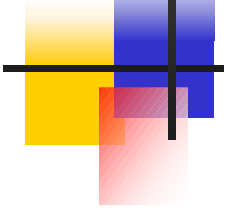


VEGETABLES- FRUITS AND THEIR PRODUCTS

Chapter 18



Part of plant that is eaten:

Earth vegetables

Roots Sweet potatoes, carrot

Tubers Potatoes

Bulbs Onion

Herbage vegetables

Leaves Cabbage, spinach, lettuce

Petioles (leaf stalk) Celery

Flower buds Cauliflower, artichokes

Sprouts Asparagus

Fruit-vegetables

Legumes Peas, green beans

Cereal Sweet corn

Vine fruits Squash, cucumber

Berry fruits Tomato, egg plant

Tree fruits Avocado

Typical percentage composition of edible portion of foods of plant origin.

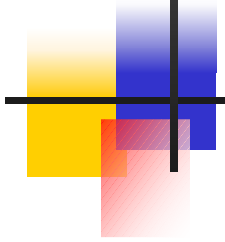
Food	CHO	Protein (<3%)	Fat (<0.5%)	Ash	Water (>70%)
Potatoes	18,9	2,0	0,1	1,0	78
Carrots	9,1	1,1	0,2	1,0	88,6 (like milk)
Radishes	4,2	1,1	0,1	0,9	93,7
Asparagus	4,1	2,1	0,2	0,7	92,9
Green bean	7,6	2,4	0,2	0,7	89,1
Peas	17,0	6,7	0,4	0,9	75,0
Lettuce	2,8	1,3	0,2	0,9	94,8*
Banana	24,0	1,3	0,4	0,8	73,5
Orange	11,3	0,9	0,2	0,5	87,1
Apple	15,0	0,3	0,4	0,3	84,0
Strawberry	8,3	0,8	0,5	0,5	89,9
Melon	6,0	0,6	0,2	0,4	92,8



QUALITY OF FRUITS AND VEGETABLES

Affected by:

- 1) Pre-harvest condition
 - Botanical variety of fruits and vegetables
 - Method of cultivation- irrigation frequency, fertilizer use, Soil composition,
 - Climate and weather conditions during plantation and growth
- 2) Harvest condition
 - Degree of maturity at harvest
(unripe, mature-optimum for harvesting, ripe-optimum for eating, early senescence, senescence-unedible form)
 - Mechanical or hand harvesting condition



QUALITY OF FRUITS AND VEGETABLES

3) Post-harvest condition

Transport conditions

Storage conditions

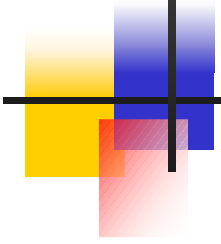
Processing conditions



QUALITY LOSS

1) **Physical changes** - Loss of **turgor** [Equilibrium moisture level within cells]. Turgor depends on existing osmotic forces: the semi-permeable membrane allows for passage of water in and out (transpiration)

When plant tissues are damaged during storage, freezing, cooking or from other causes, **denaturation** of the proteins of the cell membranes occur, resulting in the loss of permeation-selectivity. Water and dissolved substances are free to diffuse out of the cells and leave the remaining tissue in a soft and wilted condition.



QUALITY LOSS

2) Chemical Changes:

Vitamin C oxidation

Change from starch to sugars (bananas)

3) Enzymatic changes:

Enzymatic browning is due to "polyphenol oxidase" enzyme

Tissue softening is due to "pectinase" enzymes.

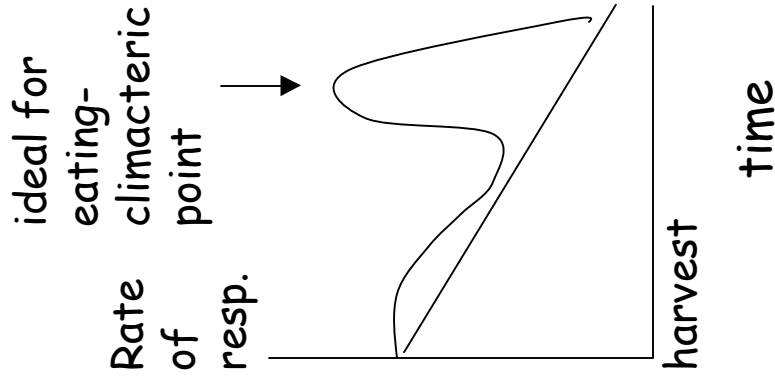
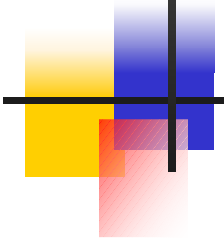
4) Microbiological changes:

Yeasts and molds: Example: Oranges can easily be infected with *Penicillium digitatum*.

Antimicrobial agents can be used for avoiding them.

"CA-Controlled Atmosphere storage" can also help.

FRUITS



Climacteric fruits

Continue ripening after harvesting.

Apricots

Peaches

Banana

Tomatoes

Plums

Non-climacteric fruits

Do not ripen after harvesting.

