DEPARTMENT OF DEFENSE TRAINING PROGRAM FOR HANDLING AND STORAGE OF FF&V

Produce is *alive* and *breathing*. From the time produce is harvested, the life of the product starts to decline. In a perfect world you would have to have many storage areas with different temperatures to get the maximum shelf life and quality *YOU* desire. We all know this is impossible as storage space and temperatures are limited. However, there are variables we can control that will help us get the maximum use and quality out of our produce. Here are some *key* variables to maximize produce life.

Temperature is the **MOST** important variable in maximizing the life and quality of your produce. Poor maintenance of the cold chain is the number one reason for produce losses. For every *ten* degrees above ideal storage temperature, a produce item will lose up to half it's life expectancy. This holds especially true for items that will be served uncooked. An example of this would be *salad mixes* and *broccoli florets*. Even short periods of time outside of the cooler can result in a significant loss of shelf life and quality. Once the damage is done, putting the product into the cooler can't fix the damage already sustained. It is extremely important that you store your produce as soon as you get it in. Coolers need to be set at/or about 38-40 degrees or colder. This should hold your produce for the seven days you need to meet your needs.

Rotation is another variable *you* can control. It is essential that all produce be dated the day it is received. Should any product be left in your cooler when your new order arrives, place your new product under or behind the older product to assure the oldest is used first. This is called **(FIFO) First in – First out.**

Storage practices are very important. As we talked earlier, we don't have ideal storage areas for all of your produce. The temperature in your cooler will fluctuate throughout the day as doors are opened and closed. Temperatures in the front of your cooler will be warmer than the temperatures in the middle or back. I know your coolers are very small, but **some items need**

to be stored in certain areas *always*. Following are some examples and suggestions for future storage:

In the ***front*** of your cooler, you should store your cabbage, apples, melons, starfruit, citrus, cucumbers, onions, pears, peppers, plums, radishes and *RIPE* tomatoes. These items have a longer shelf life and can handle the fluctuating temperatures to give you the needed life to meet your weekly needs.

In the ***middle*** section of your cooler, you should store your items such as bunched broccoli (sprinkle with ice), whole head cauliflower, grapes, green onions (sprinkle with ice), kiwi fruit, mushrooms and parsley (also sprinkle parsley with ice to prolong shelf life).

The ***back*** of your cooler will be your coolest area. Store your most perishable items there. These items will be sprouts, berries, carrots, all precut items such as carrot sticks, sweet potato sticks, celery sticks, salad mixes, coleslaw, head lettuce, leafy lettuces, ripe peaches and nectarines. All greens such as collards, kale and mustard can be sprinkled with ice to lengthen the life of the product as the slowly melting ice will replace any moisture loss in the product.

Note: There are *always* exceptions to the rules. As noted, you should store ripe tomatoes in the front of the cooler. In actuality, they should **never** be stored in a cooler, as the cooler will take all the taste out of the product. Tomatoes should be received in a firm condition with a pink to light red color. However, when they reach their ripeness and feel a little soft, they may need to go in the cooler to slow the ripening process until you are ready to use them. Potatoes need to be stored outside the cooler also. The ideal temperature to store potatoes is between 45 to 50 degrees. Potatoes stored below 40 degrees will convert the starches to sugar. This will result in the potato turning dark when fried. Also **never** store potatoes under direct light. This will result in the potato turning green and will have a bitter taste. New crop apples generally have a shelf life of up to or exceeding a month when stored under ideal conditions. With the shortage of cooler space, it may be an option to store them in the back room, as they will give you two weeks life easily. With controlled (CA) atmosphere apples, you may not want to risk it.

Ordering is a very important task that will help to make sure you always have the best possible produce on hand and will eliminate loss. Maintain an inventory control record to help show you exactly what you are using each week. Over a period of time, you will master each items useage. Make copies of the form handed out and post it on your cooler door weekly. This form will take only a couple of minutes each week to fill out and it will show you exactly what you used, and thus, what you need to order.

Handling Tips for Everyday Use Of FRESH CUT Produce

KEEP ALL PRODUCTS COLD (under 40 degrees) until ready to use.

To store unused portions for later use:

Salad Lettuce – partially used bags can be kept for about 12 hours by pushing all the air out of the bag, twisting top of bag closed and stored cold. Air is what turns cut lettuce brown. Once lettuce is put into a bowl on the salad bar, that portion can not be kept for later use.

To **rehydrate** lettuce, you can toss either newly opened or "leftover" lettuce in *tepid* water – not cold. The lettuce will rehydrate as it chills. Recipe: ½ cup tepid water to 5# lettuce.

Shred Lettuce – can not be rehydrated – store unused portions same as salad lettuce.

Carrot and Celery Sticks – Store in clean containers of water. Change water daily. You may use these directly from the bag, or Store this way.

Sliced Radishes – Store in clean containers filled with water.

Onions – Keep in bag, or put into closed containers.

Shredded Carrots – Keep in bag, or put into closed containers.

Broccoli and Cauliflower Florettes – Store in their own bags, or in a covered container.

Peppers – Store in their own bags under refrigeration. This product may appear dry (a little white-ish) – that is good! A wet pepper indicates temperature abuse.

Spinach – Keep in re-sealable bag until used.

Tomato Wedges – Avoid temperature fluctuation. Remove 1 tub from cooler at a time, or however many tubs you will use within a

½ hour period.

Sliced Tomatoes – Remove from cooler only the amount needed to prep sandwiches. Temperature fluctuation will kill the shelf life of this product. There are approximately 80 slices per tray. If you have unused slices, wrap tray in plastic wrap and return to cooloer. If they haven't been out of refrigeration too long, you might get an additional 12 – 24 hours out of them.

