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Introduction

Polyaromatic hydrocarbon (PAH) pollution is a highly concerned environmental problem in the world. Naphthalene and phenanthrene are the highly abundant PAHs in the ambient air due to the vehicular emission, industrial processes and oil refining processes. Naphthalene is

Selection of e cient PAH degrading bacteria

e best PAH degrading bacterial strains were selected based on the results obtained from the colorimetric and HPLC methods indicated below.

Colorimetric assay

Each bacterial strain was inoculated into Bacto Bushnell-Haas broth incorporated with PAH compound (1%v/v) and Methylene blue (2%v/v), the redox indicator and incubated at room temperature (28°C-30°C) with constant shaking at 180 rev/min, for 14 days with a control without bacterial inoculation. From broth culture 5 ml sample was centrifuged at 6000 rev/min for ve minutes. e recovered supernatant was assayed spectrophotometrically by measuring absorbance at 609 nm for the residual hydrocarbon. Six replicates were done for each bacterial strain and PAH degradation percentage was determined using the following equation [16].

$$\text{Percentage of PAH degradation} \quad 1-\frac{\text{Absorbance of sample}}{\text{Absorbance of Control}}100$$

HPLC determination of PAH degradation

Each bacterial strain was inoculated into Bacto Bushnell-Haas broth incorporated with PAH (phenanthrene and naphthalene) compound (100 ppm). en it was incubated at room tempe-6 (h in)20 (ur)13 (e 5 m)-ET EMC /Span <</Lang (en-US)/MCID 239 >>

ability (Figure 1).Alcaligenessp.11SO (KT356809) also had higher naphthalene (81.32%) and phenanthrene (79.24%) degradation ability compare to other bacterial strains. According to the literature [20] most of the naphthalene degraders were*Pseudomonas*sp. and*Alcaligenes* sp. were the predominant phenanthrene degraders. But the present investigation showed signi cantly high e ciencies of the two isolated Alcaligenessp. in degrading both naphthalene and phenanthrene.

ese two bacterial strains harbor an approximately 23 kb plasmid. Upon transformation of these plasmids into*E.coli* JM109 strain, it's PAH degradation ability was similar to that of original organism. Further, a er curing of plasmids, the two*Alcaligenes*sp. lost their PAH degradation ability. ese results revealed that PAH degradation ability of Alcaligenes faecalisand Alcaligenessp.11SO was a plasmid encoded character. erefore, these plasmids should harbor naphthalene and phenanthrene catabolic genes(*nah* and*phn* respectively.

nahR

(Figure 5). us, phnG gene exists as two di erent alleles in these two strains enabling them to degrade phenanthrene.

e phyllosphere bacterial strains,

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