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Biosurfactant facilitated biodegradation of naphthalene by *Pseudomonas aeruginosa* SR17

Rupshikha Patowary and Suresh Deka
Institute of Advanced Study in Science and Technology, India

Naphthalene is a ubiquitous pollutant which posses a pungent odor. It is released by several industries and production plants including petrochemical industries etc. Exposure to naphthalene is known to cause severe health hazards and mutagenic changes thereby leading to cancers. Thus, it is necessary to remove or degrade naphthalene in the environment. The main purpose of the study was to isolate bacteria that could potentially degrade naphthalene as well as produce biosurfactant that is supposed to facilitate the degradation step. A new isolate, *Pseudomonas aeruginosa* SR17 was isolated from local (Guwahati, Assam, India) automobile garage soil. The ability to utilize naphthalene for growth and produce biosurfactant was evaluated by measuring the optical density (O.D. at 600 nm) and surface tension of the culture medium containing naphthalene as sole carbon source. The biosurfactant was characterized biochemically and by applying spectrophotometric tools FTIR, LCMS. The degradation profile of naphthalene by SR17 was studied for 7 days at an interval of 24 hours by GCMS. It was observed that SR17 could utilize naphthalene for its growth and at the same time produce biosurfactant by utilizing naphthalene as the carbon source in mineral salt medium. The surface tension of the medium reduced from 70 mNm-1 to 34 mNm-1. The biosurfactant was characterized to be rhamnolipid by nature. It was found that the growth and degradation of naphthalene by SR17 was augmented at 35 °C and pH-8.0 and 0.4% naphthalene. The bacteria could potentially degrade naphthalene into its metabolic intermediates.

ruprin_03@yahoo.co.in

Recent advances in thermo-cellulosomics: A future perspective

Sachin Kumar and **Richa Arora**
Sardar Swaran Singh National Institute of Bio-Energy, India

The gradual changes in environmental conditions due to depletion of fossil-derived fuels and increased level of energy crisis are serving as the dynamic forces for the development of alternative sources of energy. Current research on biofuels mainly focuses on lignocellulosics which includes agricultural, forestry, municipal solid and industrial wastes owing to their availability. Apart from the feedstock, another major challenge is to make the conversion of this recalcitrant biomass to simple sugars economically feasible. In this regard, biofuel production can be made efficient and commercially viable through the unique set of thermophilic enzymes known as cellulosomal enzymes. Recent advances in cellulosomics highlighting their significant role in biomass-based biorefineries will be discussed. The concept of construction of designer cellulosomes and their challenges will also be discussed. This would provide a comprehensive update of the physiology of thermophilic cellulosome-producing microorganisms.

sachin.biotech@gmail.com

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