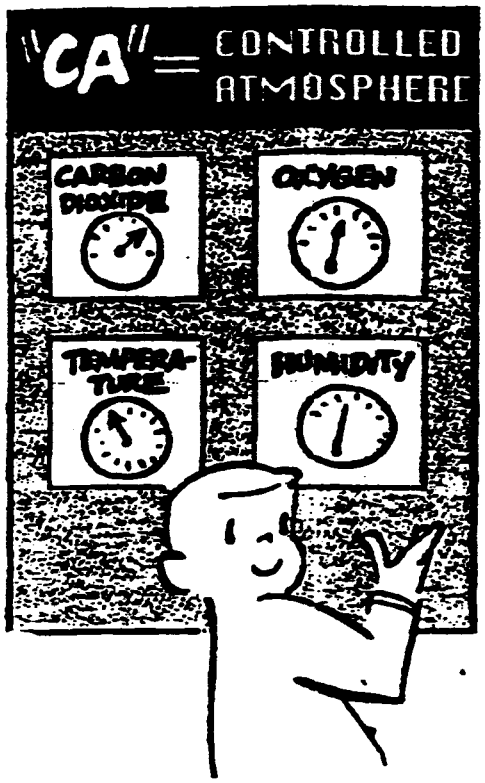
PLEASE NOTE – All fresh cut items are ready to use, directly from the bag. There is no need to rinse any product before use. They are safe and ready to go!

KEEP IT COLD!
HEAT KILLS!

NONE LIKE IT HOT!

Probably right behind sanitation, temperature is the most important factor affecting pre-cut product. **For every degree over 40° to which pre-cut produce is exposed, you lose one day of shelf life.**

CONTROLLED ATMOSPHERE (CA) STORAGE AND APPLES



Just as we do, apples take in oxygen from the air to keep them alive. Apples can be stored in cold storage units to extend their life or to keep them fresh for a longer period of time, but cold air only slows down the ripening process; it doesn't completely stop it. In order to keep the fruit from getting too ripe, we must lower the oxygen content in the air where the apples are stored.

We can do this in Controlled Atmosphere (CA) Storage. Air normally contains about 20% oxygen. In CA Storage the oxygen level is dropped to 1.5% and the temperature is kept between 32-38 degrees Fahrenheit. This process puts the apple to sleep! The apple gives off carbon dioxide that keeps it from ripening anymore. The humidity in CA Storage is kept at about 95% and this keeps the fruit from losing moisture and drying out.

Even after months of "sleeping" in CA Storage, the apples can come out as crisp and fresh as they were during harvest. CA Storage has become very important to the apple industry. It allows the growers to extend the life of their fruit so they can stretch out sales through the winter months.

Source: US Apple Association

TEMPERATURE

Effect on Produce

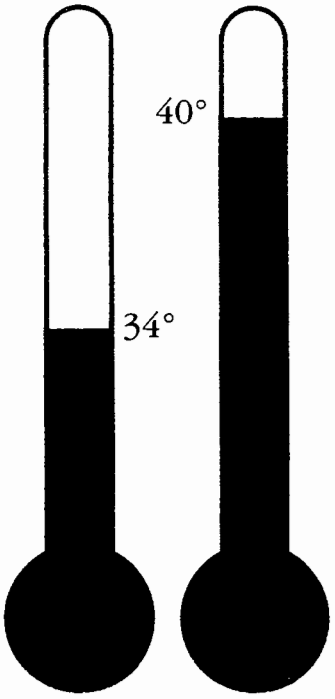
Temperature is the single most important factor in maintaining and maximizing produce quality. Temperature abuse is the cause of most produce claims and losses. For every 10 degree increase in temperature, a produce item can lose up to half of its life and will thus be served in a less than optimal condition... especially produce served uncooked.

Control

Every foodservice operator must be aware of temperatures in their receiving, storage and prep areas before they can effectively manage produce handling. These temperatures must be checked on a regular basis to ensure optimal product life!

Rotation

Proper rotation practices must be followed in order to keep produce fresh. Simply write the delivery date on the outside of every carton received and store the cartons so the date can be easily read. The oldest product should be used first according to the FIFO method (First-In, First-Out).

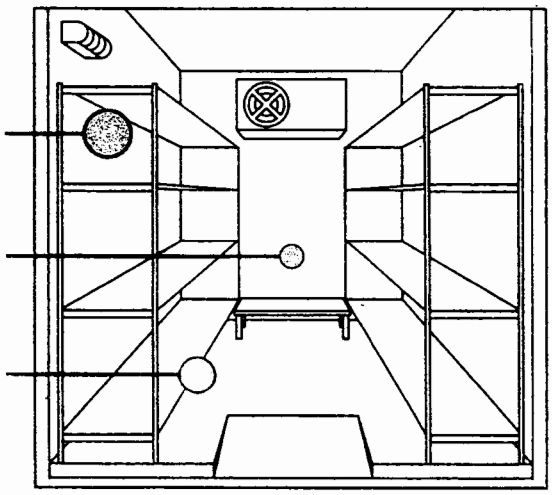


Specifically for fresh-cut vegetables, the correct temperature is between 34°- 40°F.

