

Polyphenolic compounds and potential antioxidant properties from a green microalgae, *Tetraselmis tetrahele* (Butcher, 1959)

ABSTRACT

Tetraselmis tetrahele is a marine four-flagellated prasinophyte and forms one of the important microalgae as feed in aquaculture due to its high nutritional and antioxidant contents. *Tetraselmis tetrahele* also contains bioactive compounds such as flavonoids and polyphenols, which makes it a suitable raw material for cosmeceutical product development. Due to its eurythermal and euryhaline characteristics, this indigenous microalga can be easily mass produced in large bioreactors. The antioxidant activity of indigenous microalgae, *Tetraselmis tetrahele* (UPMC-A0007) cultured in two different media (F2 and Conway) using 100L annular photo-bioreactor for 56 days was determined. During the culture period, the microalgal biomass was collected six times to check the total phenolic (TPC) and antioxidant contents. The antioxidant activities on *T. tetrahele*'s crude extract were determined by DPPH, FRAP and ABTS measurements. There was no significant difference ($p > 0.05$) in the antioxidant property between the algae cultured in F2 and Conway media. However, two groups of cell size; small cell size (0.025-0.05g/cells) and big cell size (0.055-0.08g/cells) were observed only in F2 media. The group of small cell size showed 1.6 times higher total phenolic content (90.98 ± 2.05 mg GAE/g) than that of big cell size. The average TPC (32.08 ± 3.81 mg GAE/g) also was high compared to commercial microalgae; *Spirulina platensis* and *Chlorella vulgaris* with 24.00 ± 1.14 mg GAE/g and 20.61 ± 1.40 mg GAE/g respectively. These results suggest that *T. tetrahele* is a potential antioxidant source and the effective antioxidant production can be achieved by controlling the cell size in their culturing process.

Keyword: *Tetraselmis tetrahele* (UPMC-A0007); Photobioreactor; Antioxidant activity; F2 media; Conway media; Indigenous