

UNIVERSITI TEKNOLOGI MARA

**GROWTH, PHYTOCHEMICALS
SCREENING AND ANTIOXIDATIVE
ACTIVITIES OF OIL PALM (*Elaeis
guineensis*) CELL SUSPENSION
CULTURES**

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ABSTRACT

Elaeis guineensis locally known as 'kelapa sawit' is an economic palm tree. The cell suspension cultures of this plant can be induced by tissue culture technique. Literature search has revealed limited reports on cell suspension culture and its secondary metabolites. This research aimed to determine the growth and phytochemicals of three different clones (R148, R160, R169) and to study the effects of the sucrose concentrations and spirulina addition on fresh weight, total phenolic content (TPC), total flavonoid content and radical scavenging of the oil palm cell suspension cultures. The cell suspension were subcultured every month. After 5 months of subculturing, the cell suspensions were filtered and extracted. Each clone of oil palm cell suspension has different rates of growth and different types of secondary metabolites production. Clone R148 showed the highest fresh weight (35.74 ± 0.01 g) followed by clone R160 (11.15 ± 0.02 g) and clone R169 (13.85 ± 0.02 g) after 5 months cultured. The phytochemical screening in R148 and R169 cell suspension culture clones showed the presence of flavanoid, alkaloid, tannin and saponin. Meanwhile clone R160 showed the presence of flavonoid, alkaloid and tannins only. Total phenolic content, total flavonoid content and radical scavenging activity of the cell suspension culture were increased in response to high sucrose treatments. However, very high sucrose level (7%) may have may caused osmotic stress in all three clones of the cell suspension cultures. Clone R160 cell suspension cultures at 5% of sucrose concentration demonstrated the highest total phenolic content (64.17 ± 0.15 mg GAE/100 g) and total flavonoid content (45.60 ± 0.35 mg QE/100 g). In terms of radical scavenging activity, the cell suspension culture clone R160 in the 5% sucrose concentration showed the highest scavenging activity which was $63.0 \pm 2.47\%$. Spirulina act as an elicitor has been proven to increase total phenolics and flavonoid content. Total phenolic content of the cell suspension culture was highest in clone R160 which was 78.15 ± 0.94 mg GAE/100 g at 10% of spirulina concentration. On the other hand, the total flavonoid content of clone R160 extract was the highest (67.60 ± 0.35 mg QE/100 g of sample) at 10% spirulina concentration. In terms of antioxidant activity, the cell suspension culture clone R160 in the 10% sucrose concentration showed the highest scavenging activity which showed $62.5 \pm 3.47\%$. In conclusion, the addition of sucrose and spirulina had positive effects on the growth, total phenolic, total flavonoid content and radical scavenging activities in all of the cell suspension culture clones.

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