Storage Hints To Prolong Life Of Fresh Fruits And Vegetables

Temperature fluctuates from front to back of the cooler due to the location of the cooling unit and frequency of the door being opened. Divide the cooler into three areas and store as noted below:

FRONT	Apples	Carambola	Honeydews	Papayas	Radishes
	Basil	Citrus	Jicama	Pears	Rhubarb
	Cabbage	Cucumbers	Limes	Peppers	Ripe Tomatoes
	Cantaloupes	Eggplant	Okra	Pineapples	Zucchini
		Garlic	Onions	Plums	
BACK	Alfalfa Sprouts*	Carrots	Head Lettuce	Parsnips	
	Apricots	Corn	Herbs	Ripe Nectarines	
	Bean Sprouts*	Fresh-Cut Salads	Kale	Ripe Peaches	
	Berries	Greens	Leaf Lettuce	Spinach	
MIDDLE	Artichokes	Cauliflower	Green Onions	Peas	
	Asparagus	Cherries	Kiwifruit	Turnips	
	Beets	Coconuts	Mushrooms*	Watercress	
	Broccoli	Grapes	Parsley		



**Store as far away from light as possible, usually on lower shelf.*

FRUIT: Pineapples, bananas, papayas, pears, mangos, avocados should be used upon arrival, but if additional ripening is needed, store at room temperature. Once ripe, all but bananas can be held in refrigerator for a short period of time.

TOMATOES: Should be held at room temperature to ripen and then used immediately. Be careful not to over-buy; if you refrigerate a ripe tomato, it loses flavor.

DRY STORAGE: Recommended for potatoes, garlic, ginger root, rutabagas, yams. Do not refrigerate these items. Onions can be stored unrefrigerated for short time periods.

Proper Storage & Handling

32-36 DEGREES IDEAL

Items	Storage	Handling
Apricots	Refrigerated	Ripen at room temperature.
Artichokes	Refrigerated	Excess moisture may cause mold.
Apple*	Refrigerated	Avoid excess movement. Keep cold.
Asparagus	Refrigerated	Stand upright in cold water.
Beets	Refrigerated	Sprinkle lightly during storage.
Belgian Endive	Dry & Refrigerated	Do not expose to light.
Blueberries	Refrigerated	Do not sprinkle during storage.
Broccoli/Cauliflower	Refrigerated	Store only briefly, 4-5 days maximum.
Brussels Sprouts	Refrigerated	Keep storage time short.
Cabbage	Refrigerated	Store with wrapper leaves intact.
Cantaloupe*	Cool & Dry	Ripen quickly at room temperature. (Ideal 36-38°)
Carrots/Celery	Refrigerated	Keep carrots dry. May sprinkle celery lightly.
Cherries	Refrigerated	Store away from other foods to prevent odor absorption.
Corn	Refrigerated	Keep storage time short.
Endive/Escarole	Refrigerated	To crisp, plunge in cold water.
Grapes	Refrigerated	Highly perishable. Store only briefly.
Green Onions	Refrigerated	Keep away from foods that absorb odors.
Kale	Refrigerated	Top with crushed ice to maintain freshness.
Kiwifruit*	Refrigerated	Long shelf life if stored at 32 degrees.
Leeks	Refrigerated	Sprinkle lightly during storage.
Lettuce	Refrigerated	Wash, trim, and loosely pack in plastic bags.
Mushrooms	Dry & Refrigerated	Keep dry. Use soon after receiving.
Nectarines*	Refrigerated	Ripen at room temperature.
Onions, Dry	Dry & refrigerated	May store dry onions at 55-65 degrees for short periods of time.
Oranges* (FL)	Refrigerated	Maintain good air circulation.
Parsnips	Refrigerated	Wash and store in plastic bags.
Peas	Refrigerated	Keep snow/snap peas dry; green peas moist.
Peaches*/Plums* /Pears*	Refrigerated	Ripen at room temperature.
Radishes	Refrigerated	Trim, wash, and store in plastic bags.
Raspberries	Refrigerated	Do not sprinkle during storage.
Rhubarb	Refrigerated	Maintain good air circulation.
Romaine	Refrigerated	Store away from ethylene-producing fruits.
Shallots	Dry & Refrigerated	May store shallots at 55-65 degrees for short periods of time.
Spinach	Refrigerated	Top ice to prevent wilting.
Strawberries	Refrigerated	Use shortly after receiving.
Turnips (Rutabagas)	Refrigerated	Avoid oversized or soft product.

*Ethylene-producing items. Keep out of air flow.

Fresh Fruits & Vegetables

45-50 DEGREES IDEAL

Item	Storage	Handling
Avocados* (CA)	Cool & Dry	Handle gently. Ripen at room temperature.
Cucumbers	Cool & Dry	Avoid chilling and store briefly.
Eggplant	Cool	Handle with care to prevent internal decay.
Green Beans	Cool & Dry	Cold temperatures may cause russeting.
Oranges* (CA)	Refrigerated	Maintain good air circulation.
Peppers (Sweet)	Cool & Dry	Avoid chilling; store briefly.
Pineapples	Cool & Dry	Handle gently. Will not ripen after harvesting.
Potatoes	Cool & Dry	Avoid chilling and exposure to light.
Shallots	Cool & Dry	Keep dry to prevent mold.
Squash, soft shell	Cool & Dry	Handle gently to avoid bruising. (Ideal 50-55°)
Tangerines*	Refrigerated	May suffer chill damage below 38 degrees. (Ideal 40-44°)

* Ethylene-producing items. Keep out of air flow.

