

Benya Manochai 2007: Effect of Environment on Biological Activity of Cassumunar Ginger (*Zingiber montanum* (Koenig) Link ex Dietr.). Doctor of Philosophy (Horticulture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Assistant Professor Yingyong Paisooksantivatana, Ph.D. 103 pages.

*Zingiber montanum* (Koenig) Link ex Dietr. belongs to the Zingiberaceae locally called “Phlai” in Thailand. It is a perennial, rhizomatous herb. Volatile oils from rhizome contain terpinen-4-ol and (*E*)-1-(3', 4'- Dimethoxyphenyl) butadiene (DMPBD) are active ingredients. This oil has been used to treat sprains, contusions, muscular pain and inflammation related disorders. Various research articles on its biological activities have been published; however, there were insufficient data about environmental impacts on growth, yield and quality of Phlai. Therefore the objective of this study is to investigate the effect of the environmental factors on the antioxidant activity and volatile oil of *Zingiber montanum*. Three experiments were performed as follows: changes in concentration of biologically active components year round, and the effect of light intensity and water deficit on biologically active components. The results revealed that rhizome ages have positive relationships with fresh weight, dried weight, antioxidant activity and volatile oil content. Concentrations of sabinene, terpinen-4-ol and DMPBD were not affected by rhizome ages. Antioxidant activity was significantly affected by soil temperatures at 10 cm depth but not the volatile oil content and the active ingredients. Regarding percentage of light intensity, 50% and 25% light intensity promoted cassumunar ginger growth but decreased volatile oil content while antioxidant activity was not significantly affected. Water deficit at 120 days before harvest resulted in high volatile oil content but low fresh weight, while antioxidant activity was not affected by water deficit. Water deficit at 120 days resulted in an increase of sabinene content. The highest terpinen-4-ol content was obtained from the treatment with 60 days water deficit.

*Benya Manochai*

Student's signature

*Yingyong P.*

Thesis Advisor's signature

*19 / 09 / 07*