GREENHOUSE PRODUCTION WITH SOILLESS MEDIA AS A METHYL BROMIDE ALTERNATIVE

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Greenhouse production using soilless culture should be considered as a valid alternative to field production using methyl bromide. In addition to avoiding problems associated with soil fumigation, vegetables grown in protected culture produce yields that are up to ten times higher over the season. Quality of greenhouse-produced vegetables is higher than for field-produced vegetables.

In recent years, imports of greenhouse grown produce, especially specialty tomatoes and colored peppers have increased into the United States and reduced the market share of Florida field produced vegetables. Consumers look for specialty produce such as cluster and beefsteak tomatoes and colored peppers produced in greenhouses, and are prepared to pay a premium for this produce.

In much of the world greenhouse production of vegetable crops has replaced commercial field production. The acreage dedicated to greenhouse production has increased substantially over the last decade and is continuing to expand. Greenhouse areas for vegetable production in countries that export into the U.S. include Mexico, 3,200 acres, Canada, 2,060 acres; the Netherlands, 8,000 acres; Spain has over 115,000 acres including 50,000 acres of tomatoes and 25,000 acres of colored peppers. The Mediterranean region as a whole has the highest concentration of greenhouse production in the world with around 250,000 acres.

The Protected Agriculture Project (PAP) at the University of Florida was established in 1999 as a demonstration project. Research is conducted on crop production inside screened plastic greenhouses with passive venting. These greenhouses are commercially produced and relatively economical ($2-$4 ft^{-2}). Greenhouse production systems from other locations are adapted to function effectively under Florida conditions. The mild winter climate in Florida means that greenhouse production can be conducted with only minor, or no requirements for heating, thus lowering energy costs. The vegetables are protected from the sun, wind, rain and high humidity so the incidence of fungal diseases is decreased and pesticides may be reduced or eliminated.

Production systems have been developed for growing tomatoes, peppers, strawberries, cucumbers and melons without pesticides in soil-less culture. Several types of soilless media are available and comparisons of peat mix, perlite,

and pine bark at the PAP with crops of cucumbers, melons, peppers and strawberries found no significant differences in yield or total marketable fruit. It is recommended that the media be selected on the basis of cost.

The use of pesticides is avoided and bumble bees (*Bombus terrestris* L.) (Koppert Biological Systems Inc., Romulus, MI) are used for pollination inside the screened greenhouses. Initial problems at the PAP were caused by insect pests including aphids, whiteflies and thrips and the two-spotted spider-mite on strawberry. All of these problems were amenable to biological control using commercially available predators and parasites. Powdery mildew remains a problem and can be addressed by a variety of methods. Produce that is grown without the use of pesticides can be marketed for a premium as "pesticide-free".

A complete economic analysis is required to compare greenhouse production with field grown production using methyl bromide in Florida. Start-up costs are definitely higher in a greenhouse but the higher returns due to increased yields and quality can make greenhouse production profitable. This is the path followed by growers in other countries that are now exporting their produce into U.S. markets.

Advantages to greenhouse production in Florida.

- Soil fumigation in not required.
- Yields per acre up to x 10 greater than field grown
- Quality of fruit is increased.
- Incidence of most fungal and bacterial diseases is reduced.
- Insect vectored viruses are not a problem in screened greenhouses.
- Fruit can be produced and marketed as pesticide-free.
- Harvest efficiency can be improved.
- In Florida energy costs for heating are reduced or absent compared to colder climates
- Increased efficiency of water use.

Disadvantages

- Start-up costs for greenhouse production can be high.
- Grower knowledge deficit: growers are skilled at highly intensive field production. They must adapt their skills for greenhouse production.

Greenhouse production of vegetables in soilless media must be considered as a serious alternative to field production with methyl bromide.

References available at: **http://www.hos.ufl.edu/ProtectedAg**