

## Isolation and identification of thermostable amylase enzyme producing bacteria from compost production plant in Kurunegala

Y.M. Bandara<sup>1,2</sup>, P.S.T. Amandani<sup>1,2</sup>, H.D.S. Kavishka<sup>1,2</sup>, and H.D.D. Sadeepa<sup>1,2\*</sup>

<sup>1</sup>Department of Biomedical Sciences, School of Science, BMS Campus, Sri Lanka

<sup>2</sup>Department of Applied Sciences, Northumbria University, United Kingdom

Thermostable enzymes hold significant importance in diverse industrial sectors due to their ability to withstand high temperatures. Thermostable amylase is one such enzyme frequently used in different industrial applications. Hence, it is important to isolate locally available thermostable amylase-producing bacteria to address the growing demand for thermostable amylase enzymes. This study focused on isolating and identifying thermostable amylase-producing bacteria from hot soil. The soil samples were collected from the municipal solid waste compost production plant in Sundarapola, Kurunegala (7° 30' 31.50" N, 80° 21' 9.84" E). Bacterial colonies were isolated using the standard pour plate method on Nutrient Agar (NA) medium at room temperature. The amylase-producing bacteria were identified through a starch hydrolysis test. The amylase activity of crude extracts was evaluated using the Di-nitrosalicylic acid (DNS) method. The optimum temperature and pH levels for enzyme activity were determined and the most potential bacterial candidate was identified using the 16S rRNA gene sequencing method. The soil samples were collected from a point where the temperature was about 60 °C. Of 10 morphologically different bacterial colonies isolated from the soil sample, three bacterial isolates (SP1, SP5, SP7) were positive for amylase production. The isolate SP5 showed the highest amylase activity (1.434 U ml<sup>-1</sup>) at room temperature (29 °C), while SP1, identified as *Bacillus pumilus*, showed the highest amylase activity (2.282 U ml<sup>-1</sup>) at the highest optimum temperature of 60 °C. The optimum pH for the amylase activity was recorded as pH 7. Given the results, the bacterial isolate *B. pumilus* isolated from Sundarapola compost production plant could be utilized in industrial settings operating under higher temperatures. Thus, further studies are recommended to optimize culture conditions and other factors for enzyme activity to use these enzymes successfully in industrial applications.

**Keywords:** Compost, Thermophilic bacteria, Thermostable amylase, Enzyme

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\*dilini.s@bms.ac.lk

ORCID ID: <https://orcid.org/0009-0001-6515-8277>