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## ***Penicillium* Diversity from Intertidal Zone in Korea**

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*Penicillium* species are commonly isolated from various outdoor and indoor environments, including marine environments such as sponges, algae and sand. *Penicillium* is especially important because numerous bioactive compounds have been isolated. *Penicillium* was the most common species in intertidal zone in Korea, however the diversity and ecological roles of *Penicillium* in intertidal zone are not clarified. We explored diversity and ecological roles of marine-derived *Penicillium* from tidal flat and sea sand in Korea. The diversity of marine-derived *Penicillium* from Korea was investigated using both culture-dependent and culture-independent approach by  $\beta$ -tubulin sequence. In addition, we evaluated optimal temperature, halo-tolerance, and enzyme activity of *Penicillium* strains, such as extracellular alginase, endoglucanase,  $\beta$ -glucosidase, and protease. For culture-dependent approach, a total of 182 strains of 62 *Penicillium* species were isolated, with 53 species being identified. The most common species was *Penicillium oxalicum*, followed by *P. crustosum*, *P. brasilianum*, *P. koreense*, and *P. griseofulvum*. Species richness and composition were not significantly different by season, substrates, and seaside. For culture-independent approach using Illumina sequencing, 73 OTUs were detected. The most frequently observed species was *P. antarcticum*, followed by *P. koreense*, *P. crustosum*, and *P. brevicompactum*. Diversity of *Penicillium* was higher during winter season than during summer season and in western sea than in southern sea, respectively. Community structure was significantly different by season and sea side. 52 species were detected by both methods. Unique species were isolated from each of methods - 10 from culture methods and 21 from Illumina sequencing. Furthermore, salinity adaption of the *Penicillium* varied depending on species. Many *Penicillium* species showed endoglucanase,  $\beta$ -glucosidase, and protease activity. Some species including *P. paneum* and *P. javanicum* degraded the polycyclic aromatic hydrocarbons. Thus, our results demonstrate that intertidal zone in Korea harbors diverse *Penicillium* community and marine-derived *Penicillium* play important ecological roles as decomposers of organic material in marine environments.