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Exploring if *Porphyra* sp. extract functions as serum substitute in HT29 cell culture

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This study investigates the impact of *Porphyra* sp. extracts on HT29 cell line growth and viability at reduced serum conditions. The concentration-dependent effects of phycobiliproteins (PBPs) on cell proliferation were examined over various time intervals. Lower concentrations of PBPs (20 µg/mL) demonstrated an increase in HT29 cell viability after 48 hours and 5 days of cultivation at reduced serum concentration (final serum concentration was in the range from 5 to 8%). This suggests a potential positive influence on cell proliferation, likely due to their antioxidant properties. Conversely, higher concentrations of PBPs exhibited inhibitory effects on cell growth, possibly due to cytotoxicity at elevated levels. Remarkably, when HT29 cells were cultured solely in algal extract without fetal calf serum (FCS), complete growth inhibition was observed after 72 hours. This finding underscores the insufficient nutrient and growth factor provision of PBPs alone for sustaining cell viability. Morphological differences observed in cells cultured with 70 µg/mL of PBPs indicated potential alterations in cellular morphology. Notably, 70 µg/mL of PBPs in RPMI medium with 5% FCS displayed growth inhibition compared to the control (5% FCS). Furthermore, we assessed HT29 cell adaptability to changes in FCS concentration and PBP supplementation. Cells incubated under varying FCS and PBP conditions were subcultured into RPMI medium with lower FCS concentration and PBPs from *Porphyra*. The viability of cells following subculturing indicated sustained adaptability to reduced FCS levels. Overall, this study provides valuable insights into the concentration-dependent effects of PBPs from *Porphyra* extracts on HT29 cell growth and viability. The findings underscore the potential benefits of PBPs at lower concentrations for cell proliferation at reduced serum conditions and reveal the adaptability of HT29 cells to changing culture conditions.

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