

学 位 論 文 要 旨	
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題 目	Investigation of Factors Influencing Growth and Oxyppinnatanine Accumulation and Secondary Metabolites in Daylily (<i>Hemerocallis</i> spp.) (Daylily (<i>Hemerocallis</i> spp.)の生育およびオキシピナタニン含量に影響を与える要因の分析および同属植物における二次代謝物のスクリーニングおよび抗酸化能測定)
<p>Daylily (<i>Hemerocallis</i> spp.) is a perennial medicinal plant, having been utilized for thousands year in Asia to treat some diseases. The factors influencing growth, yield and oxyppinnatanine (OPT) accumulation, the phytochemical components, and DPPH radical scavenging ability of daylily were investigated in this research.</p> <p>The evaluation of growth, yield and OPT accumulation of <i>H. fulva</i> var. <i>sempervirens</i> (Synonym: <i>H. sempervirens</i>) cultivated in dark-red, gray, and red soils of Okinawa, Japan and in dark red soil with eight of N,P,K amount combinations (0.0 - 0.6 g/pot, size 1/5000a) revealed that dark-red soil was better for plants to grow, yield, and accumulate OPT than the other soils. In dark red soil, growth and leaf yield of <i>H. sempervirens</i> were proportional to supplied N,P,K amount, but flower yield and OPT content were not. The N,P,K combinations at 0.4–0.6 g/pot promoted the leaf yield; at 0.4 g/pot was the best for production of flower; and at 0.3-0.4 g/ pot were ideal for the OPT accumulation.</p> <p>Besides, this research also pointed out that environmental factors such as relative light intensity (RLI) and temperature conditions influenced markedly OPT accumulation of <i>H. sempervirens</i>, but waterlogged soil did not. The plants grown under condition of 100 and 40% RLI (non-shade and severe shade, respectively) produced significantly more OPT than those of 75% and 60% RLI. Plants exposed to 40°C for 10 days before harvesting accumulated the most OPT, followed by to 15°C in comparison with to range of 20°–35°C. The lowest OPT amount was observed in plants treated at 10°C. In Okinawa, <i>H. sempervirens</i> accumulated the highest OPT concentration in December and January in comparison with the rest months in a year, next by in August and September. After harvested, <i>H. sempervirens</i> leaves could be stored for 2 days at room temperature, 10 days at 0-4°C, and 150 day at -20°C to preserve OPT content. Store method of drying at 50°C made the decrease about 75% of OPT in leaves.</p> <p>The analysis of relationship between some internal factors and OPT accumulation of 24 daylily strains revealed that ploidy level (2x and 3x) did not influence OPT synthesis. However, it was observed that of 16 strains of the same species <i>H. fulva</i>, 14 triploid strains showed higher OPT content than 2 diploid strains. Genetic diversity and growth stage affected significantly on OPT accumulation of daylily: the different strains in the same species, the different species, and the different genetic similarity groups showed the different OPT concentration; daylily plants during the vegetative and flowering periods produced more OPT than during the post-flowering period.</p> <p>The qualitative analysis of 13 main phytochemical compounds in methanol daylily extracts found the presence of 12 compounds. The high content of total phenolic (77.80 – 317.13 mg GAE/g extract) and flavonoid (15.96 – 33.00 mg CE/g extract) had a positive correlation to antioxidant capacity of daylily extracts. These results may provide an explanation for many medicinal benefits of daylily and indicate a value source of bioactive compound for pharmacological industry.</p>	