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New method of nutrient management in hydroponics and the application for production of low potassium tomato fruit

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Chronic kidney failure becomes a global problem in recent years, and the patients are often restricted K intake because of the problem with excretion of excess K. Low K tomato fruit will improve the dietary habits of the patients and their QOL. In this study, a method of producing tomato fruit with low K content was investigated. Medium-sized and cherry tomato (*Solanum lycopersicum L.*) cultivars were used, and the supply of K was restricted using hydroponic technology. In medium-sized tomatoes, fruit K content decreased 40% to 60% depending on cultivar by K withdrawal from the nutrient solution. Although total soluble solid content showed a slight decrease, titratable acid content was affected by K restriction and decreased 20% to 40% depending on cultivar. In either case, K withdrawn in hydroponic culture from anthesis of the 3rd truss was effective in producing tomato fruit with low K, and could decrease the fruit K content to at least 50% of the expected tomato fruit K content. Next study, we applied the newly developed management method, quantitative management, about nutrient supply in hydroponics to control the K supply more precisely. In quantitative management, total amount of nutrients necessary for the plants to achieve their life cycle is divided by the estimated cultivation period. And the calculated amount of fertilizers is supplied to the solution tank at every regular interval. Low K fruit (100 mg K/100 g fruit) was achieved when 0.9 g of potassium was supplied. From these results, restriction of K supply in hydroponics with double or triple truss system is hopeful to produce low K tomato fruits, and quantitative control is thought to be more suitable for low K tomato production. Further study is necessary to expect the cultivation period accurately before the cultivation to plan the schedule of K supply.

Recent publications

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Biography

Satoru Tsukagoshi has his expertise in Hydroponic Vegetable Production, especially management method of nutrient solution and improvement of products' quality. In recent years, his research activity spreads through the field of Plant Factory. He takes some classes about Hydroponic Technologies for foreign students and overseas engineers in Chiba University. Chiba University has concluded the agreements on the joint project about plant factory using artificial light and advanced environment control with some foreign research institutes and universities. He contributes to the technology transfer by the joint project as a leading expert of Hydroponics.

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