National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: SURFACE-MODIFIED CATIONIC CARBON DOT ON SHELF-LIFE ENHANCEMENT OF RAW MILK AT ROOM TEMPERATURE
Speaker	: Ms. Samayeeta Ghosh (519ch1013)
Supervisor	: Prof. Santanu Paria
Venue	: Old seminar hall , Department of Chemical Engineering
Date and Time	: 13 Mar 2024 (4:30 P.M.)
Abstract	: In India, milk holds significant economic value within the agriculture and food sectors. However, studies indicate economic losses due to milk wastage. Complex biochemical properties, environmental conditions, and inadequate refrigeration infrastructure are main factors for wastage of raw milk by sitmulating bacterial growth. Maintaining a temperature of 4˚C is important until pasteurization to prevent microbial proliferation and spoilage of milk. Our objective is to minimize microbial load in milk to ensure minimal wastage before pasteurization. The antimicrobial activity of Carbon dots (CDs) has recently attracted much attention as it possess inherent antibacterial properties. The interaction between CDs and microorganisms relies on their composition, size, and surface chemistry. In this research work, we developed a surface charge-modified cationic carbon dot (CD-CTAB) to show better antibacterial activity. The antibacterial investigation shows that modified CD-CTAB can selectively inhibit the growth of E. coli. These CD-CTABs with positive surface charge can preferentially adhere to the cell membrane of E. coli via electrostatic interaction and then disturb their physiological metabolism, resulting in bacterial death. CD-CTAB is also used to extend the shelf life of raw milk at room temperature by inhibiting bacterial growth for up to 10 hours without altering milk properties. This novel approach shows potential for reducing milk wastage and ensuring milk quality for consumers