

MANGROVE-ASSOCIATED *KOCURIA FLAVA* PUTS1_3 AS A POTENTIAL FUNCTIONAL PIGMENT PRODUCER FOR THE TEXTILE INDUSTRY

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Kocuria flava is a Gram-positive coccus known for its yellow carotenoid pigments. Carotenoids can have potential biotechnological applications, especially in the textile industry. The current study was conducted to isolate and characterise the carotenoids produced by *K. flava* PUTS1_3. Further, the antibacterial potentials of the crude pigment and dyed fabrics were evaluated. PUTS1_3 was isolated from the sediments of the Puttalam mangrove forest, and 16S rRNA sequencing results revealed its close relation to *Kocuria flava* (GenBank accession no: OQ 442354.1). Isolate was grown in nutrient broth supplemented with 1.5% dextrose, and after 5-7 days of incubation, the pigment was extracted using methanol. UV-visible spectroscopy, Thin Layer Chromatography (TLC) and column chromatography were conducted to characterize and purify the pigment. Antibacterial activity of the pigment extract of the bacterium was tested against six standard bacterial cultures (three Gram positives and three Gram negatives), by the agar well diffusion assay. The application of the pigment in the textile industry was investigated by dyeing ten types of fabrics, each exhibiting different dyeing abilities depending on the fibre type. The antibacterial activity of the dyed fabrics was analyzed according to the ISO 20645:2004 method against *Staphylococcus aureus* and *Escherichia coli*. UV-visible analysis confirmed the presence of carotenoids with three absorption maxima at 409 nm, 437 nm, and 466 nm. Three spots were observed (Rf of 0.88, 0.78 and 0.61) in the TLC analysis conducted using butanol: ethanol: water (9:1:2) solvent system. Pigment extracts resulted in inhibitory zones against *Bacillus subtilis* ATCC 6633 (14.89±0.16 mm), *Staphylococcus aureus* ATCC 25923 (15.55 ± 0.32 mm), and *Listeria monocytogenes* NCTC 11994 (17.00 ± 0.00 mm). The dyed fabrics showed a good antibacterial effect against *S. aureus* and a limited effect on *E. coli*. In conclusion, mangrove isolate *K. flava* PUTS1_3 holds potential as an antibacterial pigment producer for the textile industry.

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