UV-PROTECTIVE NANO FINISHED FABRICS USING INDIAN SQUID
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INTRODUCTION:
Repeated exposure to ultraviolet radiation (UVR) influences the function and survival of many cell types to induce skin cancer in human being and is also responsible for the reduced shelf life of the fabric we wear. Melanin is known to protect our skin by absorbing broadband UV radiation and act as important photo-protective factor. Hence, melanin was recovered from the ink sac of the Indian squid available along the Coastal Karnataka by optimising suitable working environment factors, product release conditions, insoluble removal parameters, and product purification conditions. Here, 0.1 M Tris–HCl buffer of pH 6.8 is a suitable homogenisation buffer due to its solubility at pH 6.8. Operating pestle speed of 3000 rpm for 10 min at 15 passes/min of the tissues at 4°C through the Teflon pestle and glass mortar is optimum to release melanin from the ink sac. RCF of 1681.1×g for 5 min is effective in clarifying the tissue homogenate. Chloroform:methanol extraction method at 8:4:3 (by volume) of Chloroform, methanol and water can in one hand reduce bulk of volume of the tissue homogenates and on the other hand can optimally purify melanin. The melanin at 1% was soluble in solutions at and beyond pH level 8. Bleaching of the melanin in test samples in 1% bromine water, 10% hydrogen peroxide and 1% KMnO4 in comparison to the blank solutions are the presumptive evidence for melanin.

UV-Vis spectral analysis showed that Indian squid melanin exhibits a high absorption throughout UV-Vis-NIR range and this lead it to an effective candidate for UV absorbent finish for cotton fabric. FTIR analysis of the melanin reveals the existence of functional groups such as C-H, COOH, and N-H that can be responsible for the binding sites of different metallic ions leading to many new applications. Based on this finding in FTIR we conclude that the resulted pigment is Eumelanin, as other types lack nitrogen. It was found that squid melanin is made of aggregate of spherical particles having about 50-150 nm in diameter. Nan finished cotton fabric with squid melanin at single, triple and multiple coating showed additional two prominent peaks at 2360.87 cm⁻¹ and 1022.27 cm⁻¹ and decrease in signals at 1579.70, 1519.91 cm⁻¹ indicates the optimum binding of melanin on cotton fabric in triple coat. Hence, squid ink Eumelanin is an effective UV absorbent that can ne nano finished on cotton fabric that can be used as protect ourselves from the UV irradiation and also to protect fabric degradation by UV.

OBJECTIVE:
1. To isolate melanin from squid ink sac at different homogenization speed using buffer of different pH.
2. To remove insoluble from the homogenate at different Relative Centrifugal Force.
3. To extract melanin from other impurities using Chloroform: methanol extraction method.
4. To optimize the nano coating of purified melanin on cotton fabric.
5. To characterize purified melanin and nanofinished cotton fabrics using bleaching test, solubility test, Scanning Electronic Microscope (SEM), Fourier transform infrared spectroscopy (FTIR), UV spectrophotometer.

**METHODOLOGY:**

- Sample collection
- Homogenization
- Clarification
- Extraction
- Product Drying Techniques
- Product Preparation
- Solubility Test, bleaching test, Absorption spectra analysis
- Nano-Finishing of Cotton Fabric Using Squid Melanin

**CONCLUSION:**

Repeated exposure to ultraviolet radiation (UVR) influences the function and survival of many cell types to induce skin cancer in human being and is also responsible for the reduced shelf life of the fabric we wear. Melanin is known to protect our skin by absorbing broadband UV radiation and act as an important photo-protective factor. Hence, melanin was recovered from the ink sac of the Indian squid available along the Coastal Karnataka by optimizing suitable working environment factors, product release conditions, insoluble removal parameters, and product purification conditions. Here, 0.1 \( M \) Tris–HCl buffer of pH 6.8 is a suitable homogenisation buffer due to its solubility at pH 6.8. Operating pestle speed of 3000 rpm for 10 min at 15 passes/min of the tissues at 4°C through the Teflon pestle and glass mortar is optimum to release melanin from the ink sac. RCF of 1681.1×g for 5 min is effective in clarifying the tissue homogenate. Chloroform: methanol extraction method at 8:4:3 (by volume) of Chloroform, methanol and water can in one hand reduce bulk of volume of the tissue homogenates and on the other hand can optimally purify melanin.

The melanin at 1% was soluble in solutions at and beyond pH level 8. Bleaching of the melanin in test samples in 1% bromine water, 10% hydrogen peroxide and 1% KMnO4 in comparison to the blank solutions are the presumptive evidence for melanin. UV-Vis spectral analysis showed that Indian squid melanin exhibits a high absorption throughout UV-Vis-NIR range and this lead it to an effective candidate for UV absorbent finish for cotton fabric. FTIR analysis of the melanin reveals the existence of functional groups such as C-H, COOH, and N-H that can be responsible for the binding sites of different metallic ions leading to many
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Nan finished cotton fabric with squid melanin at single, triple and multiple coating showed additional two prominent peaks at 2360.87 cm\(^{-1}\) and 1022.27 cm\(^{-1}\) and decrease in signals at 1579.70, 1519.91 cm\(^{-1}\) indicates the optimum binding of melanin on cotton fabric in triple coat. Hence, squid ink Eumelanin is an effective UV absorbent that can be nano-finished on cotton fabric that can be used as protect ourselves from the UV irradiation and also to protect fabric degradation by UV.

**FUTURE WORK:**

Squid ink Eumelanin is an effective UV absorbent that can be nano finished on cotton fabric that can be used as protect ourselves from the UV irradiation and also to protect fabric degradation by UV. There is lots of scope for further research in this area.