Grapes

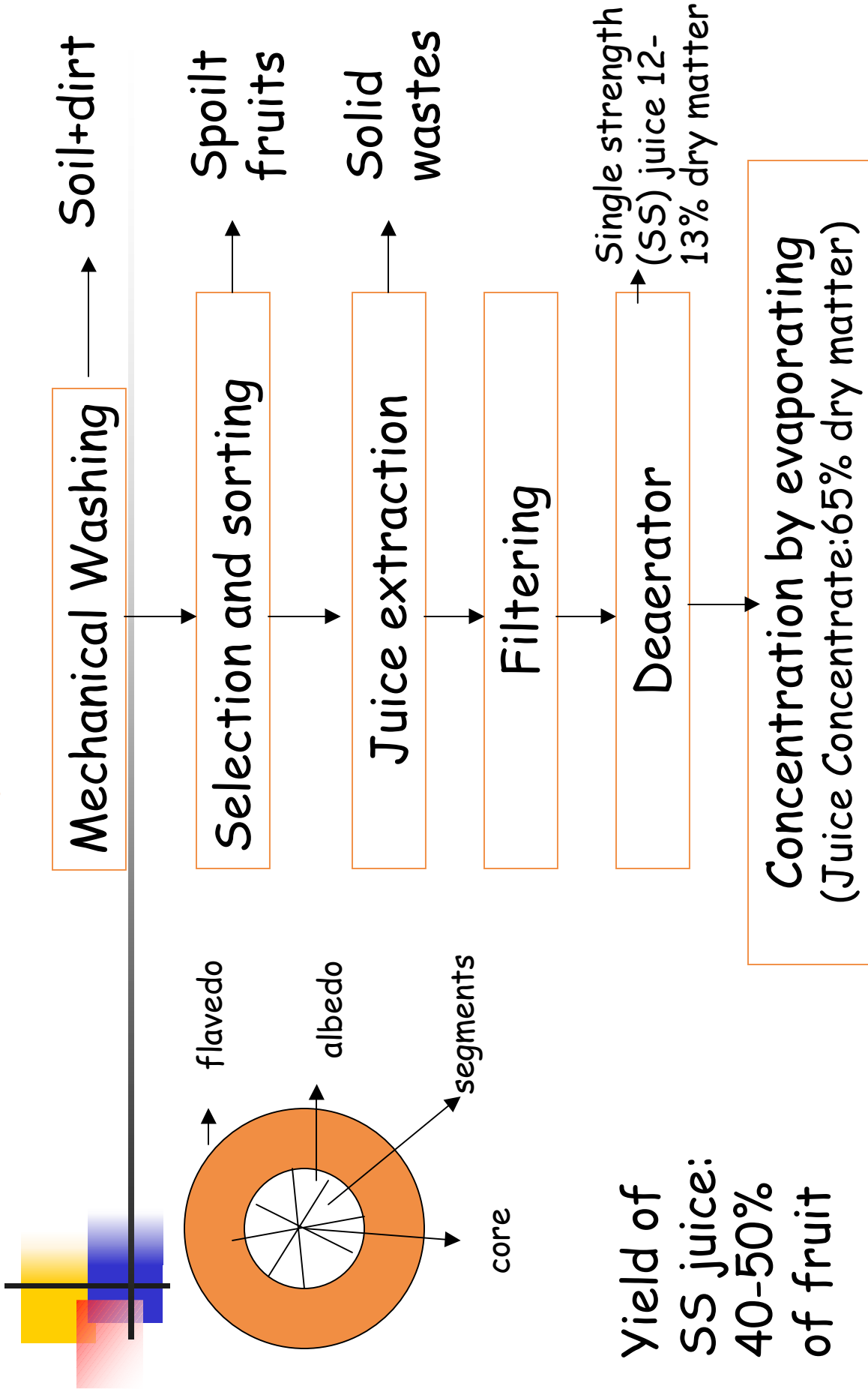
Cherries

Oranges

Strawberries

(No climacteric point)

