

Exploring Paper Mill Sludge and Sugarcane Bagasse as Carrier Matrix in Solid State Fermentation for Carotenoid Pigment Production by *Planococcus* sp. TRC1

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Abstract : Bacterial isolates from *Planococcus* genus are known for the production of yellowish orange pigment that belongs to the carotenoid family. These pigments are of immense pharmacological importance as antioxidant, anticancer, eye and liver protective agent, etc. The production of this pigment in a cost effective manner is a challenging task. The present study explored paper mill sludge (PMS), a solid lignocellulosic waste generated in large quantities from pulp and paper mill industry as a substrate for carotenoid pigment production by *Planococcus* sp. TRC1. PMS was compared in terms of efficacy with sugarcane bagasse, which is a highly explored substrate for valuable product generation via solid state fermentation. The results showed that both the biomasses yielded the highest carotenoid during 48 hours of incubation, 31.6 mg/gm and 42.1 mg/gm for PMS and bagasse respectively. Compositional alterations of both the biomasses showed reduction in lignin, hemicellulose and cellulose content by 41%, 15%, 1% for PMS and 38%, 25% and 6% for sugarcane bagasse after 72 hours of incubation. Structural changes in the biomasses were examined by FT-IR, FESEM, and XRD which further confirmed modification of solid biomasses by bacterial isolate. This study revealed the potential of PMS to act as cheap substrate for carotenoid pigment production by *Planococcus* sp. TRC1, as it showed a significant production in comparison to sugarcane bagasse which gave only 1.3 fold higher production than PMS. Delignification of PMS by TRC1 during pigment production is another important finding for the reuse of this waste from the paper industry.

Keywords : carotenoid, lignocellulosic, paper mill sludge, *Planococcus* sp. TRC1, solid state fermentation, sugarcane bagasse

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