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### Phellinus Linteus and Cordyceps Militaris Supplementation on Antioxidant System During Physical exercise

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I investigated the reproduction system of nine natural populations of *P. discolor* in Korea and two Mongolian *P. conferta* populations. The measurements of 19 quantitative or qualitative morphological characters were taken on each of total individuals directly from their natural habitats. Multivariate principal component analyses (PCA) were conducted to detect differences among populations considering several characters simultaneously of variances using the statistical analysis system. 19 morphological characteristics between Korean *Potentilla* species and Mongolian *Potentilla* species showed a slight heterogeneity of variance. The length of internodes (LFL and LSI) and characteristics of root (LLR and NOR) were shown a significant difference between two species ( $P < 0.05$ ). The number of ramets in *P. conferta* decreased with increasing geographic distance from viviparity. However, *P. discolor* has most ramets at distance intervals 60~80 cm. In light conditions, *P. discolor* was significantly less resilience than *P. conferta*. In drought conditions, although there was not shown significant difference, *P. conferta* was less resilience than *P. discolor*. The core analysis indicates that *P. conferta* is the more resistant species than *P. discolor* and usually propagates by clonal growth during several strong environmental disadvantages such as drought events.

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### Improvement of Catalytic Activity of Recombinant Epoxide Hydrolase for the Production of Enantiopure Styrene Oxide by Reaction Engineering

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The effect of reaction temperature and adding various detergent on the catalytic activity of recombinant *Escherichia coli* containing epoxide hydrolase gene from *Rhodotorula glutinis* was investigated for the production of enantiopure styrene oxide. The addition of 0.5 % (w/v) Tween 20 at low temperature increased the initial hydrolysis rate and enantioselectivity by 1.45-fold and 2.0-fold, respectively. Enantiopure (S)-styrene oxide was prepared with a high enantiopurity (100 %ee) and 46.08 % yield (theoretical yield = 50%) from 20 mM racemate. Acknowledgement: This work was supported by the Marine and Extreme Genome Reserch Center Program, Ministry of Marine Affairs and Fisher, Republic of Korea.

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