Università degli Studi di Napoli Federico II

PhD in Biotechnology - 39th cycle

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Production and characterization of biobased materials functionalised with microbial melanin

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Melanin acts as pigment in humans, animals, plants, fungi, and bacteria [1, 2]. it has high thermal stability, good UV-visible light absorption and metal ion chelating abilities, hybrid ionic-electronic conductance, antioxidant, and redox properties. It also shows good antimicrobial actions, biocompatibility, biostability, no cytotoxicity and no antigenic response [3], so that it can be employed in various fields. Melanin is currently produced by extraction from animal sources, in not environmentally friendly ways [4]. The current PhD project aims to optimize the biotechnological production of melanin by *Streptomyces* strains and then to employ the pigment to functionalize biobased materials for different applications. To optimize the melanin production the physiological conditions and the supplemention of metal ions and lignocellulose substrates to the medium will be explored. After purifying and characterizing melanin, biobased materials will be obtained by incorporating the pigment into various protein and polysaccharide matrixes, as chitosan, pectin, or even microbial polysaccharides. Considering the melanin properties, these materials will be tested for protecting foods from oxidation, microbial contamination, and heavy metal exposure. Additionally, hydrogels containing melanin will be prepared for potential applications in drug delivery, cosmetics, and wound healing.

References

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