

## OE5) Novel Bio Active Pigment Fabricated Electrospun Hybrid Mat for Enhanced Antimicrobial Activity *via* Generation of Reactive Oxygen Molecule

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A mixture nanofibrous membrane containing of polyurethane, dextran and redox-active bio pigment natural compound (pyocyanin) with 1 wt% are facilyly obtained using direct conventional horizontal electrospinning method. The Field Emission Scanning Electron Microscopy (FE-SEM) showed that bead-free smooth round fibers with crumpled surface morphology for the pyocyanin-loaded membranes. The roughness of the membranes was increased after incorporation of pyocyanin which was perceived through Atomic Force Microscopy (AFM). The addition of pyocyanin has turned the hybrid membrane into hydrophilic. Further, the thermal behaviours and mechanical stability of hybrid membranes was investigated. Hybrid fibers containing pyocyanin showed an initial burst release and further sustained release profile. The antibacterial test revealed that membranes mixed with pyocyanin were effective in inhibiting the 98.54% and 90.2% growth of E.coli and S. aureus. The sustainable release of pyocyanin from fibers significantly declined the viable cell number. The physical contact of hybrid membranes with bacteria caused cell shrinkage and disrupts the cells morphology. The pyocyanin incorporated with fibers was found to stimulate the oxidative stress through the intracellular ROS generation. Further, FACS was performed to confirm the apoptotic cell death due to oxidative stress. Hence, the hybrid pyocyanin nanofibers meet the increasing demand for efficient antimicrobial material in various applications like disinfectant wiping, food packaging and protective textile industries.

### References

- El-Zawawy, N. A., Ali, S. S., 2016, Pyocyanin as anti-tyrosinase and anti tinea corporis: A novel treatment study. *Microb. Pathog*, 100, 213-220, DOI: 10.1016/j.micpath.2016.09.013.
- Sill, T. J., von Recum, H. A., 2008, Electrospinning: applications in drug delivery and tissue engineering. *Biomaterials*, 29, 1989-2006, DOI: 10.1016/j.biomaterials.2008.01.011.