

03-2-17

## Effects of Carbon Dioxide on Cell Growth and Ginsenosides Production in Bioreactor Cultures of Mountain Ginseng (*Panax ginseng* C.A. Meyer)

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### Introduction

*Panax ginseng* is a traditional chinese medicinal plant in the Araliaceae family. Its secondary metabolite ginseng saponin has hemostatic, antioxidant, promotion of blood circulation and pain relief activities.

### Objectives

The gaseous composition in plant cell and tissue cultures is an important factor affecting the plant physiology. Some studies have shown that carbon dioxide is required for the growth of plant cell suspension initiated at low cell densities.

Recently, the production of secondary metabolites using plant cells has been the subject of extended research. A series of experiments were conducted to establish an efficient ginseng adventitious root growth and ginsenoside production in liquid media using air-lift bioreactor. However, not so much of report studied of the effects of CO<sub>2</sub> on cell growth and metabolites production in ginseng species. This present study was undertaken to learn more of the role about CO<sub>2</sub> in controlling biomass and ginsenoside production during bioreactor culture of ginseng cells.

### Materials and Methods

1. Materials: Suspension cells of *P. ginseng* were grown in Murashige and Skoog (MS) medium.
2. Methods: Surface sterilization of ginseng root, callus induction, bioreactor culture, different volume of CO<sub>2</sub> (1%, 2.5%, and 5%) supplied bioreactor culture. Measurement of SOUR, DO, biomass yield and ginsenosides was also investigated.

### Results and Discussion

The growth of ginseng cell was greater when concentration 1% CO<sub>2</sub> was used as evidenced by dry weight (12.35 g/L). Ginsenoside contents decreased with increasing concentration of CO<sub>2</sub>. The accumulated ginsenoside contents were 3.8 mg/g DW at 1% CO<sub>2</sub> and 2.05 mg/g DW at 5% CO<sub>2</sub> concentration on day 20.

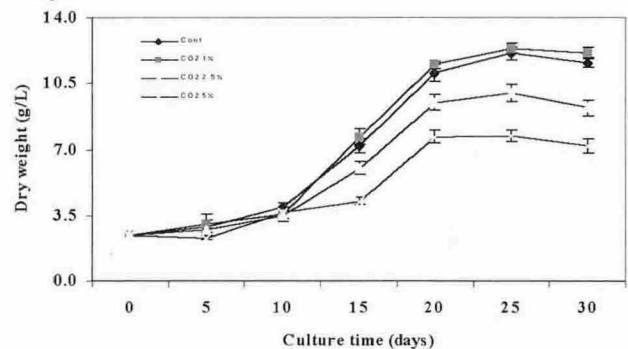


Fig. Growth kinetics of cell dry weight in bioreactor culture at different carbon dioxide concentration