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**The Thesis Submitted for the Degree of M.Sc
in Agroecology**

**Investigation of physiomorphological and phytochemical
reaction of cinnamon basil to growth elicitors**

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Abstract

The medicinal plant of cinnamon basil (*Ocimum basilicum*) belongs to the mint family (Lamiaceae). Its medicinal properties are reported to be anticonvulsant, strong invigorating, tonic, diuretic, digestive enhancer, anti-bloating, anti-vomiting. In medical research, it has been shown that basil has antiviral, anti-*Helicobacter pylori*, antioxidant and muscle strengthening properties. In order to investigate the physiomorphological and phytochemical responses of Rehan Darchini to biological stimuli, this study was conducted as a factorial experiment in the form of a basic randomized complete block design with three repetitions in the crop year 1402 in the research greenhouse of Zabul Agricultural Research Institute located in Chah Nimeh Baqiyat Elah. Al-Azam (AS) was performed. The experimental treatments include spraying with brassinosteroid at 3 levels (0, 200, 400 ppm) and carrageenan (0, 100, 200 ppm) at the stages of 4, 8 and 12 leaves in 3 times. The solution has been sprayed. The morphological parameters of stem height, number of sub-branches, number of inflorescences, length of inflorescences, number of flower cycles, number of florets, wet and dry yield were measured. Phytochemical traits of chlorophyll a, chlorophyll b, total chlorophyll, anthocyanin, total phenol, flavonoid, antioxidant activity and percentage of essential oil were measured. The data obtained from this experiment were analyzed by SAS software version 9.1. The results of this research showed that different parameters such as: stem length, number of inflorescences per plant, number of florets per inflorescence, inflorescence length, fresh and dry weight of the plant, amount of chlorophyll a and b, total chlorophyll, total phenol, flavonoid Total and antioxidant activity increased significantly under the effect of foliar spraying with biological stimulant. The highest phenolic content (100.49 mg gallic acid/gram fresh weight) was accumulated in the foliar treatment with 100 ppm carrageenan + 100 ppm green synthesis nanoparticles. Green zinc nanoparticles had the greatest effect on the antioxidant activity of cinnamon basil extract; Thus, the highest percentage of inhibition of DPPH free radicals (92.66%) was observed. Carrageenan had the greatest effect on the percentage of essential oil, so that the highest amount of essential oil (1.47%) was obtained from the foliar treatment with carrageenan 100 ppm. In general, it can be acknowledged that the effect of biological stimuli is different depending on the type of stimulus, concentration and plant species. According to the results, brassinosteroid biostimulants, carrageenan and zinc nanoparticles synthesized in ginseng extract in high concentrations are effective for stimulating vegetative growth and increasing the synthesis of secondary metabolites, and their use is recommended for other medicinal plants.

Keywords: essential oil, exciting, secondary Metabolite, Green synthesis nanoparticle.