55-60 DEGREES IDEAL

Item	Storage	Handling
Bananas	Do not refrigerate	Avoid chilling; handle with care.
Grapefruit*	Cool & Dry	May suffer chill damage below 50 degrees.
Lemons*	Cool & Dry	Maintain good air circulation.
Limes*	Cool & Dry	Do not store below 45 degrees. (Ideal 48-55°)
Mixed Melons	Cool & Dry	50-55 degrees Handle gently. Ripen at room temperature.
Papaya	Cool & Dry	Ripen at room temperature.
Squash, hard shell	Cool & Dry	Long storage life if stored at proper temperature.
Sweet Potatoes	Cool & Dry	Keep temperature constant to prevent deterioration or sprouting. (Ideal 58-65°)
Tomatoes*	Do not refrigerate	Highly perishable. NEVER REFRIGERATE. (Ideal 65-72°)
Watermelon	Cool & Dry	Do not cut until ready to use. Avoid chilling. (Ideal 55-70°)

* Ethylene-producing items. Keep out of air flow.

IDEAL PRODUCT INFORMATION STATISTICS

PRODUCE COMMODITY	DAYS OF SHELF LIFE	OPTIMUM TEMP.	ETHYLENE PRODUCTION	ETHYLENE SENSITIVITY
Apples	90-240	32 f	Very High	High
Asparagus	14-21	32 f	Very Low	Moderate
Avocados	14-28	50 f	High	High
Bananas	7-28	58 f	Moderate	High
Bell Peppers	12-18	50 f	Low	Low
Broccoli	10-14	32 f	Very Low	High
Cabbage	14-20	32 f	Very Low	High
Cantaloupes	10-14	40 f	High	Moderate
Carrots	14-28	32 f	Very Low	Moderate
Cauliflower	10-14	32 f	Very Low	High
Celery	10-20	32 f	Very Low	Moderate
Cucumbers	10-14	45 f	Low	High
Dry Onions	30-180	50 f	Low	Low
Grapefruit	15-25	50 f	Low	Low
Grapes	10-25	32 f	Low	Low
Green Leaf	10-14	32 f	Very Low	High
Green Onions	7-10	32 f	Very Low	Moderate
Kiwifruit	10-15	32 f	Low	Moderate
Lemons	15-30	50 f	Very Low	Moderate
Lettuce	10-14	32 f	Low	High
Limes	15-30	50 f	Very Low	Moderate
Melons	10-20	50 f	High	Moderate
Mushrooms	10-15	32 f	Very Low	Moderate
Oranges	10-15	45 f	Very Low	Moderate
Pineapple	10-15	50 f	Low	Low
Potatoes	30-50	50 f	Very Low	Low
Pre-Cut	5-17	32 f	Very Low	Moderate
Radishes	10-15	32 f	Very Low	Low
Spinach	10-14	32 f	Very Low	High
Squash	7-14	50 f	Low	Moderate
Strawberries	5-10	32 f	Low	Low
Tomatoes	7-14	55 f	Moderate	High

NOTE..."Days of Shelf Life" is calculated from the time of harvesting.
"Optimum Temp." is the IDEAL TEMPERATURE and you should strive to place these items as close to their "Optimum Temp." as possible by knowing your cooler and/or case's cold and hot spots.

Ideal Storage Temperatures

32° to 40° F

Apples	Corn	Parsley
Apricots	Cranberries	Parsnips
Artichokes	Garlic	Peaches
Asparagus	Grapes	Pears *(Ripe)*
Beets	Greens	Peas
Berries	Green Onions	Pineapple *(Fresh-Cut)*
Broccoli	Herbs *(other than Basil & Oregano)*	Plums
Brussels Sprouts	Iceberg Lettuce	Radishes
Cabbage	Kale	Rhubarb
Cantaloupe	Kiwifruit	Rutabagas
Carambola	All Leaf Lettuce	Spinach
Carrots	Mushrooms	Sprouts
Cauliflower	Nectarines	Strawberries
Celery	Onions	Turnips
Cherries	Oranges *(Florida & Texas)*	Watercress
Coconuts		

40° to 50° F

Avocados *(Ripe)*	Jicama	Papaya
Basil *(Fresh)*	Lemons	Peppers
Beans	Mandarins	Pineapples
Cucumbers	Melons	Potatoes
Eggplant	Okra	Squash *(Summer)*
Ginger Root	Oranges *(California)*	Tomatoes *(Ripe)**
Honeydews	Oregano *(Fresh)*	

Leave Out of Cold Room

Avocados *(Unripe)*	Mangos	Squash *(Winter)*
Bananas	Pears *(Unripe)*	Sweet Potatoes
Grapefruit	Plantains	Tomatoes *(Green)*
Limes	Pumpkins	Watermelons *(Whole)*
	Shallots	

Source: PMA Foodservice Produce Reference Manual, Postharvest Technology - University of California - 1992

* Will lose flavor at this temperature during prolonged storage.

Fresh Fruit

Ripening Guide

Some fresh fruits continue to ripen after they have been harvested while others do not. Whether or not a fruit continues to ripen is a key factor in determining its storage and shelf life. Fruits that require additional ripening should be stored at room temperature until they become ripe. Fruits that do not ripen after harvesting should be stored in a cool area until they are used. For an overview of ideal storage temperatures for specific fruits, please refer to page 4 of this booklet.

Fruits That Ripen After Harvest

Apricots	Honeydew	Pears
Avocados	Kiwifruit	Plantains
Bananas	Nectarines	Plums
Cantaloupe	Papaya	Tomatoes
Carambola	Peaches	

Fruits That Don't Ripen After Harvest

Apples	Grapes	Oranges
Berries	Lemons	Pineapple
Cherries	Limes	Strawberries
Grapefruit	Mandarins	Watermelon

Source: PMA Foodservice Produce Reference Manual

Ethylene Gas: benefits and effects of harmful exposure

Ethylene is one of the most active plant hormones known. Fruit can be ripened quickly by introducing ethylene gas into a controlled environment. For example, it is often used to ripen bananas, tomatoes, and avocados. By placing peaches in a closed bag, you're taking advantage of the fruit's natural ethylene to speed softening.

