

Mass Production of *Allium victorialis* using Bioreactor System

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Objectives

Bioreactor was used for mass production of *Allium victorialis* var. *platyphyllum* Makino. It is known that the bioreactor is useful culture system to reduce the labour and production cost. Therefore, appropriate culture system for shoot proliferation and bulb formation was investigated and uptake of soluble carbohydrates depending upon culture system also analyzed during the entire culture period.

Materials and Methods

1. Plant material : *Allium victorialis* var. *platyphyllum* Makino, 0.1g shoot clump proliferated on MS medium containing 3.0 mg/L BA and 0.1 mg/L NAA.
2. Basal medium :
 - Proliferation : MS medium + BA 3.0 mg/L + NAA 0.1 mg/L + sucrose 3%.
 - Bulb formation : MS medium + sucrose 9%.
3. Bioreactor : 5L balloon type air lift bioreactor (100 segments/1.5 L medium)
 - ① Raft culture (RC)
 - ② Raft culture with medium reservoir (MRC)
 - ③ Ebb & flood culture (E&FC)
 - ④ Immersion culture with air supply (ICA)
 - ⑤ Immersion culture without air supply (IC)

Results and Discussion

Effect of different bioreactor culture systems on shoot proliferation and bulb formation were investigated. Optimal results for multiple shoot formation was observed in RC and MRC (13-15 per explant) in which explants were placed on sieve contacting liquid medium. MRC was better way to avoid hyperhydricity by controlling the medium supply using medium reservoir. For bulb formation, 93% of shoot clumps were formed bulb at the basal part when cultured with E&FC. In this system, sucrose, glucose and fructose content in the medium were remarkably decreased during bulb formation period (6-8 weeks).