



**Università degli Studi di Napoli Federico II**

**PhD in Biotechnology - 37<sup>th</sup> cycle**

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**Bacterial Cellulose Nanoparticles (BCNPs) as an effective vehicle to deliver Host Defence Peptides (HDPs): from food waste to high value products**

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Since microbial resistance to antibiotics is strongly established worldwide, novel natural compounds are investigated to counteract microbial growth and spread. Among them, Host Defence Peptides (HDPs) are proposed as alternative drugs because of their wide range antimicrobial and anti-biofilm properties and because of the low probability to induce resistance phenotype associated to their employment [1]. However, one of the main limits to their industrial applicability is represented by their fast degradation. For this reason, several protective scaffolds have been proposed. Among others, cellulose represents a promising material for its abundancy, biocompatibility and stability. Moreover, cellulose can be produced by bacterial fermentation of waste materials, a promising process that must be improved to reduce the production costs [2]. The main aim of the present PhD project is the production of a versatile smart and antimicrobial biomaterial consisting of selected HDPs and bacterial cellulose nanoparticles. To this purpose, bacterial cellulose will be produced by a sustainable biotechnological process that could lead from wasted material to a high value product.

**References**

[1] Browne, K. et al. (2020), International Journal of Molecular Sciences.

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[2] Kadier, A. et al. (2021), Polymers. Multidisciplinary Digital Publishing Institute.

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