
Nanobiotics Development: Utilizing Natural Resources to Improve Therapeutic Efficacy

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Antibiotic resistance presents a significant challenge in the search for new therapeutic agents, making the development of effective alternatives essential. This presentation focuses on using natural compounds to enhance therapeutic efficacy, with a particular examining tropolone, betha-thujaplicin, carvacrol, thymol, and chlorothymol.

Tropolone and betha-thujaplicin, derived from natural sources, exhibit significant antioxidant and potential but faces challenges such as low solubility and thermal instability. Similarly, carvacrol and thymol, both found in thyme oil, possess antibacterial properties; however, their low bioavailability and volatility pose a challenge.

To address these limitations, lipid-based nanocarriers utilizing high-pressure homogenization techniques were prepared. Comprehensive characterization including particle size, zeta potential, and encapsulation efficiency indicated that these nanocarriers exhibited higher encapsulation efficiency and stability. Our study further investigated the antimicrobial activity of these nanobiotics against clinically isolated microorganisms, revealing significant differences in antimicrobial efficacy among the bioactive compounds. These compounds showed potential against antibiotic-resistant strains, highlighting their role as alternative therapeutic agents in an era of increasing antibiotic resistance.

This work highlights the potential of utilizing natural resources to develop novel nanobiotic treatment that can effectively address various health challenges, particularly in resistant microbial infections.

Keywords: nanoemulsions, nanostructured lipid carriers, antimicrobial, thymol, chlorothymol, carvacrol, tropolone, betha-thujaplicin

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