ISP technologies

environmentally clean crop production for healthier food

Cucumber
Greenhouse/High Tunnel

(Rates Based on 100 plants)

Growing a successful greenhouse/high tunnel cucumber crop requires careful attention to plant nutrition from planting through the maturation of the last fruit. There are distinct advantages to growing and marketing cucumbers in trellised, indoor systems. These include: reduced scarring on the fruit, higher yield using a small footprint, straight and long fruit, selling into markets both before and after the traditional outdoor season, and, very quick turnaround times in replanting. A single structure can continually produce fruit from March through November without artificial lighting. Proper plant nutrition including balancing potassium, calcium and magnesium in plant tissue will greatly reduce culls and improve your percentage of #1 fruit. Cucumbers can be produced in the soil, high porosity soilless media and fully hydroponic.

It should be noted that this program is presented as a guideline only based upon research and the experiences with a number of growers. With the wide variances possible from both soil types and environmental conditions present during any particular season, your actual recommendation can vary from what is presented. It is always advisable to discuss actual management practices with your local ISP specialist.

Fertility; Soil Culture: Apply approximately 50% of your expected nutrient requirements to the soil as granular materials prior to planting. Knott's Handbook for Vegetable Growers estimates that fresh market cucumbers use 100 units of nitrogen, 100 units of P_2O_5, and 150 units K_2O per acre. This is a good starting point for the application of a preplant nutrient blend. Apply as a bulk blend 40-50 units of N, 50 units of P_2O_5, and 75 units K_20 per acre prior to planting. Since this publication focuses on high tunnel production that works out to 1.5 units of N + 1.5 units P + 2.5 units K per 100 plants.

Fertility; Soilless Media and Hydroponic Culture: Plant nutrition is based on a near constant feed system with some ppm of N and sufficient P, K, Ca, Mg and micros being applied through regular fertigation. Once the first true leaves are opened, we start feeding ever increasing amounts of N-based plant foods for about 4 weeks. Once fruiting begins in earnest shift to a high K-based program, maintaining a constant flow of macro- and micronutrients based on regular tissue analysis. Manufactured potting medias come with a 'starter charge' of nutrients that will generally last for about 2 weeks. After that time, most of the N-P-K has either been used by the plants or been removed (leached) through irrigation.

Transplant Solution: Transplant solution should contain: .8 pounds of 10-45-10 + 3 fluid ounces of Phytogro Xtra + 2 fluid ounces of Metabolik SB per 10 gallons of total solution. Water all transplants in thoroughly with this mix. Begin fertigation within a week of transplanting or once the first true leaves have emerged on direct seeded plants.

The more aggressive growers are always observing all aspects of plant growth, vegetative development, numbers of fruit set, and of course any outbreak of pests or disease. Although this provides valuable data, it is recommended that tissue testing begin as the vines reach 2 - 3' of growth on their trellis lines and again 2 weeks later as the first fruit forms are setting. This testing schedule is generally sufficient to adjust plant nutrient needs as necessary to achieve high yield and quality. Watch for elevated N, low K, low Ca and Mg levels as these are common problems. Recommended range for tissue nutrients: N 2.5 - 5%, P .5 - 1%, K 3 - 6%, Ca .8 - 3%, Mg .4 - .8%, S .4 - .8%, B 40 - 100 ppm, Cu 4 - 10 ppm, Fe 90 - 150 ppm, Mn 50 - 300 ppm, Mo 1 - 3 ppm, Zn 50 - 150 ppm, & Si 2,000 - 3000 ppm. (Testing silicon, Si, is an additional test).

Katrina cucumbers grown in a greenhouse environment

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Research has clearly indicated that a constant feeding program based on ppm N is the best method to feed indoor cucumbers. In an optimum situation, a two tank system where one tank contains N-P-K, plus Mg and micros, and a second tank with Calcium (CalStore or MetaCal) will allow for a six days on, one day off weekly feeding schedule without any concerns about precipitation clogging the system. Applying clean water only on the day off will go a long way to preventing the buildup of excess salts in the soil or media. All of the information in the table below are shown as "per week" application rates.

Week	N-based ppm	ISP Soluble Plant Foods For 1 gallon stock solution for a 1/100 injector	Other Notes, micronutrients, calcium, magnesium
1	75	.22 pound 28-16-7	
2	75	.22 pound 28-16-7	
3	100	.15 pound 28-16-7, & .42 pound 10-20-20	Begin feeding CalStore or MetaCal through second injector. Use 4 oz per gallon of concentrate based on a 1/100 injector.
4	125	.20 pound 28-16-7, & .55 pound 10-20-20	Include SiMag58 at 2 teaspoon/gallon in N-P-K stock tank.
5	150	.70 pound 9-14-24, & .63 pound 10-20-20	Continue Ca and Mg materials through the end of the crop. Begin weekly foliar nutrients with disease management program.
6	200	.85 pound 9-14-24, & 2 pounds 4-18-38	
7	200	4.2 pounds 4-18-38	
8	200	4.2 pounds 4-18-38	
9 to end	200	4.2 pounds 4-18-38	Continue based upon crop condition and sequential planting schedule.

NOTE: The information in the table is designed for most cucumbers with a maturity of 45 to 50 days, with average weather. Prolonged cool, cloudy periods will add days to this schedule, and extreme heat can shorten the schedule. Tissue testing at the two critical points listed on front page will greatly improve opportunities for a successful crop. In addition, maintaining a consistent moisture level in your growing medium is essential for maximum yield and fruit quality.

Although this is not a complete list, proven varieties for greenhouse production include Katrina, Corinto and Tasty Jade. Others are well suited for this production method based upon your market demands.

Foliar Applications: Foliarly applied nutrients (K, Ca and Mg) will greatly assist growers in maintaining sufficient amounts of these nutrients when coupled with a proper fertigation program, especially at key stress points. Examples are fruit set and / or maintaining vegetative growth with a heavy fruit load. Include ISP plant food 4-18-38, plus SiMag58 at 1-2 teaspoons (5 -10ml) per gallon of foliar solution. Spray weekly with any foliar applications for pest management. CalStore and MetaCal can be applied foliarly with pest management materials, but not with 4-18-38 in order to avoid any reactions with phosporous (P).