	:	Master of Science (Plant Biotechnology) – AT 736
Faculty	:	Plantation and Agrotechnology
Dissertation Title	:	Optimization of Selected Plant Growth Regulators on Callus Induction of *Oryza sativa* L. var. MR 219.
Signature of Student	:	……
Date	:	April 2021

ABSTRACT

This study was using Malaysian Rice 219 (MR 219), an *indica* rice from a cross between MR 137 and MR 151. It was considered as recalcitrant variety because of low potentiality of callusing and regeneration. The objective of this study was to develop an effective protocol for obtaining MR 219 callus induction using different combinations and concentrations of plant growth regulators (PGRs) which were 2,4-Dichlorophenoxyacetic acid (2,4-D), Kinetin (KIN) and Naphthalene acetic acid (NAA) as plant growth regulators ranging from 0.5 to 15.0 mg/L. The callus was induced from the mature seeds of MR 219 on the MS media supplemented with 4.4 g/L of MS powder with vitamins, 30.0 g/L of sucrose and 3.5 g/L of gelrite with addition of various PGRs in different types, concentrations and combinations. All media supplemented with 2,4-D had successfully induced the callus and 2.0 mg/L of 2,4-D was the best concentration for the callus induction with 100% success rate and with the addition of 15.0 mg/L of NAA, it provided less time taken for callus induction with better callus morphology which resulted in less browning problems. The induced calli then were analysed through reversed-phase HPLC for the presence of the desired secondary metabolites which was ɣ-oryzanol. The chromatogram of the standard was shown to have six components of ɣ-oryzanol through this reversed-phase HPLC method that used HPLC grade of methanol: acetonitrile: dichloromethane: acetic acid (50:44:3:3 v/v) as mobile phases and 40 minutes of isocratic elution with 1.4 ml/min of flow-rate through C18 column. Through this study, there is a potential in maximizing the use of callus culture of obtaining desired secondary metabolites for future researches.

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TABLE OF CONTENTS