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Assessment of the Viability of Antimicrobial Peptides as Gamma Ionizing Radiation Sensitive Materials in Nuclear Applications

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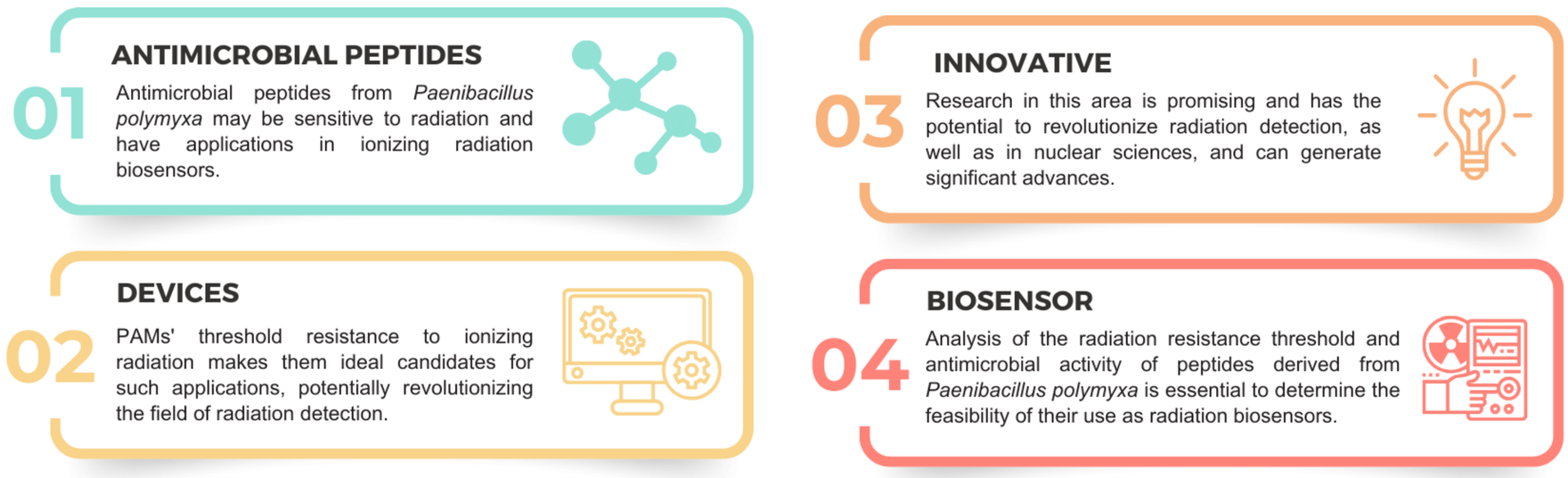
Introduction

The convergence between nuclear science and antimicrobial peptides (AMPs) opens new perspectives in multidisciplinary research. This study aims to explore the potential of AMPs derived from the fermentation process using the bacterium *Paenibacillus polymyxa*, subjecting them to ionizing radiation from gamma nuclear sources. Evaluation of antimicrobial activity before and after radiation exposure seeks to identify their potential applications, including radiation-sensitive materials in biosensors for precise measurements of gamma radiation levels.

Results and Discussion

The present study investigated the interaction of gamma ionizing radiation with antimicrobial peptides derived from the bacterium *Paenibacillus polymyxa.* The results obtained so far indicate that the peptides have a threshold of tolerance to gamma ionizing radiation, conserving their antimicrobial activity after exposure. This promising characteristic makes them potential candidates to be used as sensitive materials in biosensors in order to detect gamma ionizing radiation.

Figure 01 - Main points.



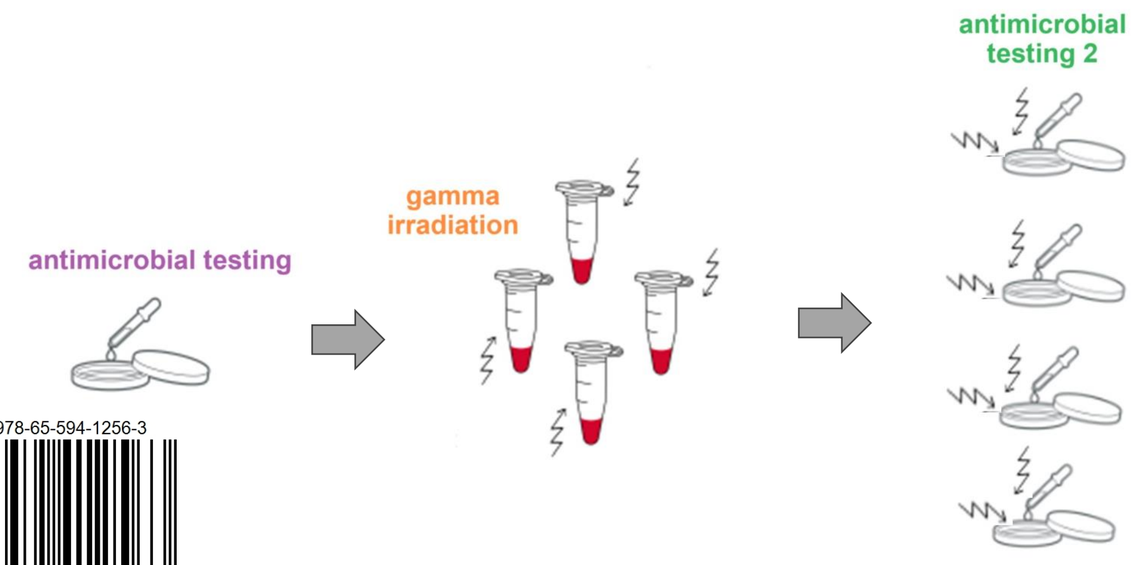
Source: prepared by the author, 2024.

Methodology

The use of antimicrobial peptides involves a multi-stage methodology due to its complexity and wide range of applications.

To evaluate the antimicrobial activity of the peptide, analysis procedures are performed before and after irradiation of the antimicrobial peptide (AMP) with gamma radiation.

Figure 02 - Schematic representation of the methodology.



Source: prepared by the author, 2024.

Conclusion

This multidisciplinary approach offers opportunities to address critical issues such as nuclear security, radiobiology, and detection, with the ultimate goal of providing innovative solutions to contemporary challenges associated with radiation and security.

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