Abstract:

The focus of the study was to survey for bacterial strains from the soil collected from different locations, near the area of the Tezpur University Campus, producing antimicrobial substances. Soil samples were collected from different locations such as rhizosphere region, garbage area, compost etc. Bacterial strains in the soil were isolated by dilution plate method. About 68 isolates from soil were screened, out of which three showed the desired antimicrobial activity and they were named as S_1, S_2, and S_3.S_1 and S_2 exhibited antimicrobial activity against *P. aerugenosa, E. coli, where* as S_3 inhibited the growth of *P. aerogenosa, E. coli, and S. aureus*. The three isolates showing the desired property of antimicrobial activity were characterised on the basis of morphological and biochemical studies and their response towards gram's staining was also observed. Molecular characterisation were also carried out that would help in better identification of the three isolates. Antimicrobial activity of the three isolates was confirmed using agar well diffusion method (Bauer, *et al.*) and measuring the zone of inhibition (ZOI) by millimetre scale. Tests were performed to check the sensitivity of the antimicrobial substance produced by the three isolates towards protease and heat treatment and it was found that the antimicrobial property was partially affected by the heat and protease treatment. Their ability to inhibit bio film formation was also checked and it was found that they could inhibit the bio film formation by *S. aureus* and *B. subtilis*. The genomic DNA of the three isolates were extracted and colony PCR was carried out taking 16s rDNA sequence as primer and then sequencing was done by using Big Dye Terminator Method. The similarity with other sequences in the nucleotide database was obtained by NCBI-BLAST and the phylogenetic tree for S_1 was also obtained using CLUSTALW Multiple Sequence Alignment. Finally, the filtrates of the supernatant of the broth culture of the three isolates exhibiting antimicrobial property were subjected to SDS-PAGE (tricine) and bands of around 10kDa were obtained using Coomassie Brilliant Blue Staining.