

Worapannee Eamla-or 2009: Effect of Nitrogen, Potassium and Calcium on Growth and Nutritional Values of Chinese Kale Grown in Hydroponics. Master of Science (Agriculture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Assistant Professor Thammasak Thongket, Ph.D. 116 pages.

Three experiments in Completely Randomized Design were conducted at the Department of Horticulture, Kasetsart University, Nakhon Pathom to investigate the effects of N, K and Ca concentrations in the nutrient solution on growth and nutritional values of Chinese kale during June 2008 and April 2009. Chinese kale were grown hydroponically in Dynamic Root Floating Technique (DRFT) tables of 2.4 x 1.2 m (200 plants/table). Each experiment was conducted two times in two different weather conditions and consisted of 3 treatments with 3 replications (DRFT tables). In the experiment 1, plants were grown in the modified Enshi's nutrient solutions with different N concentrations of 150, 225 and 300 mg/l during 2 Jun.–30 Jun. 08 (Exp. 1.1) and during 10 Oct.–7 Nov. 08 (Exp. 1.2). The results showed that N concentration of 300 mg/l gave the highest growth, fiber, chlorophyll a and b and carotenoid contents. Increasing N concentrations in nutrient solution increased phosphorus content in the stem and leaves but had no significant effect on calcium content in the stem and leaves. Increasing N concentrations in nutrient solution decreased vitamin C and increased nitrate contents in the stem only when plants were subjected to shading on Exp. 1.1. In experiment 2, plants were grown in the nutrient solutions with constant N concentration 180 mg/l and different K concentrations of 150, 250 and 350 mg /l during 7 Jul.–4 Aug. 08 (Exp. 2.1) and during 3 Feb.–5 Mar. 09 (Exp. 2.2). K concentration of 250 mg/l gave the highest growth under warm weather condition (high temperature 34-44°C) and K concentration of 150 mg/l gave the highest growth under hot weather condition (high temperature 38-47 °C). Increasing K concentrations had no significant effect on vitamin C, fiber, chlorophyll a and b, carotenoid, phosphorus, calcium and nitrate contents. In the experiment 3, plants were grown in different Ca concentrations of 120 140 and 160 mg/l. In Exp. 3.1, they were grown during 3 Sep.–1 Oct. 08 in the nutrient solutions with constant N and K concentrations at 150 and 250 mg/l, respectively and In Exp. 3.2, plants were grown during 12 Mar.–9 Apr. 09 in the nutrient solutions with constant N and K concentrations at 150 and 150 mg/l, respectively. Increasing Ca concentrations had no significant effect on growth, vitamin C, fiber, and phosphorus contents in the stem and leaves but increased calcium content in the stem and leaves. Ca concentration of 140 mg/l gave the highest chlorophyll a and b and carotenoid.

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Thesis Advisor's signature