

## **Biosurfactant: A Greener Approach For Enhanced Concrete Rheology And Strength**

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**Abstract :** Concrete is essential for global infrastructure, yet enhancing its rheology and strength in an environmentally sustainable manner remains a significant challenge. Conventional chemical admixtures often pose environmental and health risks. This study explores the use of a phospholipid biosurfactant, derived from *Rhizopus oryzae*, as an environmentally friendly admixture in concrete. Various concentrations of the biosurfactant were integrated into fresh concrete, partially replacing the water content. The inclusion of the biosurfactant markedly enhanced the workability of the concrete, as demonstrated by Vertical Slump, Slump Flow, and T50 tests. After a 28-day curing period, the concrete's mechanical properties were assessed through compressive strength and bonding tests. Results revealed that substituting up to 10% of the water with the biosurfactant not only improved workability but also significantly increased both compressive and flexural strength. These findings highlight the potential of phospholipid biosurfactant as a biodegradable and non-toxic alternative to traditional admixtures, enhancing both structural integrity and sustainability in concrete. This approach reduces environmental impact and production costs, marking a significant advancement in sustainable construction technology.

**Keywords :** concrete rheology, green admixture, fungal biosurfactant, phospholipids, *rhizopus oryzae*

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