Bioprospecting of Novel Sunscreen- and Plastic-Degrading Fungi in Tannin-Rich Coconut Fiber

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Sunscreen and plastic pollution are widespread and pervasive in ocean waters, stressing marine life through chronic exposure. Previous studies have demonstrated certain fungi have the ability to degrade sunscreen toxins and plastic polymers, yet have not been utilized for bioremediation purposes. Building on a two-year engineering project using coconut husk fiber as an ocean water filtration medium, this research tested whether fungi native to coconut husks can help biodegrade these pollutants. In addition, the natural concentrations of tannin (polyphenolic plant compounds known for their antimicrobial effects) found in coconut husk were tested for selective enrichment of stress-tolerant fungi. Four coconut fiber extracts of high and low tannin were inoculated onto sunscreen and plastic media to test fungal growth on each substrate. More than 50 fungal isolates were recovered from the pollutant media, with a greater abundance of pollutant-degrading fungi grown from the high tannin fiber extracts. A subset of isolates were then analyzed for growth rates on pollutant media. Overall, these results support a novel, tannin-driven environmental selection as a practical strategy to enrich and identify fungi that interact with sunscreen and plastic.

Awards Won:
Third Award of $1,200