

**Respons Anatomis dan Fisiologis Tanaman Kacang Tanah
(*Arachis hypogaea* L.) Setelah Aplikasi *Gibberellic Acid* (GA₃)
dan *Sludge Biogas***

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Intisari

Produksi kacang tanah menunjukkan pertumbuhan yang positif namun belum dapat memenuhi permintaan masyarakat. Rendahnya produktivitas kacang tanah dapat diatasi dengan memberikan zat pengatur tumbuh (ZPT), yaitu GA₃ (*Gibberellic Acids*), dan pupuk, yaitu *sludge biogas*. Tujuan penelitian ini adalah untuk mengetahui respons anatomis dan fisiologis kacang tanah setelah aplikasi GA₃ dan *sludge biogas*. Penelitian dilakukan dengan Rancangan Acak Kelompok Pola Faktorial 4 x 2, yaitu dosis GA₃, yang terdiri dari empat taraf, yaitu kontrol, 50 ppm, 100 ppm, 150 ppm, dan *sludge biogas* yang terdiri dari dua taraf, yaitu kontrol dan 70ml/liter air, dengan tiga ulangan sehingga terdapat 24 unit satuan. Analisis data dilakukan secara statistik dengan ANOVA yang dilanjutkan dengan uji DMRT dengan tingkat signifikansi 95% ($\alpha = 0,05$). Hasil menunjukkan bahwa terdapat perbedaan nyata antar respons anatomis tanaman, yaitu diameter metaxilem ($p\text{-value} = 0,006$), tebal korteks ($p\text{-value} = 0,001$) dan diameter empulur ($p\text{-value} = 0,021$), juga antar respon fisiologis tanaman, yaitu tinggi tanaman ($p\text{-value} = 0,000$), panjang daun ($p\text{-value} = 0,000$), lebar daun ($p\text{-value} = 0,046$), berat basah tajuk ($p\text{-value} = 0,005$) dan berat kering tajuk ($p\text{-value} = 0,000$) kacang tanah setelah kombinasi aplikasi GA₃ dan *sludges biogas* dalam berbagai konsentrasi. Sebaliknya, tidak terdapat perbedaan nyata pada diameter batang ($p\text{-value} = 0,117$), volume akar ($p\text{-value} = 0,650$), jumlah anak daun ($p\text{-value} = 0,120$), berat basah akar ($p\text{-value} = 0,180$) dan berat kering akar ($p\text{-value} = 0,190$) tanaman kacang tanah yang diberikan kombinasi aplikasi GA₃ dan *sludges biogas* dalam berbagai konsentrasi.

Kata kunci: *Arachis hypogaea* L.; GA₃; *Sludges Biogas*; Anatomis Tanaman; Fisiologis Tanaman.

Anatomical and Physiological Responses of *Arachis hypogaea* L. after Gibberellic Acid (GA₃) and Sludge Biogas Applications

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Abstract

Peanut production showed a positive growth but had not been able to meet the community demands. The low productivity could be solved by providing a plant growth regulators, such as GA₃, and fertilizer, such as biogas sludge. The purpose of this study was to determine the anatomical and physiological responses of peanuts to the application of GA₃ and biogas sludge. The research was conducted with a 4 x 2 factorial randomized block design, four levels of GA₃ dose consisting of control, 50 ppm, 100 ppm, 150 ppm, and two levels of biogas sludge dose consisting of control and 70 ml / liter of water, with three repetitions so that there are 24 units. Data were analyzed statistically by Anova test followed by the DMRT test with a significance level of 95% ($\alpha = 0.05$). The results showed that there were significant differences between plant anatomical responses: metaxilem diameter (p-value = 0.006), cortical thickness (p-value = 0.001) and pith diameter (p-value = 0.021), also between physiological responses: plant height (p-value = 0,000), leaf length (p-value = 0,000), leaf width (p-value = 0.046), shoot fresh mass (p-value = 0.005) and shoot dry mass (p-value = 0.000) of peanuts applied a combination of GA₃ and biogas sludges in various concentrations.. On the other hand, there was no significant difference in stem diameter (p-value = 0.117), root volume (p-value = 0.650), number of leaflets (p-value = 0.120), root fresh mass (p-value = 0.180) and root dry mass (p-value = 0.190) that were applied a combination of GA₃ application and biogas sludges in various concentrations.

Keywords: *Arachis hypogaea* L.; Gibberellic Acid; Biogas Sludges; Plant Anatomy; Plant Physiology.