

Inoculum sizes of locally isolated phototrophic bacterium on the utilization of palm mill effluent

ABSTRACT

To produce *Rhodobacter sphaeroides* strain UMSPSB3 biomass with the reduction of chemical oxygen demand (COD) from palm oil mill effluent. Locally isolated phototrophic bacterium with different inoculum levels were used in Palm Oil Mill effluent (POME). Collected POME was characterized before used as substrate. Inoculum of bacterium was grown in synthetic media and 48 hours inoculum was used to utilize the substrate. Biotechnological laboratory, Borneo Marine Research Institute, University Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia, between February 2014 to April 2014. Growth characteristics of bacterium *Rhodobacter sphaeroides* strain UMSPSB3 was monitored at different light intensities. Later phototrophic bacterium *Rhodobacter sphaeroides* strain UMSPSB3 was grown in settled non-sterilized Palm Oil Mill effluent (POME). The growth characteristics of bacterium in term of dry cell weight and total carotenoids production, and reduction of COD were compared using 10%, 20% and 30% (v/v) levels of inoculum developed in synthetic 112 media. The optimum light intensity for the growth of *Rhodobacter sphaeroides* strain UMSPSB3 was 2.5 klux. The highest bacterial biomass (X_{max}) of 6.5 g/L (dry weight) and 72% reduction of COD were obtained after 96-h culture with 20% (v/v) inoculum level. The reduction of COD (%) and cell yield ($Y_{x/y}$, g cell/g COD) in POME were 82% and 0.98 respectively, after 96-h culture with 30% (v/v) inoculum. Production of carotenoids was comparatively low in bacterium using POME as substrate. Inoculum levels of 20-30% (v/v) developed in synthetic 112 media supported the growth of phototrophic bacterium in settled POME, but higher level of inoculum was required for faster removal COD from effluent. A 10% (v/v) level of inoculum in POME did not support the isolate to grow. Production of bacterial biomass with bioremediation of effluent could be achieved using POME as substrate with locally isolated *Rhodobacter sphaeroides* strain.