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## P1.51 - USING AGRO-INDUSTRIAL BYPRODUCTS FOR A MORE SUSTAINABLE PRODUCTION OF NATURAL PIGMENTS

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### ABSTRACT

Pigments have a vast record of enhancing product appeal in industries like food, cosmetics, textiles, pharmaceuticals, and tanneries. A shift towards eco-consciousness has fueled the demand for biocompatible, natural pigments, prompting interest in microbial fermentation. Filamentous fungi, particularly *Penicillium* species, stand out as promising pigment producers. Recently, we have demonstrated that a *Penicillium* strain is able to produce different pigment mixtures under different fermentation conditions and culture media [1], [2]. Using agro-industrial byproducts, such as cheese whey and corn steep liquor, as substrates for microbial growth can be a sustainable approach to reduce production costs and byproduct accumulation. Both cheese whey and corn steep liquor are rich in valuable nutrients and were shown to enhance pigment production when used as medium supplements [1]. In this work, we present a comparative study involving three fermentation types (submerged, submerged with biomass immobilization, and solid-state fermentation) and employing two distinct culture media (synthetic medium composed of commercial substrates (A), and an alternative medium only composed of cheese whey and corn steep liquor (B)). Notably, we found that, under submerged fermentation either with free or immobilized biomass, the alternative medium (B) provides similar results in terms of pigment production to the reference synthetic medium (A). These results show that it is possible to obtain a value-added product exclusively using agro-industrial byproducts, which not only decreases the associated production costs but also contributes to the circular economy. Moreover, we describe a more sustainable approach to obtain natural pigments, which can also help to address environmental concerns, ethical issues, and/or consumer demands raised against synthetic pigments.

### References:

[1] B. Basto, N. R. da Silva, J. A. Teixeira, and S. C. Silvério, "Production of Natural Pigments by *Penicillium brevicompactum* Using Agro-Industrial Byproducts," *Fermentation*, vol. 8, no. 10, p. 536, Oct. 2022, doi: 10.3390/FERMENTATION8100536.

[2] C. S. Fonseca *et al.*, "*Penicillium brevicompactum* as a novel source of natural pigments with potential for food applications," *Food Bioprod. Process.*, vol. 132, pp. 188–199, Mar. 2022, doi: 10.1016/j.fbp.2022.01.007.

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