OASIS® GROWER SOLUTIONS **Fact Sheet**

Hydroponic basil production using OASIS® Horticubes® XL or Horticubes® allows clean, uniform, and vigorously growing high quality plants

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Basil is the most popular culinary herb that is produced hydroponically. Hydroponic production not only allows basil to be produced fresh and flavorful year round, but also, the growth is much faster compared to the field production.

Basil *(Ocimum basilicum)* is a fast-growing herb that belongs to the aromatic Lamiaceae family, which includes several other herbs like mint, oregano, thyme, sage, rosemary, lavender, and lemon balm. There are several types of basil that are available, with a distinct flavor and aroma. Among those, sweet basil is the most commonly grown type. Basil can be grown in an NFT (Nutrient Film Technique) system or a Float System. Basil seedlings are extremely sensitive to Pythium and other damping off pathogens. Propagating basil in OASIS® Horticubes® or Horticubes® XL* ensures uniform germination and growth, without any concerns of disease-causing pathogens. Following are the salient features and benefits of OASIS® Horticubes® or Horticubes® XL medium:

- The OASIS® foam growing media are a uniquely engineered propagation media.
- They are thermoset foam materials and are considered to be sterile because of the high temperature involved during the manufacturing process.
- The OASIS® foam growing media are inert with no buffering capacity. As a result, all the applied nutrients are readily available to the plants.
- Horticubes® is a relatively higher drainage and higher density medium and Horticubes® XL is a lower drainage and lower density medium. Both types of foam media are suitable for basil seedling production. The lower density and finer cells of Horticubes® XL promote faster root penetration, and also promote profuse fine secondary roots, which in turn promote faster shoot growth.

Basil is sold as fresh cut or living basil with a root system intact. The postharvest shelf life of basil is limited. Retailers often hold sweet basil at room temperature to avoid a chilling injury, although these warm temperatures promote water loss and eventual desiccation. Keeping the roots intact and moist can maintain the postharvest quality and improve the shelf life of basil. Producing basil hydroponically in OASIS® Horticubes® or Horticubes® XL foam media allows the plants to be held with roots intact and moist through the postharvest environment.

*This product is available in limited areas.

The following is the general procedure for basil propagation and production:

Basil Propagation in Horticubes® XL or Horticubes®:

- **Seed:** Make sure that you are using a good quality seed with a high germination percentage.
- **Media:** Use Horticubes® XL or Horticubes® Medium (276 cell count) with multi-seed dibble hole.
- **Tray:** Choose the tray depending on the method of irrigation (solid bottom with drain holes for overhead irrigation and web bottom tray for sub irrigation).
- **Initial Watering and Nutrition:** This is the most important step for optimal success. The Horticubes® XL or Horticubes® sheets need to be thoroughly watered with Oasis® Hydroponic Fertilizer* (OHF 16-4-17) at 1mS/cm (125 ppm N) or any other high quality complete nutrient solution with first watering. The recommended procedure for proper initial watering is to float saturate the foam in complete nutrient solution, followed by complete overhead flushing with a nutrient solution using a hose and a breaker. Refer to the Horticubes® or Horticubes® XL protocol sheet for a detailed step-by-step procedure.
  - *Note: Float saturation should be always followed by overhead flushing with complete nutrient solution. Not following the proper initial watering protocol can result in non-uniformity and delay in growth*
  - *Note: Using complete nutrient solution at 1 mS/cm (125 ppm N) instead of clear water with initial watering will double the basil seedling growth.*
- **Seeding:** With basil, it is recommended to place multiple seeds in a hole (~ 6 seeds / hole). It is not required to top dress the seed.
- **Germination:** After seeding, the sheets can be placed directly in a greenhouse under light, or in a dark room for the first two days and then move them to the greenhouse. The seeds germinate best at warm temperatures of 21° C to 24° C (70° F to 75° F). It takes about 5 to 6 days for the seeds to germinate.
- **Watering:** On days 3 and 4, mist the seedlings once or twice per day, depending on the greenhouse temperatures. From day 5 onward, water once a day or every alternate day, using a hose and a breaker if you are using overhead watering. Watering can be also done by sub-irrigating, using an ebb and flood table.
  - *Note: Complete nutrient solution at 1 mS/cm (125 ppm N) should be used at every watering event during the whole course of propagation.*
- **Light and Temperature:** Basil seedlings can be exposed to full sunlight. Consider shading the greenhouse, when light levels exceed 500 - 600 µ.moles/m^2/s. Maintain the average daily temperatures between 70° F to 80° F (20° F to 27° F).
- **Transplant:** Seedlings will be ready to transplant within 14 to 17 days, depending on the time of the year. The criteria for transplant is the emergence of true leaf, and roots penetrating out of the bottom of the foam.
  - *Note: Hold off watering the foam one day before transplant and this will allow easy separation of the foam cubes at transplant.*

Basil Hydroponic Production:
Basil can be grown in an NFT (Nutrient Film Technique) system or a Float System with deep or shallow nutrient solution. To produce a marketable basil bunch from transplant, it takes about 4 - 5 weeks to finish during summer months and 6 - 7 weeks during winter months, when the light and temperature levels are lower.

