Phanuphong Khongchiu 2014: Effect of Zinc on Growth, Expression of Zinc Transporter (*ZIP*) Gene and Anatomical Characteristics of Cassava (*Manihot esculenta* Crantz) Grown in Nutrient Solutions. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Assistant Professor Sutkhet Nakasathien, Ph.D. 121 pages.

As a micronutrient, Zinc (Zn) has important role on growth and development of cassava in all growth stages, especially in the establishment stage, and possibly retarding the growth and development of cassava plant. The objectives are to study the effect of Zn during the establishment stage, the expression of Zn transporter (*ZIP*) gene and some anatomical characteristics. The cassava plants (cv. KU50) were grown in the hydroponic system, with 4 Zn levels ($ZnSO_4.7H_2O$) 1, 2, 10, 100 µM and treatment without Zn, and harvested at 2, 4 and 6 weeks after transplanting. The experimental design of factorial in CRD with 3 replications was applied. The results showed the stem height and root length were highest at 10 µM Zn treatment, with the increment of 18% and 29% when compared with a control (2 µM), respectively. Similarly, the higher Zn levels affected on the increment of biomass while reflecting on significantly decrease with Zn deficiency level (-67%). Moreover, shoot/root ratio of either fresh or dry weight significantly decreased with the increment of Zn concentration, demonstrating the greater root proportions and longer root length. The Atomic Absorption (AA) analysis revealed a significant increase of Zn accumulation and Zn uptake in all plant parts of 100 µM Zn grown plant. Moreover, The Zn was accumulated in roots more than those in leaves and stems, respectively. In contrast, the increased Zn supply could decrease the cassava Zn utilization efficiency. The relative partial *ZIP* gene expression was observed in all plant parts. It was found that higher expression in leaves were observed when compared to those of stems and roots, respectively. The results also revealed that the highest expression of Zn were observed in the deficient and lowest Zn concentration treated plants, as concomitantly reflected on the low Zn use efficiency. The anatomical study of leaf showed significantly decreased of thickness of leaf, and caused the compaction of adaxial epidermis, abaxial epidermis, palisade and spongy parenchyma cells when compared to the low or deficient Zn treated plants. Thus, in concert, Zn importantly demonstrated its effect on Zn transporter (*ZIP*) gene expression levels, anatomical characteristics, which consequently resulted on cassava growth and development observed during the establishment stage.

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