Production of natural colorants by filamentous fungi using baffled flasks

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Abstract:

Natural colorants, compared to synthetics ones, have fewer adverse effects and more acceptability by population. They can be obtained from sources like animals, plants and microorganisms. Inside the last source, the filamentous fungi are considered promising and studies related to the increment parameters of production are important to reduce the global cost and to accelerate their entrance in the consumer market. The aim of this work was investigate the red colorants (RC) production by submerged culture of *Penicillium Purpurogenum* in conventional Erlenmeyers flasks (without baffles) and with two, three and four baffles. To this purpose, the inoculum was prepared in Petri dish with Potato dextrose agar and incubated at 30ºC for 7 days. Following. Erlenmeyers flasks (500 ml) conventional and with two, three or four baffles and containing 50 mL of CYA liquid medium (K_2HPO_4 1g/L, yeast extract 11,8g/L, sucrose 48,5g/L, Czapeck concentrated 10ml/L) were inoculated with 5 mycelium disks (8mm diameter) and kept under orbital shaking at 150rpm/ 30°C for 216h. The samples were filtered and in the supernatant was determined: sugar concentration (DNS method), biomass (dry weight) and pH (potentiometric). The RC production was quantify by reading in spectrophotometer at 490 nm and expressed in units of absorbance (UA). It was calculated the RC productivity (P), cell yield ($Y_{X/S}$), RC yield on the basis of substrate consumed ($Y_{P/S}$) and the RC yield based on ($Y_{P/X}$). According to the results, the presence of baffles (independent of amount) not influenced the RC production. The RC production was 2.34 UA, 0.87 UA, 0.80 UA and 1.83 UA with 0, 2, 3 and 4 baffles, respectively. The productivity, $Y_{X/S}$, $Y_{P/S}$ and $Y_{P/X}$ in all conditions studied not presented significant difference considering the standard error. Nevertheless, the higher values were obtained in the experiment with conventional flasks: P = 0.0108 UA/h, $Y_{X/S}$ = 1.48 g/g, $Y_{P/S}$ = 0.06 g/g, $Y_{P/X}$ = 0.04 g/g. Although the baffles generate bigger friction between the microbial cells and facilitated the breakup of cells to product liberation, there was changed only at the cells morphology and no in the extracellular production. As conclusion, flasks Erlenmeyers with baffles not improved the production of red colorants by *P. purpurogenum* in submerged culture but it changes the cell morphology.

Keywords: red colorants, baffles, bioprocess

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