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Effect of mass transfer and characterisation of aeration & agitation in xanthan gum production using oxygen vector

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Oxygen mass transfer represents the most important parameter involved in the design and operation of mixing-sparging equipment in bioreactors. It can be described and analyzed by means of the mass transfer coefficient, k_La. The k_La values are affected by many factors such as geometrical and operational characteristics of the vessels, microorganism morphology, biocatalysts properties, composition, type & concentration of media.

Oxygen mass transfer rate have been studied during xanthan gum production process in stirred tank bioreactor. The volumetric mass transfer coefficient, k_La, has been measured by dynamic technique in solution of xanthan gum for a wide interval of operational condition. This coefficient has been determined changing many variables such as air flow rate, agitation speed, and superficial velocity. The efficiency of oxygen transfer could be enhanced by adding oxygen-vectors in broths, such as hydrocarbons or fluorocarbons, without increasing the energy consumption for mixing or aeration. The work was aimed at investigating the mass transfer effects of xanthan gum production by using oxygen vectors from Xanthomonas campestris. Since the solubility of oxygen is very low in fermentation broth, it becomes a growth-limiting substrate the for xanthan gum production. The use of oxygen vectors will enhance the oxygen solubility should necessarily increase the k_La and hence oxygen transfer rate (OTR). In this work, the effect of oxygen vector n-dodecane on the xanthan gum production was compared with that of control without oxygen vector. Experimental results obtained for simulated broths indicated a considerable increase of k_La in the presence of n-dodecane, and the existence of a certain value of n-dodecane concentration that corresponds to a maximum mass transfer rate of oxygen.

Biography

K. Vasantharaj has completed his post graduation M.Tech from SASTRA University. He has published 2 papers in the reputed journal. He has participated & presented more than 9 International & National symposiums during his academic. He holds a rank in the Graduate Aptitude Test for Engineering 2012 (Biotechnology).

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Bioremediation - Comparison of degradation of petroleum hydrocarbons using Pseudomonas isolated from oil contaminated soil versus Pseudomonas incorporated into a vector

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Soil, especially from oil field has posed a great hazard for terrestrial and marine ecosystems. The traditional treatment of oil contaminated soil cannot degrade the crude oil completely. So far, biodegradation proves to be an efficient method. During biodegradation, crude oil is used as the carbon source and addition of nitrogenous compounds increases the microbial growth, resulting in the effective breakdown of crude oil components to low molecular weight components. The objective of this project work is to evaluate the biodegradation of crude oil by Pseudomonas aeruginosa. Pseudomonas aeruginosa, an oil degrading microorganism also called as hydrocarbon-utilising microorganism (or "HUM" bug) can utilise crude oil as sole carbon source. In this study, the biodegradation of crude oil is being conducted with modified mineral basal salt medium and nitrogen sources added to increase the degradation. The efficacy of the isolated strain degrading the crude oil was finally evaluated by FT-IR and GC-MS analysis in which efficient degradation of oil into was found.

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