

Sub-Irrigation is the recommended irrigation method for microgreens production. While it is technically feasible to water manually it is not recommended because it makes plants more susceptible to disease. *Note: some types of irrigation systems are not compatible with organic nutrients due to the build-up of filamentous bacteria.*

Modified Aquamat, a New Alternative for Microgreens Growers

We recently conducted preliminary testing of a new growing system for microgreens production which allows conventional growers to transition from production in soilless mixes to Sure to Grow[®] with a low capital investment.

The Modified Aquamat is an economical, easy to install system that requires minimal changes to standard cultivation practices. A grower wishing to use the Modified Aquamat for Microgreens production With Sure to Grow[®] requires:

- Level growing benches with mesh tops
- Modified Aquamat
- Pressure regulator, Filter, timer
- Fertilizer injector or nutrient tank w/ pump
- Complete, water soluble hydroponic nutrient



**Note: Aquamat is not compatible with some organic nutrient solutions*

For more information about the Sure to Grow[®] Aquamat Trial contact: tech@suretogrow.com. For information about Aquamat go to: www.solenotextiles.com. The Modified Aquamat for Microgreens is a custom-produced product which can be fabricated in widths ranging from 3' to 15' wide up to the length specified by the grower. For additional information and inquiries contact: Ms. Josianne Picard, Sales and Marketing Coordinator, Solena Textile, (450) 668-2545, email: jpica1@soleno.com.

NUTRIENTS AND IRRIGATION

There is no "standard" nutrient in the microgreens industry in the USA. Irrigation systems vary from simple manual systems to an assortment of automated systems including nutrient injectors, irrigation booms, drip systems, nutrient film and flood and drain (or ebb and flow) systems. Nutrients used include:

- Water soluble chemical nutrients- these commonly are conventional greenhouse nutrients or complete commercial hydroponic solutions
- Water soluble organic nutrients - common ones are derived from kelp, sea water and compost teas
- Organic additives such as compost, vermicompost and mineral dusts

Recommended Nutrient for Sure to Grow[®] - STGPads are completely inert, with no starter nutrient; therefore a complete hydroponic nutrient solution is required. Conventional water soluble nutrients containing urea based nitrogen are not recommended. Organic nutrients can be used in some systems, but there are issues with fermentation and the development of filamentous bacteria which plug emitters. At this time there are no known scientific studies to determine the optimal nutrient composition for microgreens production. A common practice is to use a half-strength solution.

Recommended Irrigation for Sure to Grow[®] - Sub-irrigation by Nutrient Film Technique (NFT) or Flood and Drain are recommended for the production of microgreens with Sure to GroW[®] Pads and Rolls.



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Made in the U.S.A.



SURE TO GROW

The Future of Plant Growth Media

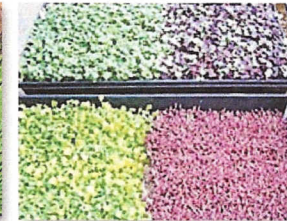
The only Media for Growers of Microgreens, Baby Greens, Wheat Grass and Sprouts

Better Technology • Faster Growth • Higher Yields • Clean • Hygienic • Sterile

WHEAT GRASS



MICROGREENS

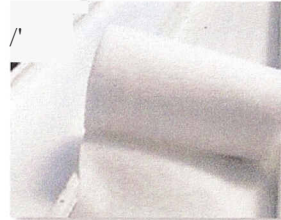


BABY GREENS



See the STG[®] Advantage for yourself:

STEP 1



STEP 2



FINAL REWARD



STG PADS & ROLLS

- STG P200C
Fits standard 10" x 20" nursery trays
- STG PT2D-C
lence fiber- Fits standard 10" x 20" nursery trays
- STG Grow Pads
Fits Jamba spec 16" x 16" trays
- STG R135-C
135' roll for use with 10" x 20" trays
- STG R260C
26' roll for use in 12" wide troughs
- STG R130C
13' roll, fits 9" wide Crop Kingtroughs
- STG R1820C
182' roll, fits 9" wide Crop Kingtroughs
- STG R600C
60' roll, fits 4" wide Crop Kingtroughs
- STG CL3-C
3" x 3" clamshell pad
- STG CL4-C
4" x 4" clamshell pad

MICROGREENS PRODUCTION WITH SURE TO GROW® PADS

By: Adriana Gutiérrez

BACKGROUND

Microgreens are exceptionally tender, young seedlings, which are used by "high-end" restaurants chefs for creative garnishes or flavoring. Over the past 10 years, the demand for microgreens has expanded dramatically, moving from very high end restaurants to the mainstream "white table-cloth" restaurants. They typically are grown in high density production systems with very short crop cycles of 8 to 14 days.

Production is split between very large commercial growers who distribute their products through produce brokers and distributors on a regional and national scale and "boutique growers" who market directly to local restaurant customers and distributors. The growing interest in microgreens, coupled with the increasing demand for locally grown, sustainable produce has created a niche for new growers of microgreens.

