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Medium Optimization for Enhanced Biomass Production of *Bacillus Sp.*

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Abstract :

Single cell protein (SCP) refers to the dried cells of microorganisms such as algae, yeast and bacteria that are used as protein supplements in human food and animal feeds. Among bacteria, *Bacillus subtilis* has been utilized as SCP and probiotic in aquafeeds and confers growth and immune benefits to many farmed fishes. Despite the nutritional value, low biomass yield of bacteria has been a challenging factor in SCP production. Statistical medium optimization is an excellent method for increasing biomass production of microorganism using mathematical models. In the present study, biomass production of a probiotic strain *B. subtilis* was optimized using statistical methods. For optimization, the effects of medium components were initially screened using Plackett-Burman design. ANOVA was performed to evaluate the statistical significance of the model. Among the components, glucose and yeast extract were found to have significant influence on the biomass yield of bacteria ($p<0.05$). Further optimization was done with Response Surface Methodology (RSM) and the model indicated that individual and synergistic effectsof glucose and yeast extract were highly significant on biomass yield ($p<0.05$).Coefficient of determination (R^2 =0.9477) showed that the