While ethylene is great for ripening some fruits, the gas can cause premature decay of other fruits and vegetables that are sensitive to it. To avoid deterioration or rapid ripening of sensitive commodities, you should avoid holding them in the same storage room or refrigerator compartment with products that emit a great deal of ethylene gas. Diseased or injured fruits generate substantially increased levels of ethylene, so remove injured produce right away. If you have only one cooler, keep lids on storage boxes, store sensitive commodities as far away as possible from ethylene producers, and rotate product properly. If your inventory turns quickly, ethylene should not cause quality problems.

Fruits That Produce Large Quantities Of Ethylene

Apples	Honeydew	Peaches
Apricots	Kiwifruit *(ripe)*	Pears
Avocados	Mangos	Plums
Cantaloupe	Papayas	

Commodities That Are Sensitive To Ethylene

Bananas	Cucumbers	Peas
Beans	Eggplant	Peppers
Broccoli	Greens	Spinach
Brussels Sprouts	Kiwifruit *(unripe)*	Summer Squash
Cabbage	Lettuce	Sweet Potatoes
Carrots	Nectarines	Watermelon
Cauliflower	Okra	

Table 8: Products that are ethylene producers or ethylene sensitive

Ethylene Producers:		Ethylene Sensitive:	
apples	mangosteen	bananas, unripe	leafy greens
apricots	nectarines	belgian endive	lettuce
avocados	papayas	broccoli	okra
bananas, ripening	passion fruit	brussel sprouts	parsley
cantaloupes	peaches	cabbage	peas
cherimoya	pears	carrots	peppers
figs	persimmons	cauliflower	potted plants
guavas	plantains	chard	spinach
honeydew melons	plums	cucumbers	squash
kiwifruit, ripe	prunes	cut flowers	sweet potatoes
mamey	quinces	eggplant	watercress
mangoes	rambutan	florist greens	watermelon
	tomatoes	green beans	yams
		kiwi fruit, unripe	

Odor Sensitivity: Never transport or store odorous products with products that will absorb the odors. Table 9 lists products that produce odors with products that can absorb them.

Table 9: Products which produce or absorb odors

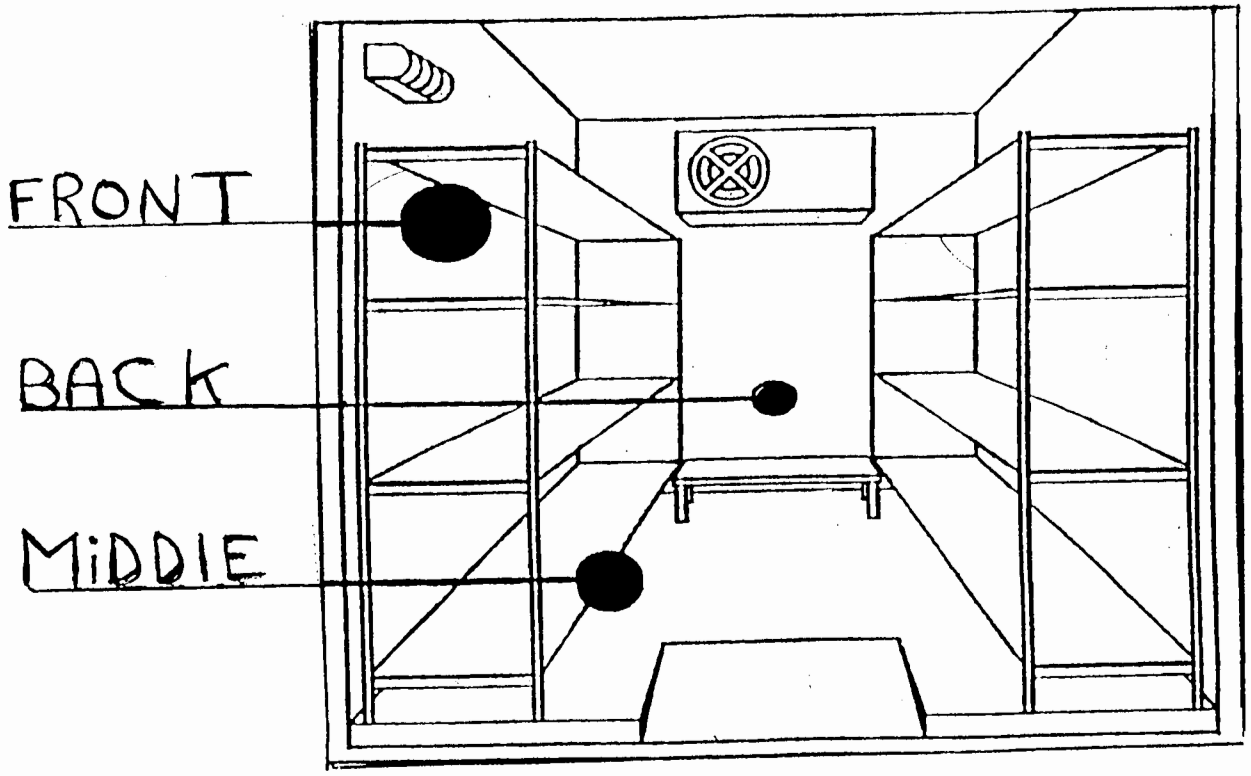
Odor produced by	Will be absorbed by:
apples	cabbage, carrots,celery, figs, onions, meat, eggs, dairy products
avocados	pineapples
carrots	celery
citrus fruit	meat, eggs, dairy products
ginger root	eggplant
grapes fumigated w/sulfur dioxide	other fruits and vegetables
leeks	figs, grapes
onions, dry	apples, celery, pears
onions, green	corn, figs, grapes, mushrooms, rhubarb
pears	cabbage, carrots, celery, onions, potatoes
potatoes	apples, pears
peppers, green	pineapples
"strongly scented vegetables"	citrus fruit

