APPLICATION OF PLANT TISSUE CULTURE IN OIL PALM (*Elaeis guineensis* Jacq.) FOR YIELD IMPROVEMENT- A REVIEW

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TABLE OF CONTENTS

ABSTRACT

APPLICATION OF PLANT TISSUE CULTURE IN OIL PALM (*Elaeis guineensis)* FOR YIELD IMPROVEMENT

High yield production of oil palm is vital especially in the economic perspective because its main products i.e., fresh fruit bunch (FFB) and oil yield used as the main sources of natural palm oil production that is fundamental raw material in many industries. With increasing global demands for vegetable oils, the yield productivity must be improved urgently. Through biotechnology, conventional breeding can be supersede by using several micro propagation techniques such as callogenesis, organogenesis and somatic embryogenesis. Several approaches were done vegetatively similar with application of plant tissue culture in oil palm which possible to produce high mass of superior genotype oil palm which genetically uniform planting material with good characteristics, known as an elite clonal oil palm. Malaysia has successfully produce clonal *Elaeis guineensis* with 2.53 million ramets in 2009. However, the capacity is still not reach the point of high global demand and our country has developed about 12 tissue culture laboratories to improve high production of *Elaeis guineensis* elite clone. An elite clonal palm would resulting in uniform high yield production which it can be feasibly management of harvesting. The objectives of this review are to identify the best plant tissue culture protocol that gives the optimum success rate of clonal elite planting material of oil palm and to prove that clonal palm as planting material could help for yield improvement. Through this review, several finding could be point out such the issues of ortet availability and flower abnormality of clonal palm.

Keywords: *tissue culture, callogenesis, somatic embryogenesis, FFB yield, oil yield*

CHAPTER 1

INTRODUCTION

In 1960s, there is 55,000 ha of oil palm estate in Malaysia and the production of palm oil is 0.1 million tonnes. In 2014, the palm oil production expended to 13.98 million tonnes because of augmentation of crop area about 3.8 million ha. In Malaysia, oil palm such the precious oil seed plant that comprises many advantages because of its high return in oil yield per bunch. The average yield for crude oil is 4 to 5 t/ha and up to 7 to 8 t/ha (Te-Chato and Hilae, 2007). It is give an astonishing advancement in plantation sector. Palm oil has generally used as a part of numerous commercial ventures such in the food, cosmetic and pharmaceutical. Malaysia has been the second largest world producer of vegetable oil after soybean when the production is successfully recorded about 43,118 million tonnes (MPOB, 2008).

Oil palm or scientific name is *Elaies guineensis* is originated from West Africa. *Palmacea* is the oil palm family that closely related to coconut, dates and other ornamental plant (Verheyer, 2010). There are four *Dura* seedlings, two from Mauritius or Reunion and another two from Amsterdam has been brought to Indonesia and was planted at Taman Botani Bogor (Buitenzorg) Jawa in year 1848. In Deli, seedling from Bogor was planted as an ornamental plant at the roadside in early 1870's. At 1911, the seedling from Deli was brought to Malaya and also was planted as an ornamental plant at the roadside of Rantau Panjang, Selangor. It was commercially planted at Tennamaran estate by Henry Fauconnier on 1917 until now (Mahat, 2012).