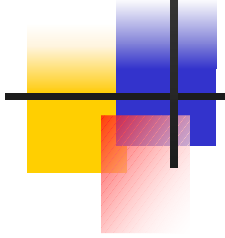
ORANGE JUICE PRODUCTION



SSjuice

Juice

Concentrate

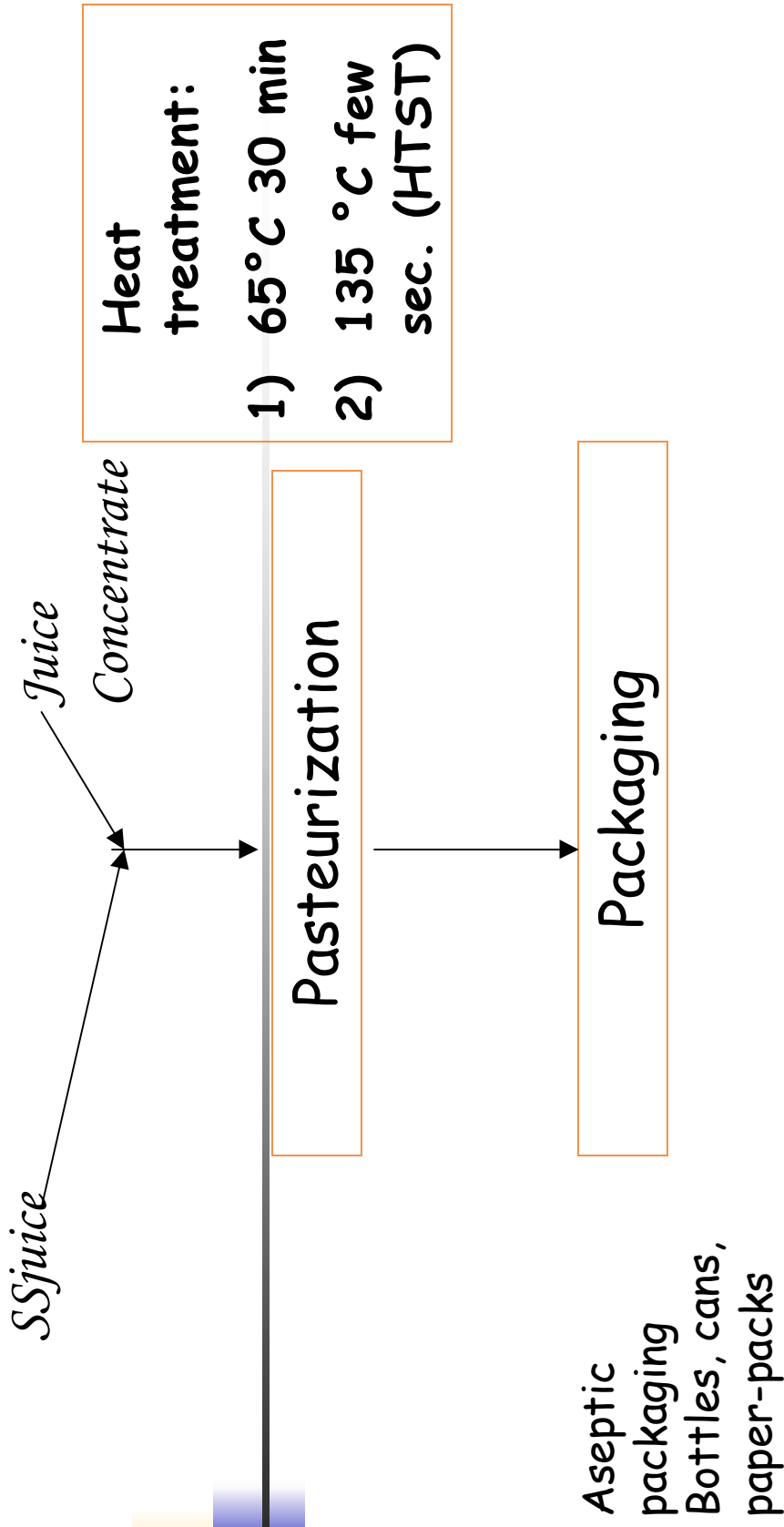


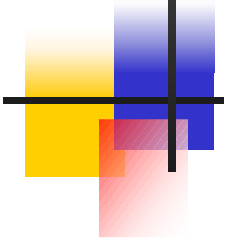
Heat treatment:
1) 65°C 30 min
2) 135 °C few sec. (HTST)

Pasteurization

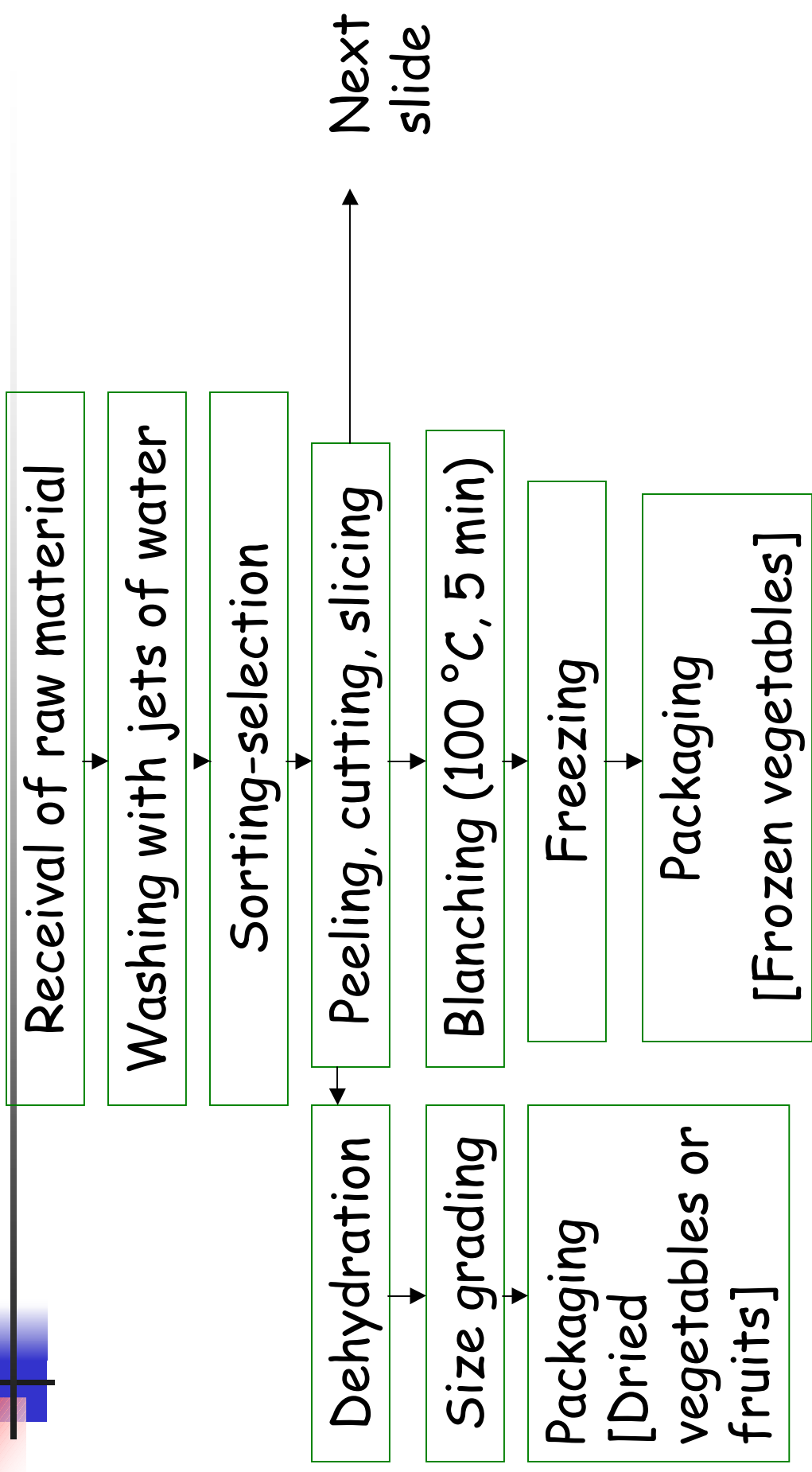
Aseptic packaging
Bottles, cans,
paper-packs

