

In this study, a novel gene cluster involved in the degradation of lignin-derived monoaromatics has been identified in the thermophilic nitrate reducer, *Thermus oshimai* JL-2, previously isolated from the U.S. Great Basin hot springs. The degradation pathway follows a less common route, proceeding via the decarboxylation of protocatechuate to form catechol, and involves a novel thermostable γ -carboxymuconolactone decarboxylase homolog, identified here as protocatechuate decarboxylase. The gene cluster is conserved in only a few Thermales and shows traces of vertical expansion of catabolic pathways in these organisms toward lignoaromatics. Apart from transformation of lignin-derived aromatics by strain JL-2, the newly identified thermostable protocatechuate decarboxylase has the potential to be used in the biosynthesis of *cis, cis*-muconate, an important intermediate in the commercial production of plastics.

Chakraborty J, Suzuki-Minakuchi C, Tomita T, Okada K, and Nojiri H (2021). A novel gene cluster is involved in the degradation of lignin-derived onoaromatics in *Thermus oshimai* JL-2. *Appl. Environ. Microbiol.* (Accepted)