

OPTIMIZATION OF CULTURE CONDITIONS FOR PRODUCTION OF PNEUMOCOCCAL CAPSULAR POLYSACCHARIDE TYPE I

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Streptococcus pneumoniae (pneumococcus), the most common cause of bacterial pneumonia, has an ample polysaccharide(PS) capsule that is highly antigenic and is the source of PS vaccine. This investigation was undertaken to optimize the culture conditions for the production of capsular PS by type 1 pneumococcus. Among several culture media, brain heart infusion (BHI) and Casitone based media were found to support luxuriant growth of pneumococcus type 1 at the same level. Because BHI medium is rather expensive and more complex than the Casitone based media, the Casitone based media was used to study optimization of the culture condition. The phase of growth which accomodated maximum PS production was logarithmic phase. Concentrations of glucose greater than 0.2% did not enhance growth or PS production. Substitution of nitrogen sources with other resources or supplementation of various concentrations of metal ion (with the exception of calcium ion) had adverse effects on growth and PS production. On the other hand, low level aeration was beneficial for increased PS production. Addition of 3 mg/l concentration of methionine, phenylalanine, and threonine were found to enhance growth and PS production. The synergistic effect of all the favorable conditions observed in pneumococcal growth assays provided a two-fold cumulative increase in capsular PS production.