Chill Sensitivity Most tropical products are subject to chilling injury when transported or stored at lower than recommended temperatures. This damage often becomes apparent after the products warm up. Products injured may show pitting, discoloration, water soaked areas, decay and failure to ripen. The following Table 5 lists tropical and other products that sensitive to this injury.

WHATS GREAT THIS MONTH

JANUARY	February	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SETEMBER	OCTOBER	NOVEMBER	DECEMBER	WHATS GREAT ALL YEAR
Avocados	Avocados	Artichokes	Artichokes	Artichokes	Apricots	Apricots	Apricots	Arugula	Apples	Apples	Apples	Bananas
Broccoli	Broccoli	Asparagus	Asparagus	Asparagus	Arugula	Arugula	Arugula	Beans	Beets	Broccoli	Broccoli	Carrots
Brussels	Brussels	Avocados	Avocados	Avocados	Basil	Basil	Basil	Beets	Broccoli	Brussels	Brussels	Celery
Sprouts	Sprouts									Sprouts	Sprouts	
Cabbage	Cabbage	Beets	Beans	Basil	Beans	Beans	Beans	Berries	Brussels	Cabbage	Cabbage	Coconuts
									Sprouts			
Chinese	Chinese	Broccoli	Beets	Beans	Beets	Beets	Beets	Cabbabe	Cabbage	Chinese	Chinese	Eggplant
Cabbage	Cabbage									Cabbage	Cabbage	
Cardoons	Cauliflower	Cabbage	Broccoli	Beets	Berries	Berries	Berries	Chinese	Chinese	Cauliflower	Cardoons	Garlic
								Cabbage	Cabbage			
Cauliflower	Celery root	Chinese	Cabbage	Berries	Cabbage	Cherries	Cherries	Cauliflower	Cauliflower	Celery root	Cauliflower	Ginger
		Cabbage										
Celery root	Cherimoyas	Cauliflower	Chinese	Broccoli	Cherries	Corn	Corn	Corn	Celery root	Chicory	Celery root	Herbs
			Cabbage									
Cherimoyas	Chicory	Celery root	Cauliflower	Cabbage	Chives	Cucumbers	Cucumbers	Cucumbers	Chicory	Cranberries	Cherimoyas	Kiwi fruit
Chicory	Fennel	Chicory	Celery root	Chinese	Cucumbers	Mangoes	Dates	Dates	Cranberries	Cucumbers	Chicory	Lemons
				Cabbage								
Fennel	Grapefruit	Chives	Chicory	Chives	Dandelion	Melons	Figs	Figs	Cucumbers	Dates	Cranberries	Limes
Grapefruit	Ugli fruit	Dandelion	Chives	Cucumbers	Leaf lettuce	Okra	Grapes	Grapes	Dates	Fennel	Dates	Chinese melons
Ugli fruit	Greens	Fennel	Cucumbers	Dandelion	Mangoes	Peaches	Mangoes	Head lettuce	Fennel	Grapes	Fennel	Cultivated mushrooms
Greens	Leeks	Grapefruit	Dandolion	Fiddleheads	Melons	Chile peppers	Melons	Leaf lettuce	Figs	Greens	Grapefruit	Onions
Leeks	Mache	Ugli fruit	Horseradish	Horseradish	Okra	Sweet peppers	Okra	Mangoes	Grapes	Kumquats	Greens	Parsley
Mache	Mandarin Oranges	Greens	Leeks	Head lettuce	Papaya	Plums	Peaches	Melons	Kumquats	Leeks	Kumquats	Snow peas
Wild Mushrooms	Sweet Oranges	Horseradish	Head lettuce	Leaf lettuce	Peas	Sorrel	Chile peppers	Wild Mushrooms	Leeks	Head lettuce	Leeks	Pineapples
Mandarin Oranges	Parsnips	Leeks	Leaf lettuce	Mangoes	Chile peppers	Summer Squash	Sweet peppers	Okra	Head lettuce	Leaf lettuce	Mache	Potatoes
Sweet Oranges	Pears	Head lettuce	Okra	Okra	Sweet peppers	Tomatoes	Plums	Pears	Leaf lettuce	Mache	Wild Mushrooms	Radishes
Parsnips	Rhubarb	Leaf lettuce	Chile peppers	Sweet Oranges	Plums	Watermelon	Sorrel	Chile peppers	Wild Mushrooms	Wild Mushrooms	Nuts	Roots
Pears	Shallouts	Mache	Sweet peppers	Papayas	Sorrel		Summer Squash	Sweet peppers	Nuts	Nuts	Mandarin Oranges	Scallions
Prickly Pears	Spinach	Okra	Rhubarb	Peas	Spinach		Tomatoes	Plums	Okra	Okra	Sweet Oranges	Sprouts
Shallots	Truffles	Seville Oranges	Shallots	Chile peppers	Summer Squash		Watermelon	Prickly pears	Pears	Mandarin Oranges	Parsnips	Watercress
Spinach		Sweet Oranges	Spinach	Sweet peppers	Watermelon			Shallots	Chile peppers	Pears	Pears	
Sweet potatoes		Parsnips	Summer Squash	Rhubarb				Sorrel	Sweet peppers	Chile peppers	Persimmons	

FRUITS AND VEGETABLES STORAGE AREAS



PRODUCT GROWING AREA AND SEASONS

RUSSETT POTATOES:

TEMPS. .....45 TO 50 F.
SHELF LIFE .....30 TO 50 DAYS.
ETHYLENE PRODUCTION .....VERY LOW.
ETHYLENE SENSITIVITY .....LOW.

