

PRINCIPLES OF POSTHARVEST
HORTICULTURE

Midterm Exam II

100 points possible

Fall 2024

NAME: _____

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(20 Points) POSTHARVEST PATHOLOGY (Brecht)

(2 points) What term best describes most postharvest pathogens?

- a. Sophisticated saprophytes
- b. Opportunistic saprophytes
- c. Sophisticated parasites
- d. Unsophisticated parasites

(2 points) Soft rots are “soft” because enzymes produced by a pathogen dissolve:

- a. Cellulose and lignin in the cell wall.
- b. Stored starches, complex sugars, lipids and proteins.
- c. Pectates and pectins in and between cell walls.

(2 points) Arguably, the most important decay control practice for managing most perishable crops is to:

- a. Refrigerate to the lowest, non-damaging temperature as soon as possible.
- b. Wash promptly with water containing a surfactant and strong sanitizer.
- c. Dry surfaces of the harvested fruit or vegetable.
- d. Put fruits and vegetables in well-aerated, low-humidity storage.

(3 points) List three ways that breaking the skin (cuticle and epidermis) of a commodity promotes decay. This is **not** asking how the skin might become broken (e.g., scratched, cut, etc.), but why breaking through this barrier promotes decay.

(4 points) List four (4) ways to reduce postharvest decay of fresh fruits and/or vegetables that do not include the use of fungicides.

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(7 points) Discuss different ways that temperature management may affect pathogen activity, postharvest decay development, and the commodity's ability to prevent/fight pathogen invasion. Include in your answer one example of cold temperature not helping to reduce decay development.

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) MATURITY AND QUALITY STANDARDS (Ritenour)

(2 points) For each factor listed below, give an example of a fruit or vegetable crop for which that factor is used as a commercial maturity index.

a) Shape: diameter, length, compactness, uniformity

b) Soluble solids content

c) Oil content

d) Abscission layer development

(4 points) Provide a reason why a seller (shipper) might request a USDA inspection to determine the grade of their product; also provide a reason why a buyer (receiver) might request a USDA inspection when receiving the product.

(4 points) Explain why each of the following is an important feature of a maturity index for fruits and vegetables.

a. Simple:

b. Objective:

c. Stable:

d. Progressive change over time:

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) FOOD SAFETY (Brecht)

(2 points) A load of apples shipped from the U.S. to Europe arrives and the residue level of one pesticide are found to be slightly above EU tolerances. Europe is notorious for setting low pesticide residue tolerances. In this case, the U.S. shipper can negotiate a lower price with the receiver, but still be able to sell the product in Europe.
(T / F – circle the correct answer)

(2 points) Indicate which of the following food safety requirements must be followed according to U.S. law:

- GLOBALG.A.P. Produce Handling Assurance (PHA)
- Food Safety Modernization Act (FSMA)
- Primus Labs GFS
- Safe Quality Foods (SQF)
- British Retail Consortium (BRC)

(2 points) The above required by U.S. law(s) must also be followed by any foreign farm importing fresh produce into the U.S. (T / F – circle the correct answer)

(2 points) The PRIMARY purpose of adding a sanitizer(s) to recirculated water used on packinglines is to decontaminate the fruit surface of potential pathogens.
(T / F – circle the correct answer)

(2 points) Briefly explain why good food safety practices generally result in better arrivals of fresh produce quality and extended shelf life?

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) QUARANTINE TREATMENTS (Brecht)

(2 points) What is the name of the federal agency in the United States that regulates quarantine treatments?

(2 points) Quarantine treatments for fresh produce are not government approved unless they can be applied without causing injury to the product.

(T / F – circle the correct answer)

A new fruit called a Thing-a-ma-bob (TAMB) has been discovered in a tropical county that holds great promise for marketing in the United States. Unfortunately, the growing region is also home to a pest not welcome in the U.S.

(1 point) Name what type of quarantine treatment (e.g., of the chemical or physical options) or perhaps even a system approach you might most want to develop to import this product?

(2 points) Explain why this method would be your first choice.

(3 points) Why is it not necessary for an irradiation treatment to kill the targeted insect for it to be an effective quarantine treatment?

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) HARVESTING, HANDLING AND PACKINGHOUSE OPERATIONS (Brecht)

(4 points) Consider a cantaloupe grower/shipper harvesting fruit in the middle of summer in California that are then pre-cooled using forced-air cooling. Discuss possible advantages and disadvantages of harvesting the fruit during the night, rather than daylight hours.