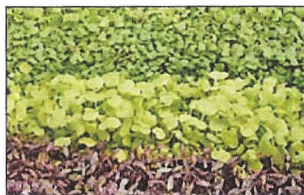
In the USA microgreens are typically sold in cut form, with the seedlings typically harvested at 2" tall. They are usually packaged in plastic clamshell containers holding 4 oz. to 8 oz. With the entry of the Dutch firm Koppert Cress into the US market in 2006 there has been increased interest among chefs in "Living Microgreens", however this is expected to be limited to a small segment of the market.



PRODUCTION SYSTEMS

There are a variety of microgreens production systems in use around the USA. Typically, growing systems have evolved from production methods used by growers for other crops, often salad greens or even bedding plant production. The majority of microgreens are produced in greenhouses; the most common production methods include:

- Soilless mix in nursery flats or plug trays
- Permanent beds on raised benches
- Channels, troughs or gulleys
- Flood and drain trays or tables
- In-ground beds
- Growing racks



GROWING MEDIA

Production is split between conventional growers and hydroponic growers. "Conventional Growers" typically grow in nursery flats or plug trays filled with peat-based soilless growing mix. Common brands of "Peat-Lite" mixes include Fafard, Promix and Sunshine Mix. Organic growers use similar mixes, often amended with compost or vermicompost. Hydroponic Growers use a variety of different media with the most common being perlite and vermiculite. Other less common media include burlap, paper towels and coco fiber. Some growers use fresh media for every batch, others clean the media between crop and re-use it.

ISSUES FACING MICROGREEN GROWERS

Microgreens are an attractive crop to growers because of the high \$ value potential and numerous crop turns. However this is balanced by high labor and high seed cost and a number of other issues:

- **Bed preparation and tray filling labor** - the 8-14 day crop cycle for most microgreens requires continuous labor for preparing growing trays or growing beds and channels, typically twice a week. Trays, beds or channels must be filled or topped off with media before every crop. Larger growers do this mechanically, small growers do it manually.
- **Seeding** - is typically done manually although some growers use specially modified automatic seeders
- **Harvest** is typically done by hand using scissors or shears.

- **Media Recycling** for growers who recycle media, there is significant post-harvest labor required to remove plant debris from the media.
- **Disease** - high density crops are prone to diseases such as damping off or pythium. This is often compounded by recirculating nutrients, the re-use of growing media and overhead irrigation.
- **Product contamination** - crops grown in loose media can easily become contaminated with media particles during growth and harvesting. It is almost impossible to assure 100% uncontaminated product.
- **Water conservation/water restrictions** - Overhead Irrigation is a common practice in conventional greenhouse bench-top production. Growers are facing water quotas and regulations are being adopted around the world requiring the containment of irrigation run-off.

SURE TO GROW® MEDIA FOR MICROGREENS PRODUCTION

With the introduction of Sure to Grow® Pads, current and prospective microgreens growers have a superior media alternative which provides significant benefits to growers, including:

- No product contamination
- Reduced labor for bed preparation and harvesting
- Reduced incidence of disease
- Increased growing bed turnover
- Significant reduction in freight and storage space for growing media

MICROGREENS GROWING SYSTEMS COMPATIBLE WITH SURE TO GROW®

The majority of growers interested in Sure to Grow® for microgreens production are existing growers who are interested in switching away from soilless mixes and more conventional bench-top growing systems. There are a number of different systems which are compatible with Sure to Grow® for microgreens production:

Hydroponic Systems

Sure to Grow® Pads are readily compatible with most hydroponic growing systems, in particular those utilizing Drip, Nutrient Film Technique and Flood and Drain systems. Examples of these systems include American Hydroponic's propagation system, Crop King's Microgreens Racks and trough systems developed by Gordon Creaser.



Gordon Creaser trough system



Crop King MicroGreen System



AmHydro Propagation System

These systems characteristically include growing trays or channels and have recirculating or one-way irrigation systems, typically utilizing pumps which deliver nutrient from a central reservoir. Conversion to STG requires removal of the existing media and replacement with Sure to Grow® Pads or rolls. The irrigation might require some minor adjustments. In very hot climates some growers supplement the irrigation system with mist systems to maintain the appropriate environmental conditions, especially during the first 3 days which are critical for germination.

Conventional Growing Systems

Growers who currently use more conventional growing systems will need to provide the following system components when setting up or converting a system to grow microgreens with Sure to Grow®:

- **Growing trays, channels or racks** - all troughs or channels need to have level bottoms.
- **Growing Benches** - need to be level.
- **Irrigation system** - automatic watering systems are highly recommended for Sure to Grow® microgreens growers. The options include:
 - **Central nutrient tank and pump** - required for recirculating systems; also an option for one-way systems
 - **Nutrient injection/ fertigation system** - such as Dosatron or Chemtron injectors;