WINTER STORAGE CROP .....ID., COLO., WISC., WASH.
SUMMER NON STORAGE CROP ....CALIF.,KANSAS
ID.,WASH.,& WISC. STARTS IN JULY, COLO. IN SEPT. PUT INTO STORAGE IN AUG.
SUMMER NON STORAGE .....MAY TO AUGUST.

ONIONS:

TEMPS: .....50 F.
SHELF LIFE: .....30 TO 180 DAYS.
ETHYLENE PRODUCTION .....LOW.
ETHYLENE SENSITIVITY .....LOW.

WINTER STORAGE CROP .....ID &OR.,COLO.,NEW YORK
SUMMER NON STORAGE CROP .....TEX., CALIF.,NEW MEX.,AZ
WINTER STORAGE CROP .....AUGUST THROUGH JUNE.
SUMMER NON STORAGE CROP .....MARCH THROUGH JULY.

APPLES:

TEMPS: .....33 TO 35 F.
SHELF LIFE: .....90 TO 240 DAYS.
ETHYLENE PRODUCTION .....VERY HIGH.
ETHYLENE SENSITIVITY .....HIGH.

MAJOR GROWING AREAS .....WASH.,MICH.,CALIF.,NY
NEW CROP HARVEST STARTS IN EARLY SEPT.
MUST BE IN STORAGE 90 DAYS TO QUALIFY FOR C.A.

PEACHES:

TEMPS: .....33 TO 36 F.
SHELF LIFE .....5 TO 10 DAYS.
ETHYLENE PRODUCTION .....HIGH.
ETHYLENE SENSITIVITY .....MODERATE.

GROWING AREAS .....CALIF.,S.C.,GA. AND CHILE.
CALIF. MAY THROUGH OCT.
S.C. JUNE THROUGH AUG.
GA. MAY THROUGH JULY.
CHILE DEC. THROUGH APR.

GREEN PEPPERS:

TEMP: .....45 TO 50 F.
SHELF LIFE: .....8 TO 10 DAYS.
ETHYLENE PRODUCTION: ...LOW.
ETHYLENE SENSITIVITY: ....MODERATE.

GROWING AREAS: FLA.,CALIF.,AND GA.
FLA.: AVAILABLE ALL YEAR ROUND EXCEPT AUG. AND SEPT., WITH NOV. THROUGH MAY PEAK MONTHS.
CALIF.: APRIL THROUGH DECEMBER.

CORN:

TEMP: .....34 TO 38 F.
SHELF LIFE: .....4 TO 6 DAYS.
ETHYLENE PRODUCTION: ...LOW.
ETHYLENE SENSITIVITY: .....MODERATE.

GROWING AREAS: MEXICO,FLA. AND GA.
MEX: AVAILABLE YEAR ROUND.
FLA: NOV. THROUGH JULY,WITH MAR.,APR.,AND MAY THE PEAK MONTHS.
GA: MAY, JUNE, AND JULY,SEPT. TO DEC.

PEARS:

TEMP: .....33 TO 35 F.
SHELF LIFE: .....60 TO 90 DAYS.
ETHYLENE PRODUCTION: .....HIGH.
ETHYLENE SENSITIVITY: .....HIGH.

GROWING AREAS: WASH.,OREGON AND CALIF.
WASH. AND OREGON: ALL YEAR ROUND WITH OCT. THROUGH MAY PEAK MONTHS. (STORAGE)
CALIF.: JULY THROUGH DEC.

TURNIPS:

TEMP: .....33 TO 35 F.
SHELF LIFE: .....30 TO 90 DAYS.
ETHYLENE PRODUCTION: .....LOW.
ETHYLENE SENSITIVITY: .....LOW.

GROWING AREAS: CALIF.,CANADA AND NEW JERSEY.
CALIF.: ALL YEAR ROUND.
CANADA: ALL YEAR ROUND
NEW JERSEY: JUNE THROUGH DEC.

SOFT & HARD SQUASH:

TEMP: .....41 TO 50 F.
SHELF LIFE (SOFT): .....7 TO 14 DAYS.
SHELF LIFE (HARD): .....30 TO 180 DAYS.
ETHYLENE PRODUCTION: .....LOW.
ETHYLENE SENSITIVITY: .....HIGH.

GROWING AREAS: CALIF.,FLA. AND MEX.
CALIF.: SEPT. THROUGH JUNE.
FLA.: OCT. THROUGH JUNE.
MEX.: ALL YEAR ROUND.

CARROTS:

TEMP: .....33 TO 35 F.
SHELF LIFE: .....28 TO 180 DAYS.
ETHYLENE PRODUCTION: ...LOW.
ETHYLENE SENSITIVITY: ....HIGH.

