The present study deals in comparison of planktonic and sessile forms of *C. sakazakii* cells on the different substrates such as glass, steel and aluminium through SEM and investigates the antimicrobial effect of natural products, lactic acid bacteria and antibiotics on these biofilm cells.

Planktonic or sessile cells are the two distinct states of bacteria in which they are found. Planktonic cells are classically defined ‘as free flowing bacteria in suspension’ as opposed to the sessile biofilm state: ‘a structured community of bacterial cells enclosed in a self-produced polymeric matrix and adherent to an inert or living surface’. They may also be found in chronic infections as suspended in host materials.

Most of the bacterial species can form biofilms. Biofilms may form in varying environments and surfaces when supplied with moisture and nutrients. They are usually composed of polysaccharides, proteins, nucleic acids and cell components with a high concentration of minerals and nutrients from the surrounding environment.

Thus, the biofilms formed by the pathogen are studied through SEM. Various biochemical tests were done prior to SEM. The revived cultures were streaked on to the TSA plates to inoculate the colonies in the TSB broth along with 1% glucose and the sterilized substrates. Biofilm formed on the surface of the substrates were then fixed by modified Karnovsky’s method. Substrates were sputter coated and were analysed by SEM.

The growth control of biofilms was carried out by antibiotics, natural products and LAB by agar well diffusion method on MHA (Muller-Hinton agar) plates.

**Plant extracts or natural products** are known to have medicinal properties and have been traditionally used since age old days. These extracts posses bacteriostatic and
bactericidal effects, and contain many active compounds. Alcoholic extracts of ‘amla’ were found to show maximum zone of inhibition against biofilms of the isolate grown on aluminium and steel.

**The Lactic acid bacteria (LAB)** are generally recognized as safe microorganisms and play an important role in food fermentation and preservation. LAB also produce antimicrobial compounds including hydrogen peroxide, CO$_2$, diacetyl, acetaldehyde, D-isomers of amino acids, reuterin and bacteriocins *Lactobacillus fermentum* (MTCC-903) was found to give largest zones of inhibition against the biofilms of the isolate grown on steel, glass and aluminium surfaces.

**An antibiotic** is defined as a substance that is produced by microorganisms, that in scarce amounts inhibits the growth of another microorganism. It is specifically designed to hinder the growth and development in other microbes, but should not cause extreme harm to normal organisms.

It was observed that the biofilms of the isolate on glass were susceptible to tetracycline. This same drug exhibited the maximum zone of inhibition against the biofilms of the standard *C.sakazakii* (MTCC-2958) grown on glass.

Gentamycin showed the biggest zone of inhibition against the biofilms of the isolate on steel substratum. The biofilms of standard *C.sakazakii* (MTCC-2958) on all the three substrata as well as to their planktonic cells were found to be resistant to gentamycin.

Thus, to control the formation of biofilms on medical devices, anti-adhesion compounds have significantly gained a lot of attention. Anti adhesion compounds may include milk constituents, low molecular weight chitosan, polymers, dietary constituents, and furanone compounds. Besides them, antibiotics are also been used, to prevent biofilm
formation, as coating agents on medical devices. Though antibiotic coating is a challenge due to resistance but this may be a way to find other compounds to control biofilms.