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Cost effective production and applications of levan from *Acetobacter xylinum* NCIM 2526 using synthetic and complex medium

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Levan is a homopolymer of fructose naturally obtained from both plants and microorganisms. Microbial levans are more advantageous, economical and industrially feasible. Microbial levans have wide range of applications in food, medicine, pharmaceutical, cosmetic and commercial industrial sectors. With excellent polymeric medicinal properties and ease of production, microbial levan appear as a valuable and versatile biopolymer of the future. Inspite of its broad spectrum of applications, the industrial usage of levan is very limited due to the high cost of production processes. The present study demonstrates the economically feasible microbial production of levan by batch fermentation process both in sucrose rich medium and pretreated sugar cane molasses (SCM) using *Acetobacter xylinum* NCIM 2526. Further the present study also focused on the optimization of levan production in synthetic medium using one factor at a time approach followed by a statistical method, central composite design (CCD) with selected variables. Neural networks coupled genetic algorithm was applied to optimize the four key fermentation parameters in SCM; medium pH, inoculum concentration, amount of Ammonium bicarbonate and amount of initial levan for levan yield. The produced Levan was characterized using various physicochemical techniques such as FTIR, ¹H NMR, ¹³C NMR spectroscopy, TGA and HPLC. The biomedical potential of the isolated *A. xylinum* levan for its anti-oxidant and anti-inflammatory activities was exploited *in vitro*. The yield of levan was increased significantly from 0.54 to 13.25 g/L in sucrose containing medium and from 17.1 g/L to 122.24 g/L in SCM with the optimized variables.

Biography

Kiran Babu Uppuluri has completed his PhD from Andhra University in biopharmaceutical technology. He has published more than 20 papers in reputed journals and serving as an Associate Professor at SAstra University, Thanjavur. His expertise covers the area of modeling, design and optimization of biopharmaceutical production. He has expertise in bioprocess development, mechanism of action of pharmaceuticals and formulation of biologicals. He received a young scientist award from department of science and technology, government of India in 2013. He is currently funded by the DST India on two projects "Serine protease inhibitors production" and "biohydrogen production".

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