

## **Glucosinolates Content in Non-elicited Plant Culture, Elicited Plant Culture and Wild Plant of Watercress (*Nasturtium officinale*)**

### **ABSTRACT**

Watercress (*Nasturtium officinale*), a green vegetable belongs to the Brassicaceae, contains considerable amount of vitamins, minerals and secondary metabolites such as glucosinolates (GS). Watercress contains phenyl ethyl glucosinolate (gluconasturtiin), a precursor of phenyl ethyl isothiocyanate, which is widely reported to restrain the growth of cancer cells. The content of secondary metabolites and other compounds in plants is affected by different growth conditions such as pH, temperature, light intensity and nutrient supply. Thus, the aim of the current study is to evaluate the concentration of gluconasturtiin (and other GS) from in vitro grown watercress under non-elicited and elicited plant culture with wild plant of *N. officinale*. The samples were collected from watercress growing wild in a spring in Kundasang area, Ranau Sabah and subjected to sterilization to establish *N. officinale* in vitro culture under laboratory condition. The sterilization was done by using Chlorox® solution (5% v/v) containing Tween 20 to obtain 90% survival rate of the plants. Explants were grown in glass jar containing hormone-free with 30 g/L of sucrose and pH was adjusted to 5.7 - 5.8. The medium was solidified with 4 g/L-1 of agar and sterilized at 121°C for 20 minutes. All cultures were kept inside growth chamber at 25°C under 16 hours photoperiod for 30 days before sub-cultured into fresh medium treated with elicitors. Different concentration of elicitors tested in this study were chitosan (10, 20, 40, 60, 100 mg/mL), casein hydrolysate (0.5, 1.0, 1.5, 2.0 g/L) and coconut water (5, 10, 15, 20, 25 % v/v). The results showed that gluconasturtiin and benzyl glucosinolate (glucotropaeolin) increased over five-fold and six-fold, respectively, in non-elicited plant culture compared to the wild *N. officinale*. Compared to the non-elicited, the concentrations of these GS were significantly lower by 52 – 76 % for gluconasturtiin and 33 – 55 % for glucotropaeolin in all the in vitro *N. officinale* treated with the elicitors. Nonetheless, the GS concentrations in all the in vitro *N. officinale* were higher compared to the matured wild plant. Tissue culture method could be a valuable

alternative for higher production of GS in *N. officinale* with short period of plant development (30 days in this study).