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Fructooligosaccharide Prebiotics: Optimization of Different Cultivation Parameters on Their Microbial Production

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Abstract : Recently, a great attention has been paid to the use of dietary carbohydrates as prebiotic functional foods. Among the new commercially available products, fructooligosaccharides (FOS), which are microbial produced from sucrose, have attracted special interest due to their valuable properties and, thus, have a great economic potential for the sugar industrial branch. They are non-cariogenic sweeteners of low caloric value, as they are not hydrolyzed by the gastro-intestinal enzymes, promoting selectively the growth of the bifidobacteria in the colon, helping to eliminate the harmful microbial species to human and animal health and preventing colon cancer. FOS has been also found to reduce cholesterol, phospholipids and triglyceride levels in blood. FOS has been mainly produced by microbial fructosyltransferase (FTase) enzymes. The present work outlines bioprocess optimization for different cultivation parameters affecting the production of FTase by Penicillium aurantiogriseum AUMC 5605. The optimization involves both traditional as well as fractional factorial design approaches. Additionally, the production process will be compared under batch and fed-batch conditions. Finally, the optimized process conditions will be applied to 5-L stirred tank bioreactor cultivations.

Keywords : prebiotics, fructooligosaccharides, optimization, cultivation
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