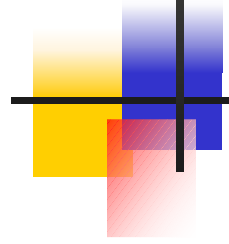
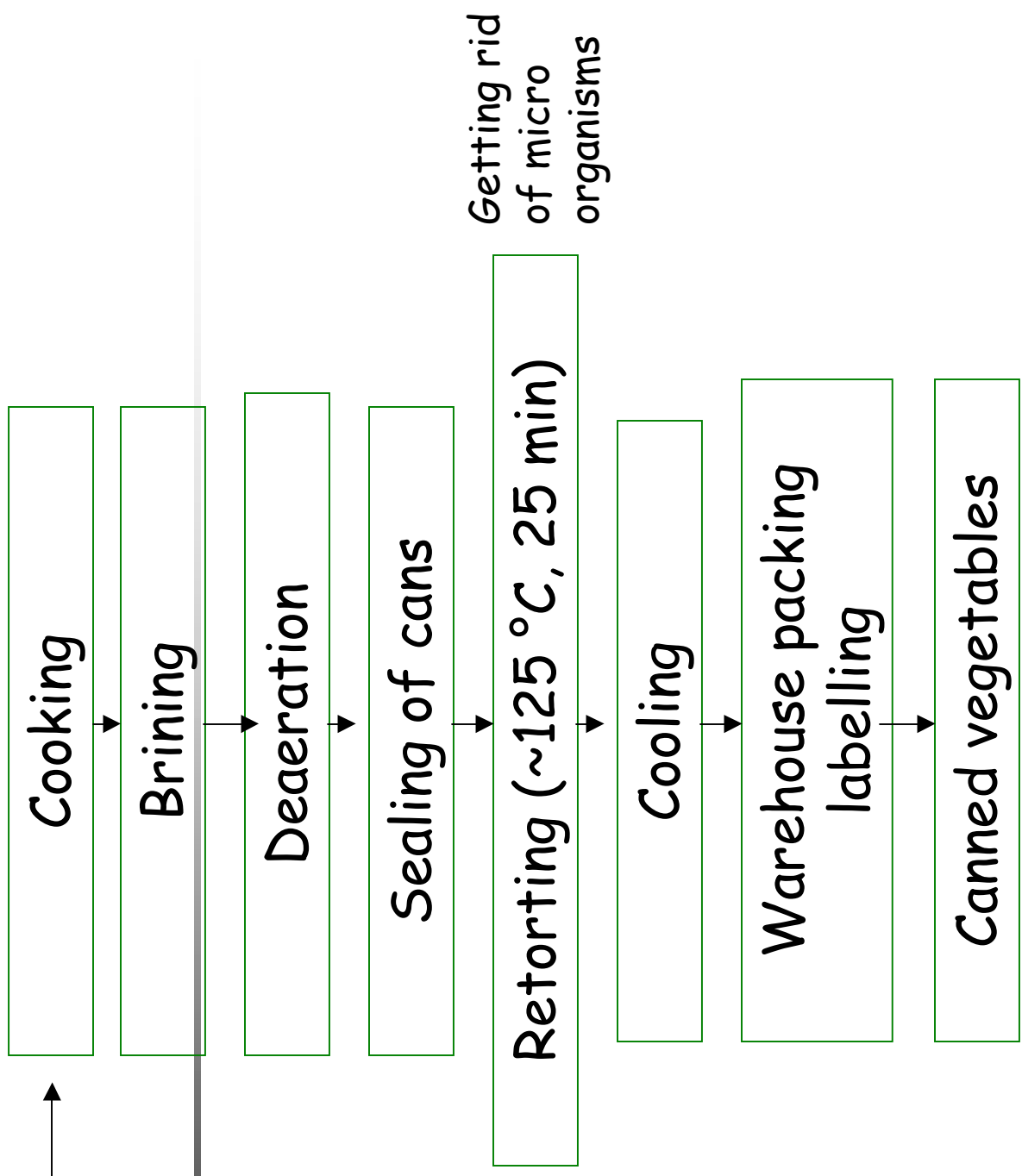
Packaging



