Abstract

The establishment of cell suspension culture from the callus of Beetroot *Beta vulgaris* variety "Ruby Queen" is described in this study. Plant cell suspension cultures have a huge potential for *in vitro* renewable production of valuable and important metabolites of plants that can not be synthesized by microbial or chemical methods. In the present study the production of the Betalain pigments synthesized by Beetroot were followed as a metabolite when establishing a model cell suspension culture. Betalains have attracted a lot of attention due to their widespread use in food industry and cosmetics as natural colorants. Moreover, consumer concerns against synthetic food colorings and recent knowledge of amazing radical scavenging and anti-oxidant properties of these pigments have increased their importance. Beetroot suspension culture could also be used for the production of other useful plant metabolites including flavonoids and tannins etc. In the present study, using various combinations of Plant Growth Regulators like 2.4-D, BAP, KIN, and NAA upon various explants of the Beetroot, callus was induced. The desirable callus was produced by a low concentration i.e. 0.1mg/L of 2,4-D and BAP in combination. The callus that developed the desired pigmented phenotype was used as inoculum for establishing a suspension culture in shake flasks. Biomass accumulation in terms of Dry Weight and the Betalain pigment accumulation in the shake-flask suspension culture was monitored over a period of 20 days. Maximum biomass was accumulated by day 12 which was g of Dry Weight. And maximum pigment accumulation appeared by day 16 which was 6.85mg/g of DW of biomass produced. Greater pigment accumulation was observed during the slow growth phase of cells. The biomass accumulation and pigment formation seemed to decline after Day 8 due to exhaustion of media components or accumulation of toxic metabolites in the shake flask suspension cultures.