

***Microbacterium barkeri* Sp. Sela 4, Characterized as a Novel Agar-Degrading Bacterium, Isolated from Soil Enriched with Laboratory Agar**

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ABSTRACT

An agar-degrading soil bacterium, designated as strain SELA 4, was isolated from agriculture soil of Ghaziabad region which was enriched with laboratory agar. The isolated bacterial strain was found to be aerobic, gram-positive and rod-shaped showing off-white colonies with marked pits on MSA (Mineral Salt Agar medium). When 16S r DNA sequence similarity search was conducted using standard tool, the strain showed 99% similarity with the genus *Microbacterium*. Thus, affiliating it to *Microbacterium barkeri* strain which has shown bio-control activity. Further, the biochemical, physiological and phylogenetic analysis of the strain designates the isolated bacterium as *Microbacterium barkeri* sp. SELA 4. The strain SELA 4 utilizes agar as the only carbon source when grown at 37°C, 5 pH and produced the enzyme, β -agarase. Highest enzyme activity of 2.04 U/ml was observed when the agar concentration was 1.5% in the growth media. The enzyme activity of 2.09 U/ml was seen at temperature 37°C and the highest activity of 1.96 U/ml was observed at 5 pH. The activity at initial level was determined by Iodine assay showing clear zones while later confirmation was done by activity staining which showed the molecular weight of the enzyme to be approximately 55.6 kDa. The enzyme hydrolysis product of agar was analyzed using Thin Layer Chromatography, indicating that the agarase enzyme from SELA 4 was β agarase which is known for cleaving agarose to Neoagarohexaose which is the final product formed. The agarolytic products have wide commercial applicability in the cosmetic industry, medical industry, and many more applications and the cultures isolated can be regarded as an indigenous source of agar degrading bacteria having agarase enzyme.

Keywords: *Microbacterium barkeri*, Mineral Salt Agar, Neoagarohexaose, SELA 4

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