

## PHOTO-STIMULATION OF *Komagataeibacter xylinus* ATCC 700178 FOR PRODUCTION OF BACTERIAL CELLULOSE USING LIGHT-EMITTING DIODES (LEDS)



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### Eixo Temático

INOVAÇÃO E BIOTECNOLOGIA

### Palavras chave

KOMAGATAEIBACTER XYLINUS,  
RED AND BLUE LED,  
CELLULOSE PRODUCTION

Acetic acid bacteria such as *Komagataeibacter xylinus* are known to produce large amounts of cellulose. This extracellular polymer is synthesized as a pellicle that facilitates the access to nutrients and atmospheric oxygen, as well as protecting the bacteria against the harmful effects of UV light. The unique properties of bacterial cellulose, derived from its physico-chemical characteristics, make it a promising polymer in several application areas. Thus, the need to develop methods that increase its productivity and decrease its cost of production is very necessary. This work aims in this way, using Light Emitting Diodes (LEDs) as a promising tool to photo-stimulate the bacterium *K. xylinus* to increase the production of bacterial cellulose. Reference strain *K. xylinus* ATCC 700178 was obtained from the bacterial collection of the Laboratory of Food Analysis of the Universidade Estadual of Londrina (UEL) and the lighting was provided by red and blue colored LEDs (3.0W). The bacterium was cultured in Erlenmeyers containing Hestrin-Schramm standard medium (HS) and the photoperiods studied were: partial (12 h illuminated with LED: 12 h without illumination) and integral / continuous (24 h illuminated with LED). At the same time, controls without light exposure were also evaluated. After incubation for 14 days / 30 ° C in static conditions, the films formed were purified at 80 °C/30 min with alkaline solution (1M NaOH) and after, rinsed to neutral pH with distilled water. The pellicle were dried at 105 ° C and weighed for further productivity calculation in dry weight (g/L). Cellulose yield for red (0.91 g L ± 0.02) and blue (0.68 g/L ± 0.03) LEDs in partial photoperiod did not differ (p> 0.05) to their respective controls, 0.88 g/L ± 0.05 and 0.65 g/L ± 0.04. While in integral photoperiods it was observed that there was a significant reduction (p <0.05) of 17% (red LED) and 77% (blue LED) of cellulose production when compared to the control. The results showed that in the applied light doses, red and blue LEDs did not stimulate increased cellulose production by *K. xylinus* ATCC 700178, and that more targeted studies with lower doses should be performed in order to achieve the goal.