Production of Single Cell Protein from Underutilized Sea Weed *Turbinaria* Spp Using Mixed Culture of Palmyrah Toddy

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Due to the steep increasing global population, the demand for protein increases day by day. To overcome the protein shortage, single cell protein (SCP) is used as a protein supplement for human and animals. This study was aimed to produce SCP from the extracts of underutilized, abundantly found marine sea weed, *Turbinaria* spp as the substrate, using the mixed culture of organisms grown in palmyrah (*Borassus flabellifer*) toddy. *Turbinaria* spp were collected, sundried, ground to a powder form and *Turbinaria* solution was prepared by mixing distilled water and this was used as a growth medium throughout the experiment without adding any supplements. This medium [10 g *Turbinaria* spp powder in 100 mL water (10% w/v)] was inoculated with 10 mL natural palmyrah toddy and allowed to submerged fermentation at 29 °C for 72 h which yielded a crude protein of 38.5% (w/v). When the growth temperature was optimized at 35 °C (43.4%), SCP yield was significantly increased by 1.36 times than the initial non- optimized temperature 27 °C (32.7%). When fermentation period was optimized as 48 h (44.33%), SCP yield was significantly increased by 1.14 times than the initial non- optimized time (24 h-38.55%). *Turbinaria* spp medium and inoculum ratio was optimized as 50:10 (43.7%), for higher SCP yield. When initial pH of the medium was set at 6.0, significantly higher relative SCP was produced. Amino acid analysis revealed that the SCP produced in the *Turbinaria* medium had all the essential amino acids with significantly higher amount of methionine (3.9%) and lower amount of threonine (0.2%). Vitamin B analysis revealed that SCP yield in the *Turbinaria* medium contained thiamin (0.85 mg/100g) and riboflavin (3.2 mg/100g). After the optimization of growing conditions and media composition, SCP production in the medium containing under-utilized sea weed *Turbinaria*, increased by 1.13 times (from 38.5% to 43.7%).

Keywords: Crude protein, Submerged fermentation, Single Cell Protein, *Turbinaria*