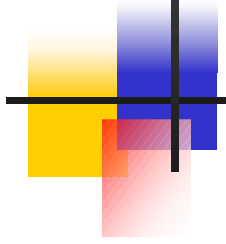


POST-HARVEST PRACTICES FOR VEGETABLES





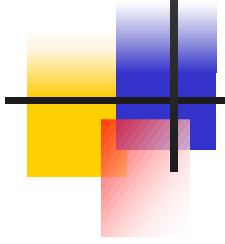
INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY



BEVERAGES AND CONFECTIONERY PRODUCTS

CHAPTER 19

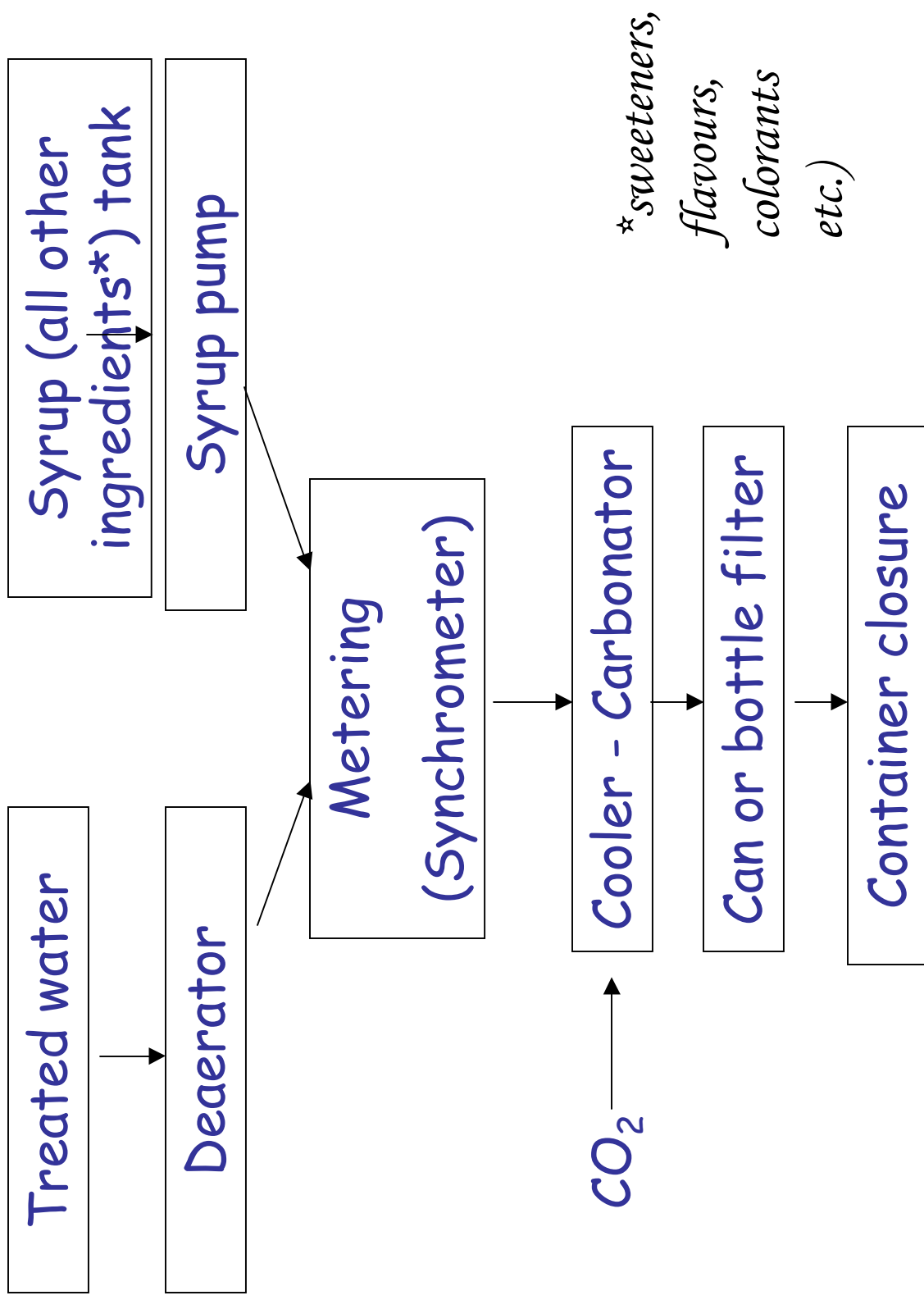
CHAPTER 20



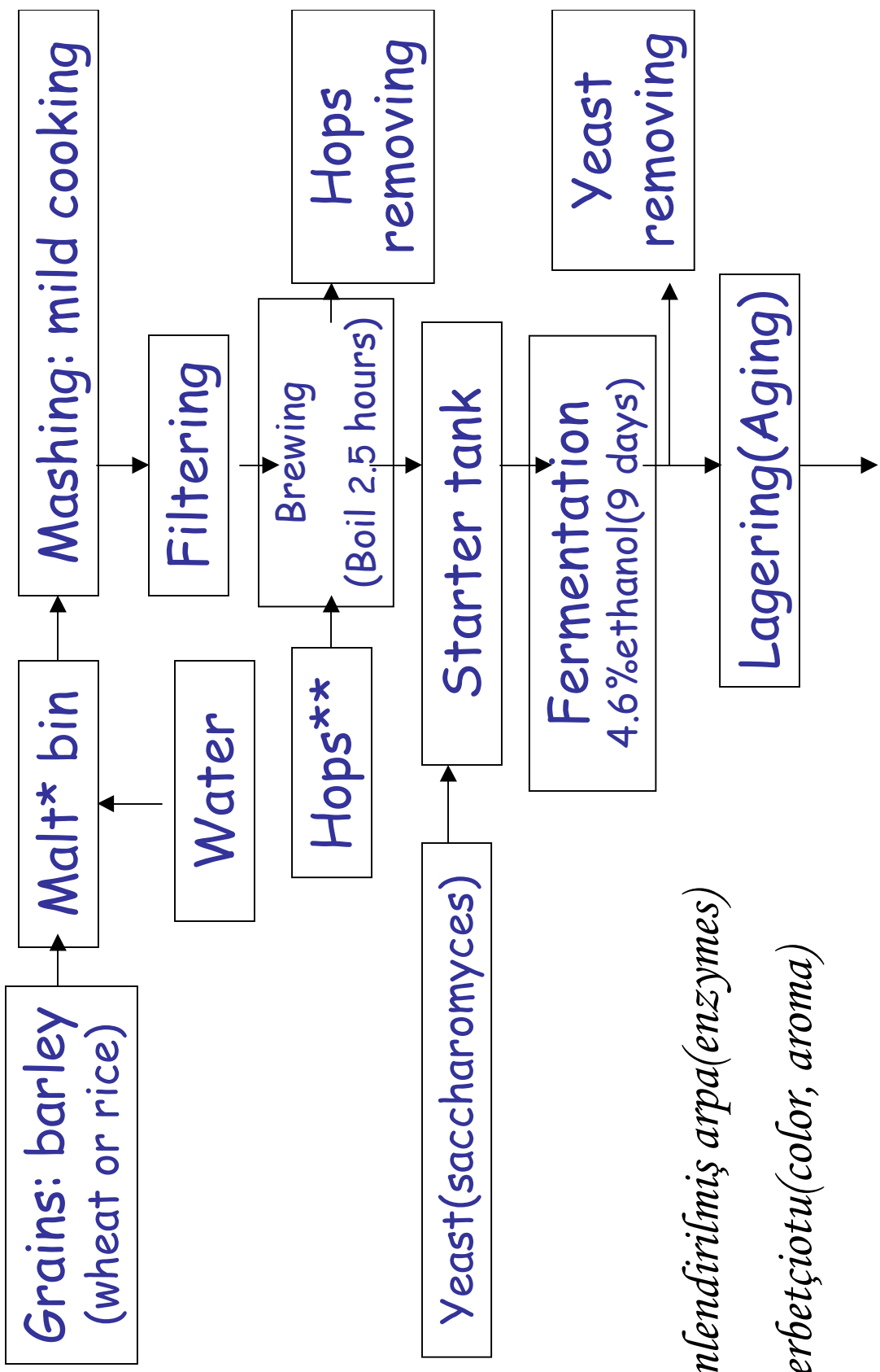
BEVERAGES

- ✓ Some beverages are consumed for their **nutritive** value (e.g. milk) yet others are consumed for their **thirst-quenching properties**, for their **stimulating effects**, or simply because their consumption is **pleasurable**.
- ✓ Carbonated nonalcoholic beverages or soft drinks “soda pop”
- ✓ Nonalcoholic, non-carbonated stimulating beverages- coffee, tea.
- ✓ Carbonated or noncarbonated mildly alcoholic beverages -beer, wine
- ✓ Distilled liquors: whiskey, vodka, gin, cognac, raki

