

## Chapter 5

### Conclusions

#### **Part 1 Studies on callus induction from endosperm explants of Physic Nut (*J. curcas* L.)**

It was found that media supplemented with 10  $\mu\text{M}$  NAA was the most efficient formulation for callus induction (100%) while callus did not form in the media supplemented with 5  $\mu\text{M}$  2, 4-D, NAA and IBA and in the control medium. In addition, the media supplemented with 10  $\mu\text{M}$  NAA was the most efficient formulation for producing friable callus (endosperm callus) and it was the most efficient for plant cell suspension culture. In this research, only one month callus was used as inoculum in subculture, which may not be the best for plant cell suspension culture. Therefore, there should be more research on the topic of age of callus suitable for plant cell suspension culture.

#### **Part 2 Study on growth and oil content from cell suspension culture of endosperm cell of Physic Nut (*J. curcas* L.)**

Endosperm cells could grow and produce oil under conditions consisting 1 gram callus content, in 30 ml of MS liquid media supplemented with 10  $\mu\text{M/L}$  NAA alone and continuously incubated on a rotary shaker (120 rpm) under dark conditions at  $25 \pm 2$  °C for 40 days. The suspended cells grew rapidly during 10–20 days of culture and gave the maximum percentage of oil content ( $27.8324 \pm 0.3954$  % (w/w)) at 20 days of culture and decreased to  $5.5866 \pm 0.0213$  % (w/w) on the last day of culture (40 days). Next, the oil production of physic nut, the increasing of initial callus content from 1 gram to 2 grams tended to promote higher oil content (35.75%) than that increasing callus content from 2 grams to 3 grams (22.72%).

The use of different temperatures significantly affected growth and oil content of physic nut endosperm suspended cells. Decreasing of temperature has resulted

to increase on growth and oil content in all during culturing. In contrast, increasing of sucrose concentrations has resulted to increasing on growth and oil content of jatropha endosperm suspended cell in all during culturing. The treatments combination of different temperature and sucrose concentrations gave significantly different results in growth and oil content at confidence level of 95 percent. The best treatment in this experiment are using temperature at 20°C and 35 gram/litter of sucrose which gave the best grown and maximum yield of oil content (%TLE)  $45.530 \pm 1.2628\%$  (w/w).

**Part 3 Study on oil production from endosperm cells of Physic Nut (*J. curcas* L.)  
in a modified bubble column bioreactor.**

The endosperm cells of *J. curcas* L. could grow in 1 liter of modified bubble column bioreactor. The endosperm cells could produce oil in the modified bubble column bioreactor. The oil content equaled 57.594% (w/w). This result indicated that it is possible to be produce oil from the endosperm cells of *J. curcas* L. in the bioreactor and conditions of this experiment.



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