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C_{60} enabled nano antibiotics for treating multi drug resitance

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The objective of this research is to design, synthesise and tailor a nanoparticle-antibiotic complex capable of a multi-targeted approach to MDR pathogenic bacterial infections. A C_{60} fullerene complexed with ampicillin had been designed and characterised via SEM, PDI, DLS, Zeta potential, UV-Vis, Raman and IR. Post-synthesis the complex was tested against several strains of bacteria, pathogenic and non-pathogenic with some positive results. The complex could reduce the quantity of ampicillin to inhibit bacterial growth. The focus of my presentation is based on the spectroscopic results obtained via UV-Vis and Raman analysis. Using Origin 8.5 software I could deconvolute the spectra to obtain hidden peaks which aren't usually visible as the devices smoothing function convolutes it. As a result, I could observe some very key characteristics about the complexes growth and potential point of binding. This was the potential π-π stack formation between the π electrons on the C_{60} nano system and the aromatic ring on the ampicillin molecule. The deconvoluted Raman spectra from C_{60} and ampicillin showed a drastic change in the aromatic region. The UV-Vis also showed a change in the nano region, hypochromic. This is mainly C_{60}-C_{60} interactions which seems to suggest π π stack. The Raman and UV-vis show a drastic change in regions that could constitute a π-π stack. Couple this with the increase in stability *via* zeta and DLS particle growth would seem to suggest a π - π system.

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