- **Nutrition:** The key to growing a high quality and nutritionally strong basil plant is by choosing the right nutrient sources that are balanced and available for the plant to take up. The recommended EC for basil production is 1.25 mS/cm to 1.5 mS/cm.
  - o Following are the general mineral nutrient targets for basil, adapted from data collected at J. R. Peters Laboratory in Allentown, Pennsylvania.

Nutrient	N	NO_3	NH_4	Urea	P_2O_5	K_2O	Ca	Mg	S	Fe	Mn	B	Zn	Cu	Mo
ppm	150	135	135	0	25 - 35	125.0	80	40	100 - 300	2 - 3	0.75 - 1.0	0.25	0.25	0.15	>1

  - o The recommended pH of the nutrient solution is 5.8 to 6.2.
  - o For production, OASIS® Hydroponic Fertilizer* (OHF 16-4-17) or any other high quality complete nutrient solution can be used. Refer to the product technical sheet for detailed instructions on using OHF 16-4-17.
- **Temperature:** Maintaining greenhouse temperature is very important for optimal basil growth. Basil is very sensitive to cold temperatures and grows very well at warm temperatures. Maintain greenhouse day temperatures between 75° F to 85° F (24° C to 30° C) and night temperatures between 65° F to 75° F (18° C to 24° C). The best growth can be observed when the average day and night temperatures are maintained between 80° F and 85° F (26° C to 30° C).
- **Humidity:** Greenhouse relative humidity needs to be maintained between 40% and 60%. High humidity favors disease development as well as nutrient deficiencies, since transpiration is hindered. Especially when warm days are followed by cool nights, it is essential to heat and vent the greenhouse. This practice allows the humid air to be driven out and to bring in air with less humidity, which is further dried by heating.
- **Light:** Basil requires good light levels and can be grown in full sunlight in the greenhouse. However, when light levels exceed 500 - 600 µ.moles/m^2/s, consider shading the greenhouse. A 14 to 16h day length with 15 - 17 moles / day gives the best growth performance.
- **Spacing:** For optimal light utilization for maximum growth and proper humidity management, maintain a center to center spacing of 5" to 6".
- **Postharvest:** Basil is marketed as fresh cut or living basil with roots intact. Basil is sensitive to chilling injury when stored at temperatures at ≤ 50° F (10° C). The optimal conditions for maximizing the shelf life of basil are to store at 60° F (15° C) and to avoid water loss. Living basil has a better shelf life and flavor compared to fresh cut basil at the retail level. Producing basil in Horticubes® XL or Horticubes® foam allows the plants to be packaged easily with roots intact. Make sure the foam cubes are fully saturated with water before packaging the plants.
  - *o Note: Harvesting basil at the end of the light period can improve the postharvest shelf life* (HortScience, Vol. 29 (2), February 1994).

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a. Basil seedlings grown in Horticubes® XL medium. The seedlings are 15 days old and ready for transplant.

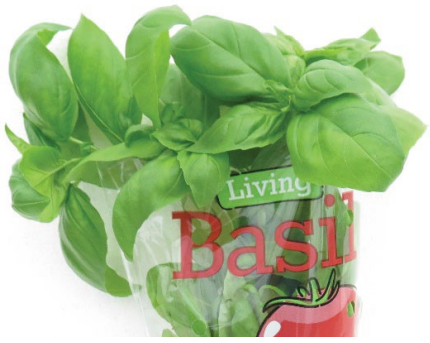
b. Basil seedlings grown in Horticubes® medium. The seedlings are 15 days old and ready for transplant.

c. Basil seedlings produced in Horticubes® XL Medium – 17 days and ready for transplant.

d. Basil propagated in Horticubes® Medium and being grown in an NFT system for 7 days.

e. Basil propagated in Horticubes® XL Medium and being grown in an NFT system for 35 days and ready for harvest.

f. Basil propagated in Horticubes® XL grown in an NFT system for 35 days and ready for harvest.



g. Basil propagated in Horticubes® XL grown in an NFT system and being sold as living basil.

OASIS® GROWER SOLUTIONS

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