

MICROBIAL PIGMENTS APPLIED TO INDUSTRY

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The world cosmetics consumption grows every year and Brazil is the 5th largest market in the world in makeup products, moving around 31 billion dollars and 6.9% of all world consumption and production just in 2017. One of the obstacles faced by this sector is the production of biosustainable cosmetics. Currently, the dyes used for cosmetic formulation are extracted from mineral sources, which creates risk of contamination of heavy metals. Another source is from vegetable pigment but it demands competition with land for the agricultural sector. The objective of this project is the development of a line of lipsticks for human use, free of heavy metals and formulated with biodegradable microbial pigments. Pigment-producing microorganisms are easily found in the environment and their production can be optimized through experimental planning of growth parameters such as temperature, pH, presence and intensity of illumination and nitrogen and carbon sources. *Serratia marcescens* is a non-pathogenic bacterium, known as the producer of the red pigment called prodigiosin. This pigment has been studied for its antimicrobial and antitumor properties, but it can be used as an alternative to traditional dyes. The *S. marcescens* sample used in the present study was isolated from soil with reference to the location of geographic coordinates -22.839407, -43.235034, identified by MALDI-TOF with a score higher than 2000 and grown in nutrient medium (peptone 5g/L, yeast extract 3g/L), then centrifuged at 4233g to isolate the pellet containing the cells with pigment. To extract the pigment from the culture medium with the cells, methanol (1:1/v/v) was used. The methanolic solution obtained was oven dried overnight at 50°C and resuspended in water. This aqueous solution was dried in lyophilizer to obtain a homogeneous powder of wine color. This powder was used in an oily lipstick formulation for the production of a prototype lipstick, which was evaluated for color stability and strength at room temperature 30°C. According to the literature, prodigiosin is safe for use on human skin, but further dermatological and cytotoxicity studies on keratinocytes and fibroblasts will be done to confirm the safety of this compound. This application is innovative for the sector of production of human cosmetics, with a non-toxic, biodegradable product and produced under controlled conditions from secondary microbial metabolites.

Key-words: prodigiosin, *Serratia marcescens*, lipstick, biocosmetics, cosmetics.

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