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Breeding new *Cordyceps militaris* strain using mating type molecular markersMiae Lee and Byungjoo Lee
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An entomopathogenic *Cordyceps militaris* is being studied and cultivated as a medicinal mushroom having many valuable biological and pharmaceutical activities substituting *C. sinensis* which has been traditionally used as a Chinese herb medicine. *C. militaris* can be cultivated artificially. As a bipolar heterothallic fungus *C. militaris* has two strains of compatible mating types, MAT1 and MAT2 which are determined by the single mating type locus MAT1 consisting of two dissimilar alleles called idiomorphs MAT1-1 and MAT1-2 of MAT1 and MAT2, respectively. They can be differentiated by crossing, fruiting body formation ability and the production of perithecia. Such process is very laborious and time consuming to carry out but molecular markers of these mating types reduces the amount of effort required for the crossing process. In this study, two opposite mating types were assayed using two sets of primers specific for *C. militaris*, which were amplified a 191-bp fragment for MAT1-1 and 233-bp fragment for MAT1-1. After crossing of two compatible mating types F1 hybrids resulted in well-developed perithecial fruiting bodies and their crossings were confirmed by the multiplex PCR assays for the rapid and specific detection of both MAT1-1 and MAT1-2. In the breeding process of new *C. militaris* mushroom, single ascospores were isolated and examined their mating types, mycelial growth, mycelial density, and selected isolates were crossed and hybrids were produced showing high quality fruiting bodies on artificial media. The stromata of new strain 'Chungnam 12' were club-shaped and bright orange-red. Its height was 6.7 cm and the cordycepin content was 0.33% on average. The new strain showed 11% higher yield than 'Yedang 3' with producing firmer fruit bodies. The optimum temperature for mycelial growth was 22~25°C and the optimum temperature for stroma development was 18~22°C. Fruiting bodies were begun to produce 43 days later after inoculation. This new cultivar may serve as a valuable one for artificial cultivation and industrial-scale production of *C. militaris*.

Biography

Miae Lee is an Agricultural Researcher in Crop Research Division, Chuncheonnam-Do Agricultural Research and Extension Services in South Korea for about 10 years and has her expertise in breeding new mushroom cultivars. She is also doing her best in developing various cultivation methods for better quality mushroom production. Recently, she is involved in environmental friendly disease and pest management, particularly against mushroom flies. She investigates the occurrence and development of sciarid flies and the use of plant extracts such as *Ginkgo biloba* fruits to control mushroom flies in button mushroom cultivation

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