Advantages:

Disadvantages:

(6 points) What is 'curing'?

What types of crops are cured?

What is the difference between curing potatoes, sweet potatoes, etc., versus onions and garlic?

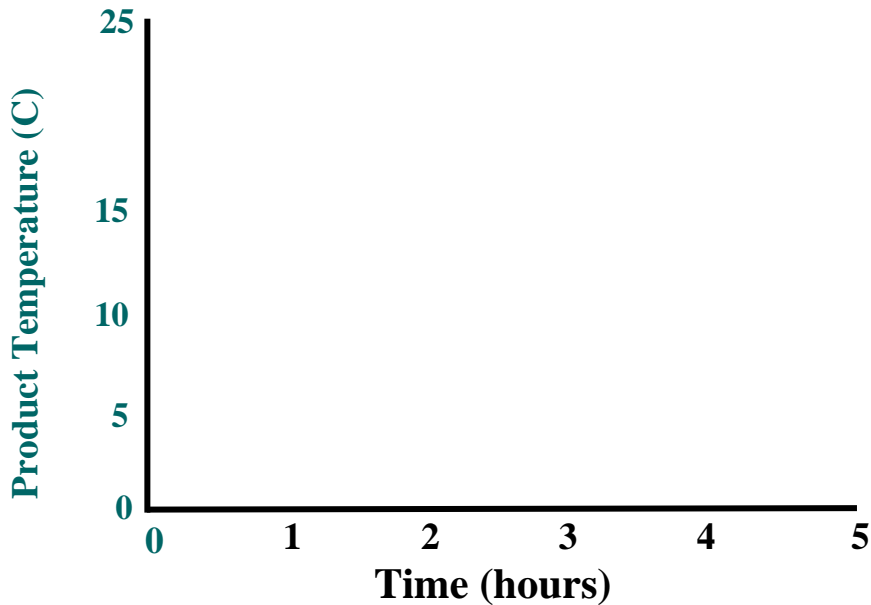
What are the benefits of curing?

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) TEMPERATURE MANAGEMENT (Ritenour)

(5 points) For a commodity cooled in air, draw a typical commodity cooling curve with temperature on the “y” (vertical) axis and time on the “x” (horizontal) axis. Assume that the starting temperature is 25°C, and the air temperature is 5°C. Identify the initial product temperature, the room air temperature, and the ½ and ¾ cooling times.



(3 points) Draw in the figure above how you would expect the above cooling curve to be different if the product was cooled using water (hydrocooling)?

(2 points) If the air temperature was maintained at 0°C instead of 5°C:

- Would the ½ cooling time change? Yes or NO (circle correct answer)
- Would the time for the commodity to cool to 5°C shorten? Yes or NO (circle correct answer)

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) COMMERCIAL STORAGE (Ritenour)

(4 points) Describe how a mechanical refrigeration system removes heat from the storage environment in terms of the physical principle that is involved. What happens to the heat?

(6 points each) Temperature control has been mentioned throughout the course as the number one tool that the postharvest horticulturist has at his disposal to maintain the quality of fresh produce. Briefly (a sentence or two), describe how temperature management is important for the following.

Growth of postharvest decay pathogens:

Rate of water loss:

Fruit ripening:

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) MA & CA (Ritenour)

(2 points) Both modified atmosphere (MA) and controlled atmosphere (CA) storage involve holding a commodity in a reduced O₂ and/or elevated CO₂ atmosphere. So, what's the difference between MA and CA?

(2 points) What is the difference between active *versus* passive modified atmosphere (MA)?

(2 points) How is ethylene involved in MA & CA storage?

(4 points) Indicate for each of the following if they are used commercially for controlled atmosphere transport conditions.

Truck semi-trailers –

Shipping container –

Refrigerated break-bulk shipping –

Air cargo containers –

MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(10 Points) TRANSPORTATION & THE DISTRIBUTION SYSTEM (Brecht)

(2 points) List four (4) things wrong with this refrigerated trailer that might make you, as a shipper of high-quality fresh produce, hesitant to allow it to haul your product from Florida to California.



MIDTERM EXAM II

POSTHARVEST HORTICULTURE

(8 points) List four different types of potential incompatibilities in mixed loads of fruits and vegetables **and** give an example of a pair of incompatible commodities for each type of potential incompatibility.