Microalgae have become study focus due to its biotechnological potential. Microalgae cultures have the purpose of obtaining natural compounds such as biopolymers. This compound concentration may vary in the biomass due to nutrients concentration in the culture media, nutrients as such carbon and nitrogen. This work objective was to stimulate Spirulina LEB 18 biopolymers synthesis utilizing different carbon sources. Cultures were carried in closed 2 L erlenmeyer photobioreactor under constant sterile aeration. Initial inoculum concentration was 0.15 g.L\(^{-1}\) and 1.5 L initial volume. Experiments were kept for 15 days in incubator at 30\(^\circ\)C, 2500 Lux of luminance with fluorescent lights and 12 h photoperiod. Several carbon sources were evaluated, and the nitrogen source was fixed to 10% of the concentration in Zarrouk media. The utilized carbon sources were sodium bicarbonate (8.4; 16.8 e 25.2 g.L\(^{-1}\)), glucose (0.2; 0.4 e 0.6 g.L\(^{-1}\)) and sodium acetate (0.2; 0.4 e 0.6 g.L\(^{-1}\)). Cellular grow was similar in the experiments, however, the microalgae Spirulina LEB 18 presented higher biopolymer percentage (44.2%) when the carbon source was sodium bicarbonate with a 8.4 g.L\(^{-1}\) concentration. The best results for biopolymer production were obtained while utilizing 50% of the Zarrouk media original carbon source as well as 10% of the nitrogen source, enabling high biopolymer productivity from microalgae.