

# Post Harvest Handling & Cooling

Standards and  
Practices for Fresh  
Fruits & Vegetables

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# Presented by Warren King WellSpring Management

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# Why Bother with Fresh Produce Markets?

- According to USDA figures, fresh produce consumption is increasing:
  - 13lb rise in per capita vegetable demand
  - 50lb rise in per capita fruit demand
- Yet imports are taking a large share of this new demand; 50% in fruit and 25% in vegetables.

# Why Bother with Fresh Produce Markets?

- Demand for local and regional foods is increasing:
  - estimated at \$5.0 billion and increasing at least 10% annually.
  - consumers want more information about their food; who grew it, how and where it comes from?
  - retailers and food service are looking to “green” their operations. This includes buying more local food.
  - local production can provide a higher level of food security for consumers and retailers.

# Why Bother with Fresh Produce Markets?

- Moving “up” the supply chain can mean higher prices, new market opportunities and increased margins...
- But you have to add “value” in the form of handling, cooling, storing and shipping that meets the needs of fresh produce markets.

# Factors That Can Influence Postharvest Handling Success

- Soil Composition & Texture
- Irrigation
- Insect Pests
- Cultivars
- Production Techniques
- Crop Maturity
- Harvest Equipment and Methods

# Factors That Can Influence Postharvest Handling Success

- Soil Composition & Texture
  - levels of nitrogen, phosphorus, potassium and calcium impact taste, color, nutrient levels and postharvest diseases.
  - percentages of soil organic matter effect overall plant health and its ability to deliver nutrients to food
  - soil texture( sand, silt, clay) have is an important consideration when choosing crops and can impact taste.

# Factors That Can Influence Postharvest Handling Success

- Irrigation
  - inadequate moisture during the growing season can lead to damage and decay during storage
  - excess moisture can lead to a decrease in flavor and nutritional quality
  - harvesting during rainy periods or storage without proper ventilation can increase postharvest decay

# Factors That Can Influence Postharvest Handling Success

- Insect Pests
  - feeding by insects leads to blemishes that negatively effect appearance.
  - feeding can also lead to surface punctures that increase postharvest diseases.
  - insect pests within storage facilities can lead to chronic infestations.

# Factors That Can Influence Postharvest Handling Success

- Cultivars
  - choose varieties that fit the types of markets and the harvest window you're aiming for.
  - do you need to optimize taste, appearance or shelf-life?
  - selling to local and regional fresh markets may mean changing cultivars and experimenting.
  - find other growers you can learn from and share knowledge.

# Factors That Can Influence Postharvest Handling Success

- Production Techniques

- staking, pruning and the use of row covers can effect plant “micro-climates”, reducing blemishes and excess moisture that can lead to decay.

- use of integrated pest management to attract beneficial insects and repel others can reduce damage from insect feeding.

- spraying fungicides at critical periods also can reduce blemishes and surface mold that can lead to postharvest decay.

# Factors That Can Influence Postharvest Handling Success

- Crop Maturity

- harvesting earlier, later or more often can reduce the potential for postharvest decay. This is a distinct advantage that smaller, local growers have over larger and more distant producers.

- knowing the definition of “ripe” for your market is critical to meeting your customers expectations.

- crops like apples, blueberries, peaches and tomatoes can continue to ripen “off the vine”. This is another advantage for local growers.

# Factors That Can Influence Postharvest Handling Success

- Harvest Equipment and Methods
  - harvesting early in the day reduces the amount of field heat that needs to be removed from produce
  - picked produce should be kept in the shade while in the field and well ventilated.
  - transfer crops from the field to cooling and storage facilities as often as possible.
  - field packing can reduce damage and shorten the cooling cycle but may lead to inconsistent grading and quality.
  - make sure your cooling equipment is designed to bring temperatures down to the necessary levels.

# Which Postharvest Handling Procedures Should I Adopt?

- A lot depends on the crops you intend to grow; the more diverse your operations are, the more complex your postharvest handling needs to be.
- No matter what crops you plant, presorting is essential to insuring your customer receives the highest quality and that the potential for disease and decay are reduced.
- Making sure your employees follow USDA grading standards AND know the expectations of your buyers is essential to success.

# Which Postharvest Handling Procedures Should I Adopt?

- Most crops should be cleaned before cooling and storage. However crops sensitive to decay on wet spots or fragile should not be washed.
- Washing systems vary depending on the type of produce but a continuous flow of cold, fresh water is essential.
- Pressure washing, barrels and spinners are all useful in removing soil, improving appearance and reducing the potential for disease, decay and food borne illnesses.

# Which Postharvest Handling Procedures Should I Adopt?

- Uniformity in pack size is one of the most important standards to meet in selling fresh produce.
- Therefore mechanical or hand-sorting is an essential element of the postharvest handling process.
- Produce of similar size must be packed in the same box to achieve the correct weight and pallet configuration for shipment.

# Which Postharvest Handling Procedures Should I Adopt?

- Just about all produce is packed in corrugated or waxed cardboard boxes.
- Plastic trays are often inserted to protect fruit from bruising or where the pack size is based on a specific “count”.
- Ice is often used for leafy vegetables and is added at the time of packing.
- Stacking boxes to insure proper ventilation during cooling, storage and transportation is essential.

