

Effects of ascorbic acid and ferum ions concentration on the hydrolysis of glucosinolate and myrosinase activity in the watercress (*nasturtium officinale* sp.)

ABSTRACT

Watercress (*Nasturtium officinale* sp.) from the Brassicaceae family contains phenethyl glucosinolates (gluconasturtiin) as the main glucosinolate (GLS). The enzymatic hydrolysis products by naturally-occurring myrosinase produced phenethyl isothiocyanate (PEITC) which reported to possess anti-carcinogenic activity. Depending on several factors, its counterpart, phenethyl nitrile (PEN) can also be formed as hydrolysis product. This study investigated the effects of adding ascorbic acid and Fe²⁺ ions at different concentration on the hydrolysis of gluconasturtiin. Hydrolysis products were extracted using dichloromethane and analyzed semi-quantitatively by using GCMS. The results showed that PEITC increased at the low concentration of ascorbic acid (up to 0.06M). Similarly, addition of up to 0.06M Fe²⁺ ions increased PEITC; higher than 0.06M inhibits the formation of PEITC. Interestingly, similar trend for the production of PEN was detected. This study also investigated myrosinase activity both by exogenous and endogenous methods at different concentrations of ascorbic acid and Fe²⁺ ions using standard sinigrin as substrate. Overall, the myrosinase activity was more active at the low concentrations of ascorbic acid. Also, the exogenous method is more efficient than endogenous. This study proved that the presence of reducing agents such as ascorbic acid and Fe²⁺ ions during the preparation of watercress as food would affect the production of the health-promoting PEITC.