

# **PENGARUH SITOKININ DAN PAKLOBUTRAZOL TERHADAP PERTUMBUHAN, PRODUKSI UMBI DAN EKSPRESI GEN *StBEL5* PADA TANAMAN KENTANG (*Solanum tuberosum* L.)**

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## **INTISARI**

Kebutuhan produk pertanian semakin meningkat seiring dengan pertambahan jumlah penduduk serta pola konsumsi masyarakat. Salah satu produk hortikultura yang dapat digunakan sebagai bahan pangan alternatif adalah kentang. Penggunaan sitokinin diawal fase pertumbuhan dapat mengoptimalkan pembelahan sel tanaman. Retardan seperti paklobutrazol digunakan untuk menghambat pertumbuhan vegetatif agar energi hasil fotosintesis dialihkan untuk pembentukan umbi pada fase generatif. Regulasi genetik melibatkan peran fitohormon dalam kontrol inisiasi pembentukan umbi (tuberisasi) tanaman kentang. Gen *StBEL5* mengatur pembentukan umbi oleh mediasi kadar hormon diujung stolon. Tujuan dari penelitian ini adalah untuk mengetahui efek pemberian sitokinin dan paklobutrazol serta ekspresi gen *StBEL5* terhadap pertumbuhan dan produktivitas tanaman kentang. Penelitian dilakukan dengan rancangan faktorial dengan 10 ulangan untuk masing-masing perlakuan. Tanaman diberi perlakuan sitokinin dan paklobutrazol 0 ppm, 12,5 ppm atau 25 ppm dengan kombinasi perlakuan. Pengamatan fisiologis meliputi tinggi tanaman, jumlah daun, kadar klorofil, berat umbi, jumlah umbidan analisa molekuler tanaman kentang. Analisa data dilakukan dengan Uji ANOVA dan perbedaan antar perlakuan dianalisis dengan uji Tukey HSD pada taraf signifikan 5% ( $\alpha=0,05$ ). Isolasi RNA total menggunakan RNeasy® Plant Mini Kit (Qiagen, Germany). Elektroforesis dan Image Analysis menggunakan *Image Analyzer software (Image J)*. Hasil yang diperoleh menunjukkan kombinasi perlakuan sitokinin dan paklobutrazol cenderung meningkatkan jumlah daun, berat umbi serta tingkat ekspresi gen *StBEL5* pada batang tanaman kentang (*Solanum tuberosum* L.). Kadar klorofil, tinggi tanaman dan tingkat ekspresi gen *StBEL5* pada daun tanaman kentang (*Solanum tuberosum* L.) menurun setelah kombinasi perlakuan sitokinin dan paklobutrazol. Produksi umbi kentang (*Solanum tuberosum* L.) terbesar terdapat pada perlakuan dengan kombinasi sitokinin 12,5 ppm dan paklobutrazol 25 ppm.

Kata kunci: *Solanum tuberosum* L., pertumbuhan, sitokinin, paklobutrazol, gen *StBEL5*.

## THE EFFECT OF CYTOKININ AND PACLOBUTRAZOL ON GROWTH, TUBER PRODUCTION AND *StBEL5* GENE EXPRESSION IN POTATO PLANT (*Solanum tuberosum* L.)

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### ABSTRACT

Agricultural products is increasing with population growth and consumption patterns. One of the horticultural products that can be used as an alternative food is potatoes. The use of cytokinin early in the growth phase can optimize plant cell division. Retardants such as paklobutrazol is used to inhibit vegetative growth so that photosynthetic energy is transferred to the formation of tubers in the generative phase. Genetic regulation involves the role of phytohormones in the control of initiation of tuber tuber formation. The *StBEL5* gene regulates tuber formation by mediating hormone levels at the end of the stolon. The purpose of this study was to determine the effect of cytokinin and paklobutrazol administration and *StBEL5* gene expression on the growth and productivity of potato plants. The study was carried out with factorial design with 10 replications for each treatment. Plants were treated with cytokinine and paklobutrazol 0 ppm, 12.5 ppm or 25 ppm with a combination of treatments. Physiological observations included plant height, number of leaves, chlorophyll content, tuber weight, tuber number and molecular analysis of potato plants. Data analysis was performed by ANOVA Test and differences between treatments were analyzed by Tukey HSD test at a significant level of 5% ( $\alpha = 0.05$ ). Total RNA isolation used RNeasy® Plant Mini Kit (Qiagen, Germany). Electrophoresis and Image Analysis used Image Analyzer software (Image J). The results obtained showed that the combination of cytokinin and paklobutrazol treatment tended to increase the number of leaves, tuber weight and *StBEL5* gene expression level on potato stems (*Solanum tuberosum* L.). Chlorophyll content, plant height and *StBEL5* gene expression level on potato leaves (*Solanum tuberosum* L.) decreased after combination of cytokinin and paklobutrazol treatment. The highest production of potato tuber (*Solanum tuberosum* L.) was found in treatment with a combination of 12.5 ppm cytokines and 25 ppm paklobutrazol.

Keywords: *Solanum tuberosum* L., growth, cytokinin, paklobutrazol, *StBEL5* gene