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Scientist at CIAB developed sunscreen from agricultural waste using environment friendly method

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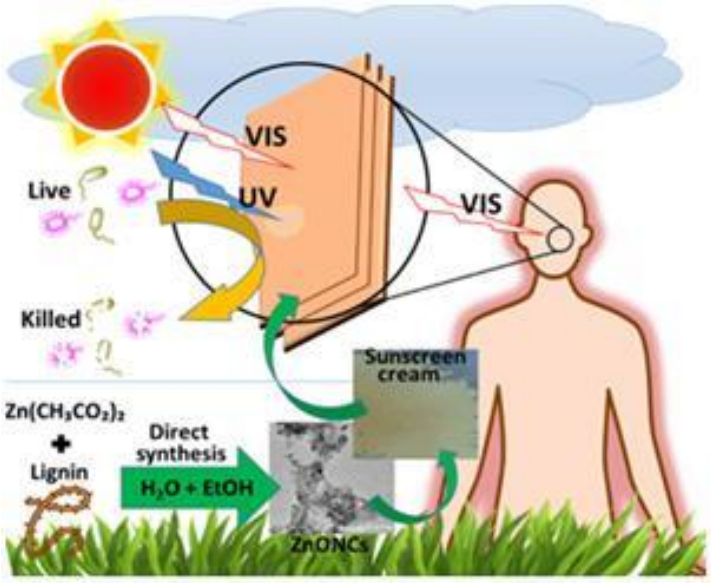
Scientists at Mohali based research institute, the Center of Innovative and Applied Bioprocessing (CIAB) have made a breakthrough by converting agro-waste derived lignin into useful metal oxide nano-composites used in antimicrobial sunscreen. In this study, the lignin, which is otherwise considered as a waste, has been converted into a value added product.



Sunscreen formulations developed from agri-waste

Lignin is a natural organic biopolymer rich in polyphenolic groups which make it an ideal candidate for various industrial applications. Lignin is a byproduct of paper and pulp industry, and it is also extracted from wheat and rice husk. It is often thrown into water bodies or openly burnt in field at end of crop harvest. In the present study, the lignin offered an easy and sustainable synthesis of zinc oxide nano-composites in the water-ethanol composition. The synthesis did not involve any toxic solvent or catalyst, thus, making the process environment-friendly.

Lignin-based nano-composites have commercial value because of its UV protective, antioxidant and antimicrobial properties. The ZnO nanoparticles were synthesized using Kraft and alkali lignin as a sole capping and reducing agent. Only the zinc oxide precursor salt and the lignin were used for nano-composite synthesis.

Usually synthesis of metal oxide nanoparticles requires harsh techniques including toxic chemicals as well as heating at very high temperature (300-400°C). However, scientists at CIAB used a simple, green and industrially feasible method to design lignin-based ZnO nanoparticles. Scientists used agro-waste based lignin to convert ZnO in a single step into nano-composites with promising UV protective and antimicrobial potential. Such nano-composites showed broad range antimicrobial activity against both Gram positive- and Gram negative bacteria.

The lignin derived nano-formulations showed excellent UV- protective efficiency when used as an additive in a commonly used body creams. They are expected to find potential applications as UV-blocking and antimicrobial ingredients for use in versatile industrial products. The research work has been published in the *Journal of Materials Chemistry* B.

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