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INFLUENCE OF ABIOTIC FACTORS ON PIGMENT BIOSYNTHESIS BY Aspergillus sp. USING PLACKETT-BURMAN DESIGN

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There is growing interest in natural products that can replace synthetic dyes, due to the negative impacts of the latter on human health and the environment[1]. Fungi of the genus *Aspergillus* stand out for their production of natural and non-toxic pigments, such as asperversin (yellow), aspergilline (black), and auroglaucine (orange-red), representing a safe, renewable, and sustainable alternative[1]. In this context, this study aims to develop natural colorants from filamentous fungi and sought to identify the abiotic factors that influence the production of intracellular and extracellular pigments by *Aspergillus* sp., using the Plackett–Burman experimental design. The effects of carbon and nitrogen sources (sucrose, glucose, meat extract, yeast extract, and urea), the influence of the presence of copper and glycine, as well as the incubation time and the role of agitation in the fermentation process were evaluated. After 21 and 33 days, the media were vacuum filtered to separate the biomass from the fermented broth, in which the production of extracellular pigments was quantified by UV/VIS spectrophotometry (395 nm). To evaluate intracellular pigment production, the biomass was treated with absolute ethanol (0.2 g/mL), stirred for 48 h, and the resulting extract was analyzed by spectrophotometry under the same conditions, with all readings taken in triplicate. In extracellular production, the most relevant factors were incubation time (–0.0183) and glycine (–0.0040), both with a negative effect, indicating that prolonged cultivation periods together with addition of this amino acid reduces pigment biosynthesis in the liquid medium. In contrast, for intracellular production, incubation time (0.3894) on a fermentation containing yeast extract as nitrogen source (0.1081) stood out, both with positive effect, suggesting that longer incubation periods and the addition of yeast extract favors the accumulation of pigments in the biomass. These results provided relevant insights for optimizing the fermentation process and scaling up the production of natural pigments from the fungal species studied, with the aim of developing alternative colorants for the food industry, in line with demands for safer, more sustainable, and environmentally viable products for food industry. The authors acknowledge the financial support provided by CNPq.

Keywords: *Pigment biosynthesis; Experimental designs; Plackett–Burman; Aspergillus sp.*

References

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