GROWING AREAS: CALIF.,MEX.,CANADA,GA.,TEX.
CALIF.: PEAK TIME ALL YEAR ROUND. (SWEET TATSE)
MEX.: AVAILABLE ALL YEAR ROUND.
GA.: JAN. THROUGH JUNE.
TEX.: JAN. THROUGH MAY.

CABBAGE:

TEMP: .....33 TO 35 F.
SHELF LIFE: .....90(WEST/MIDWEST) TO 180 DAYS. (STORAGE).
ETHYLENE PRODUCTION: ...VERY LOW.
ETHYLENE SENSITIVITY: ....HIGH.

GROWING AREAS: CALIF.,TEXAS,NEW YORK AND FLA.
CALIF.: AVAILABLE ALL YEAR ROUND (SMALLER HEADS AND LESS WRAPPER LEAVES).
TEXAS: OCT. THROUGH JUNE (PEAK TIME DEC. TO APR.)
NEW YORK: JULY THROUGH MAY (PEAK TIME AUG. TO DEC.)
FLA.: PEAK TIME DEC. THROUGH MAY.

SWEET POTATO:

TEMP: .....55 TO 60 F.
SHELF LIFE: .....10 TO 14 DAYS.
ETHYLENE PRODUCTION: ...LOW.
ETHYLENE SENSITIVITY: ....MODERATE.

GROWING AREAS: LOUISIANA AND NORTH CAROLINA.
LOUISIANA: ALL YEAR ROUND. PEAK MONTHS APR. AND SEPT. THROUGH DEC.
NORTH CAROLINA: ALL YEAR ROUND. APR. AND MAY AND SEPT. THROUGH DEC. PEAK MONTHS.

PASCAL CELERY:

TEMPS: .....34 TO 36 F.
SHELF LIFE: .....14 TO 28 DAYS.
ETHYLENE PRODUCTION: .....LOW.
ETHYLENE SENSITIVITY: .....HIGH.

GROWING AREAS: CALIF.,FLA. AND MICH.
CALIF.: PEAK ALL YEAR ROUND.
FLA.: JAN. THROUGH JUNE.
MICH.: JUNE THROUGH OCT.

CUCUMBERS:

TEMPS: .....45 TO 50 F.
SHELF LIFE: .....7 TO 10 DAYS.
ETHYLENE PRODUCTION: .....LOW.
ETHYLENE SENSITIVITY: .....HIGH.

GROWING AREAS: FLA.,N.C.,CALIF.,N.J.,GA.,AND MEXICO.
FLA.: OCT. TO JUNE.
CALIF.: MAY TO OCT.
GA.: MAY TO JULY AND SEPT. TO NOV.
N.C.: JUNE TO SEPT.
N.J.: MAY TO SEPT.
MEXICO: ALL YEAR ROUND

ORANGES:

TEMPS: .....45 F.
SHELF LIFE: .....10 TO 15 DAYS.
ETHYLENE PRODUCTION: .....VERY LOW.
ETHYLENE SENSITIVITY: .....MODERATE.

GROWING AREAS: CALIF.,FLA.,AND TEXAS.
FLORIDA: SEPT. THROUGH MAY. (INTO STORAGE IN MARCH).
TEXAS: OCT. THROUGH APR. (PEAK DEC. TO FEB.).
CALIF.: YEAR ROUND, RIVERSIDE TO SAN JUAN KING VALLEY.

GRAPEFRUIT:

TEMP: .....45 F.
SHELF LIFE: .....14 TO 28 DAYS.
ETHYLENE PRODUCTION: .....VERY LOW.
ETHYLENE SENSITIVITY: .....MODERATE.

GROWING AREAS: CALIF.,FLA.,TEXAS.
CALIF: YEAR ROUND, PEAK JUNE THROUGH OCT..
FLA: SEPT. THROUGH JUNE, PEAK OCT. THROUGH MAY.
TEXAS: SEPT. THROUGH MAY, PEAK OCT. THROUGH MARCH.

STORAGE HINTS TO PROLONG LIFE OF FRUITS & VEGETABLES

(OUTSIDE OF COOLER)

POTATOES
ONIONS
SWEET POTATOES

(FRONT OF COOLER)

APPLE--- ---------ETHYLENE PROD.-------VERY HIGH.
ETHYLENE SENSITIVE----------HIGH.
CABBAGE----------ETHYLENE PROD.--------VERY LOW.
ETHYLENE SENSITIVE----------LOW.
CUCUMBERS---------- ETHYLENE PROD.----------LOW.
ETHYLENE SENSITIVE----------HIGH.
CITRUS---------- ETHYLENE PROD.--------VERY LOW.
ETHYLENE SENSITIVE---MODERATE.
PEARS----------ETHYLENE PROD.----------HIGH.
ETHYLENE SENSITIVE----------HIGH.
PEPPERS----------ETHYLENE PROD.----------LOW.
ETHYLENE SENSITIVE---MODERATE.
SQUASH----------ETHYLENE PROD.----------LOW.
ETHYLENE SENSITIVE---MODERATE.

(MIDDLE OF COOLER)

CARROTS----------ETHYLENE PROD.--------VERY LOW.
ETHYLENE SENSITIVE---------HIGH.
CORN----------ETHYLENE PROD----------LOW.
ETHYLENE SENSITIVE—MODERATE.
PEACHES----------ETHYLENE PROD,----------HIGH.
ETHYLENE SENSITIVE---MODERATE.

(BACK OF COOLER)

CELERY----------ETHYLENE PROD.-------VERY LOW.
ETHYLENE SENSITIVE--------HIGH.
TURNIPS----------ETHYLENE PROD.----------LOW.
ETHYLENE. SENSITIVE-------LOW.