

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

Thanh N. T., Yu K.W., Hahn E. J., and Paek K. Y.

Research Centre for the Development of Advanced Horticultural Technology,  
Chungbuk National University, Cheongju 361-763, Korea

### Introduction

Ginseng (*Panax ginseng*) is traditionally considered one of the most potent medicinal plants, of which the most important active component is ginsenosides. Today, more than 20 different ginsenosides have been identified from *P. ginseng*.

### Objectives

Ethylene can affect the growth and development of cells culture. The mode of action of ethylene on growth and differentiation is highly variable, and it is not yet clear why ethylene promotes growth and differentiation in some cases and inhibits them in other. On other hand bioreactors with computer control systems offer theoretically various advantages of automation, low labour and reduction of production costs. However, very few reports are available regarding the effects of  $C_2H_4$  on cell growth and metabolites production in ginseng species. In this article, the effect of  $C_2H_4$  on the cell growth and accumulation of saponin by suspension cultures of *P. ginseng* were studied in bioreactors.

### 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  $C_2H_4$  (5 ppm, 10 ppm, and 20 ppm) supplied bioreactor culture. Measurement of SOUR, DO, biomass yield and ginsenosides was also investigated.

### Results and Discussion

The highest dry weight was observed with the gaseous compositions of 10 ppm  $C_2H_4$  (12.5 g/L) as compared to control (11 g/L). Ginsenoside accumulation was significantly inhibited with increasing concentration of  $C_2H_4$ . The ginsenoside values were 3.8 mg/g DW at 5 ppm  $C_2H_4$  and 2.1 mg/g DW at 20 ppm  $C_2H_4$  concentration on day 20.

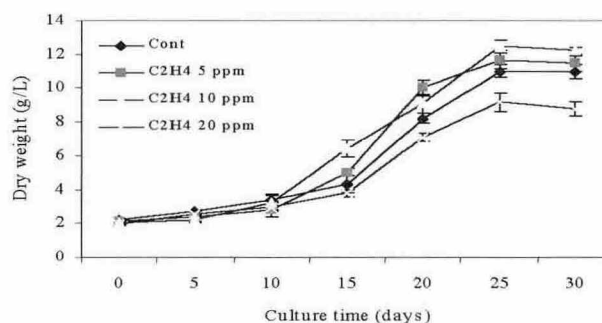


Fig. Growth kinetics of cell dry weight in bioreactor culture at different ethylene concentration