

# Influence of nutritional and environmental conditions on the biofilm formation of bacterial isolates of oral cavity and probiotics

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## ABSTRACT

**Introduction:** Microbial cells that produce Extracellular Polymeric Substances (EPSs) encounter a transition from planktonic phase into an organized mass/aggregates within this biofilm and become resistance to antimicrobial substances. *Streptococcus mutans* in the oral cavity forms biofilm and secretes chemicals that results in dental caries and diseases associated with gum. Recent studies state that probiotic bio-therapeutics can decrease oral pathogens including caries-causing *Streptococcus mutans* and oral inflammation. Current study aims to screen biofilm forming bacteria from oral cavity of infected adult individuals and commercially available probiotic capsules and study the effect of various physiological conditions like nutrients, NaCl, pH and temperature on the biofilm forming efficacy of the isolates. **Materials and methods:** Bacteria were isolated from oral cavity of adult individual and probiotic capsules using Congo red agar plate method. Biofilm production of these isolates were tested under various physiological conditions like sucrose (2%, 5%, 10%), amino acids (Tryptophan and Leucine), NaCl (15%, 2%, 5%), pH (4, 7, 9) and temperature (4°C, 25°C, 37°C) by tube method and micro titre plate method. **Results and conclusion:** Among 25 isolates, isolates A1 from the oral cavity of the adult individual and LS from probiotic showed maximum growth at 10% sucrose. Amino acid tryptophan induced more biofilm formation than leucine. All the isolates showed high level of biofilm formation at 5% NaCl. Isolate LS produced increased biofilm at pH 4 while A1 showed increased biofilm at pH7. Both the isolates showed better biofilm production at 25°C. Staining and biochemical tests revealed that the isolates A1 was gram positive, non-motile, non-spore forming *Streptococcus* sp. and isolate LS was gram positive, spore forming *Lactobacillus* sp. This preliminary analysis indicates the optimum conditions required for biofilm formation by different isolates. Further studies can be done to screen the presence of bioactive compounds from probiotics with anti-biofilm activities that could be used against the bacteria causing oral cavities.