Soft drink manufacture



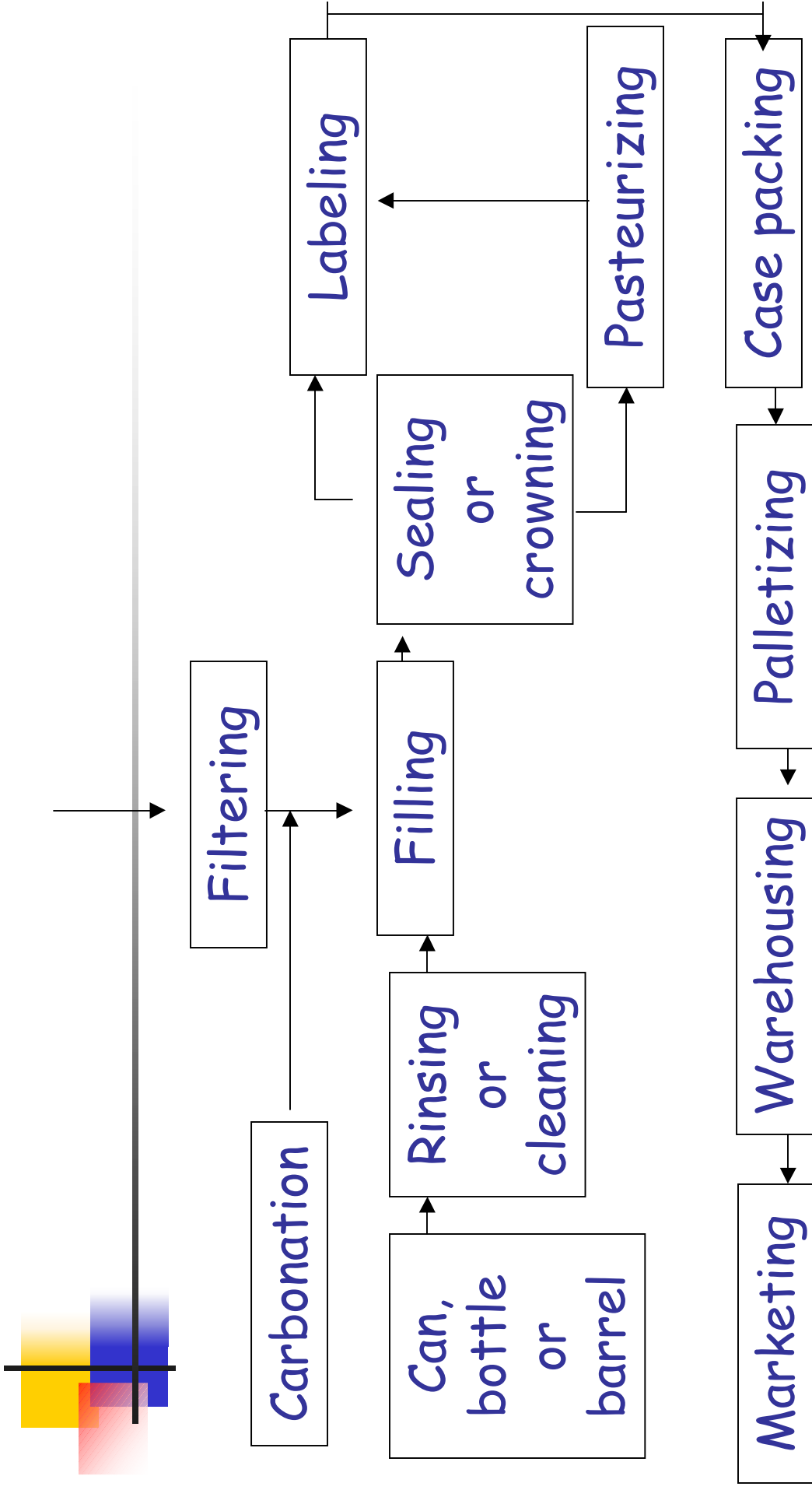
BEER PRODUCTION (BREWING)



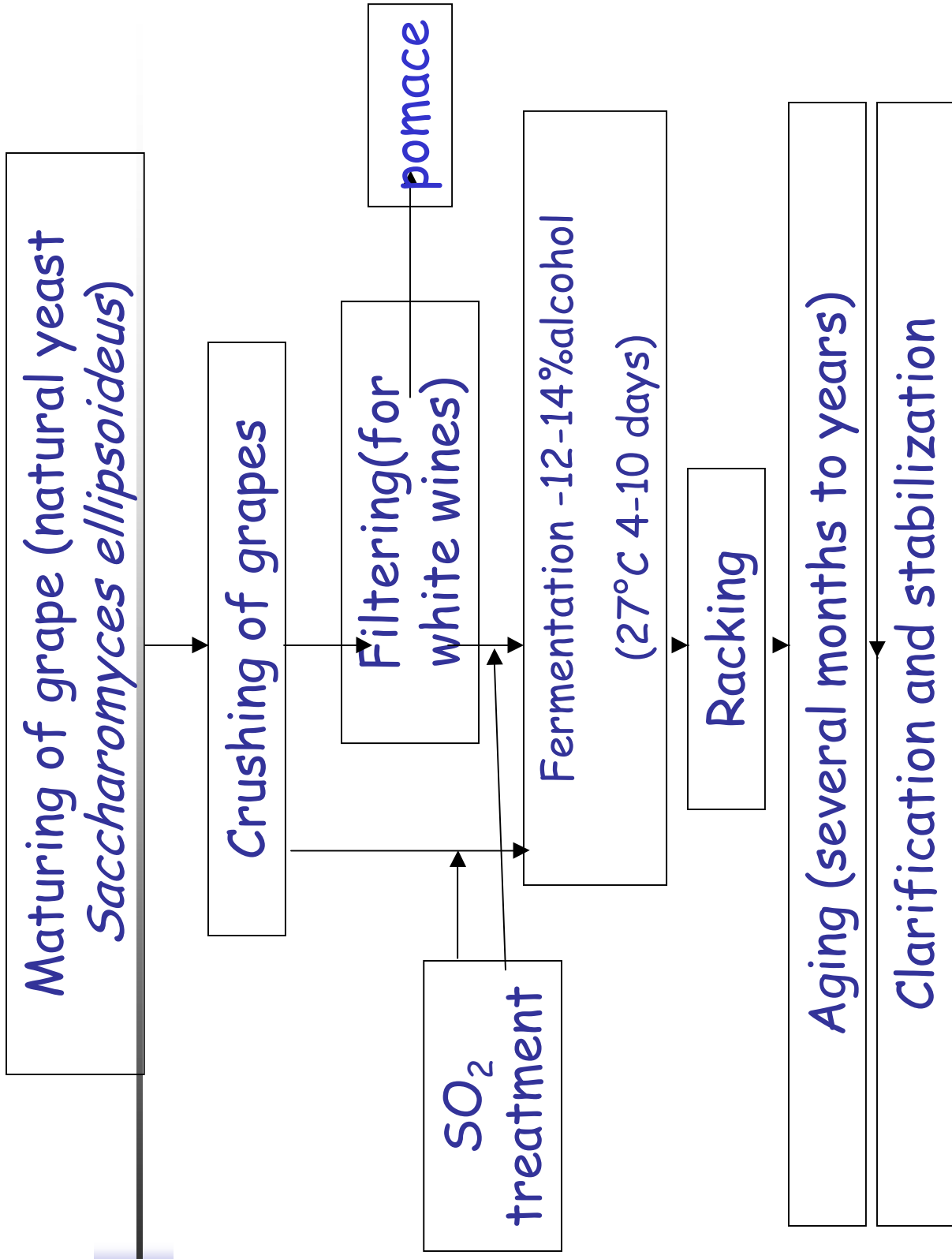
* çimlendirilmiş arpa(enzymes)