# What's My Role in the “Cold Chain”?

- The cold chain starts the minute produce is harvested. See pages 167 & 168 of the *Wholesale Success* manual for ideas on building a portacooler.
- The growers role in cleaning, cooling and temporarily storing produce at the correct temperature and humidity is what makes the fresh produce industry possible.
- Even though the majority of produce is shipped by commercial carrier, the grower needs to take responsibility for proper transportation.
- A visit to your buyers loading dock will give you much needed insight into how your produce will be handled at destination.
- See page 40 of the *Wholesale Success* manual for key points along the cold chain that you need to manage.

# What Else Do I Need to Know About Handling and Cooling Produce?

- Consider ethylene producing sources when deciding which produce to store and transport together.
- Check the temperatures of vans and truck boxes before loading.
- Consider how many different temperature and humidity zones will be needed for temporary storage.
- Trained employees and proper equipment are the keys to sorting produce effectively and efficiently.
- Produce boxes that carry your “brand” are an important way to communicate with consumers.

# How Do I Implement Good Quality Control?

- The “Wholesale Success” manual includes crop profiles that provide information on handling and USDA references for key Michigan crops.
- Follow these guidelines *and* know what your buyers expect in terms of appearance, size and weight.
- Communicate frequently during the season with your buyer. Have a “no surprises” attitude.
- Use training and frequent inspections within your operations ensure quality.

# What Else Should I Know About Selling Fresh Produce?

- The Perishable Agricultural Commodities Act (PACA) governs the trade of fresh and frozen produce.
- PACA is particularly important for growers in settling payment, grade and delivery disputes.
- Growers should make sure that their buyers are PACA licensed.
- More information on PACA and the list of licensed traders can be found at [www.ams.gov/fv/paca](http://www.ams.gov/fv/paca).

# Are Fresh Produce Market Opportunities Here To Stay??.....

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A LONGTIME ADDICT

IT'S  
A SAD  
BUT  
CLASSIC  
CASE

SUFFERING  
WITHDRAWAL  
SYMPTOMS

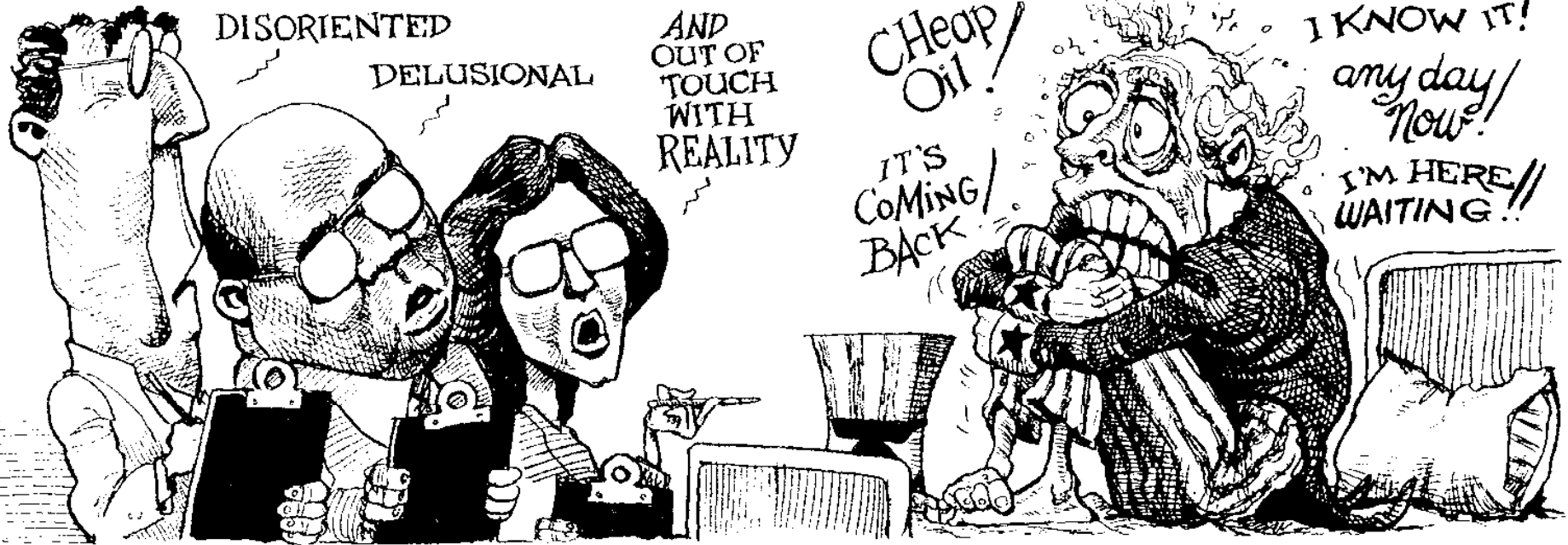


DISORIENTED  
DELUSIONAL

AND  
OUT OF  
TOUCH  
WITH  
REALITY

CHEAP  
Oil!  
IT'S  
COMING/  
BACK

I KNOW IT!  
any day/  
Now!  
I'M HERE//  
WAITING..



# Questions and Comments?

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## Final Thought.....

“Postharvest handling is the ultimate stage in the process of producing quality fresh fruits and vegetables; getting these unique packages of water (fresh commodities) to the supper table...”

## Final Thought.....

Production costs, plus postharvest handling, packaging, cooling, transportation, and marketing costs are the same whether the fruits, vegetables, and flowers that leave the farm are sold and/or consumed or not....

# Final Thought.....

Considering such investments, growers should do everything they possibly can to assure the quality maintenance of their commodities; and the satisfaction of those who purchase them. Remember, *marketing is extremely competitive.*”

*L.G. Wallace* – NC Cooperative Extension Service