Growth Characteristics and Production of Physalins from Physalis minima Hairy Roots in Shake Flasks

Abstract

This report described the growth characteristics and production of physalins from Physalis minima hairy roots in shake flask culture. The presence of lateral branches in the inoculum had a negligible effect on the final root biomass dry weight (DW), specific growth rate (μ), doubling time (td) and production of physalins. However, excising the primary and lateral root tips reduced μ and the total root length but not the final biomass. Mature root tissues were observed to accumulate more physalin B and F (1.55 and 3.74 mg.g\(^{-1}\) DW, respectively) compared to the root tips (0.65 and 1.47 mg.g\(^{-1}\) DW, respectively). Increasing the number of root tips from 2 to 12 and the medium volume significantly reduced μ and extended td. Decreasing the medium volume with a small number of inocula reduced td, improved the biomass and production of physalins and μ. Using a 100 mL flask, four root tips cultured in 25 mL medium provided the optimum conditions for biomass (0.24 g DW) and production of physalins (1.68–3.5 mg.g\(^{-1}\) DW).