**Comparative evaluation of adventitious root biomass production of *Spilanthes paniculata* in different bioreactor configurations**

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Abstract

Adventitious root culture provides a great alternative way to produce important secondary metabolites due to their excellent biosynthetic capability. The large scale production of these cultures in the bioreactors is a major challenge due to the difference in characteristics of the plant and microbial cells. In the current study, *Spilanthes paniculata* (Asteraceae) has been selected as a model system to assess the adventitious root biomass growth in three bioreactor configurations. Stirred tank bioreactor (STR), modified stirred tank bioreactor (MSTR), and balloon type bubble bioreactor (BTBB) have been selected to perform the study. The inoculum size (), medium volume (1.5 l), temperature (25°C), photoperiod (16/8 h) & rate of aeration (0.2 vvm), was maintained the same for all bioreactor configurations throughout the culture process. The cultures were harvested after the 15th day of inoculation. The most effective biomass production was obtained in modified stirred tank bioreactor (7.72 gm/l DW), whereas the balloon type bubble bioreactor showed the least biomass production (5.34 gm/l DW). The root biomass quality was better in case of MSTR than other bioreactor configurations. The harvested biomass was further subjected to chemical analysis through HPLC to check the metabolite content. The results of the study demonstrate the efficacy & advantages of the MSTR over the other bioreactor configurations.

**Keywords –** Adventitious roots, Bioreactor, Modified stirred tank, Balloon type, HPLC