** şerbetçiotu(color, aroma)

BEER PRODUCTION



WINE PRODUCTION

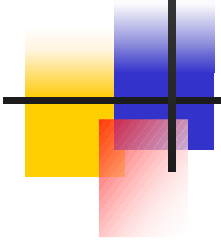


WINE PRODUCTION

If wine contains <17% alcohol;

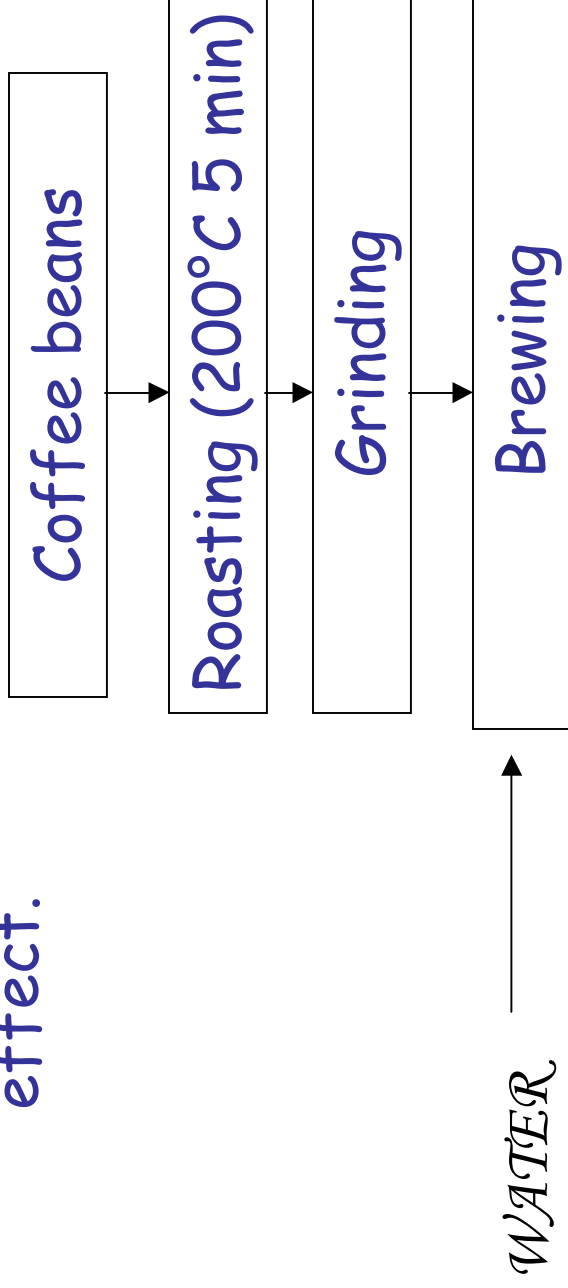
Heat pasteurization
or cold
pasteurization

Bottling



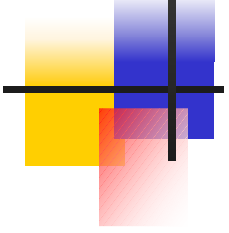
COFFEE

Both tea and coffee contain virtually no nutritional value in themselves and are consumed entirely for their refreshing and stimulating effect.



*Coffee
cherry*

Black Tea



Withering the plucked leaves to soften them and partial drying



Passing the withered leaves under rollers to rupture cell walls and to release the enzymes and juices



Fermenting the rolled leaves by exposing them to air about 27°C 2-5 h.

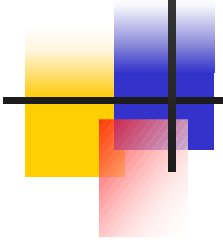


Drying the fermented leaves in ovens at about 93°C. 4% moisture, inactivating the enzymes.



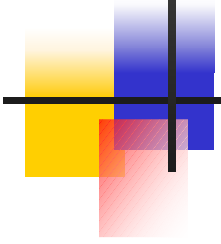
CONFECTIONERY AND CHOCOLATE PRODUCTS(CH. 20)

- Confectionary products can be divided into two broad categories:
- Those in which sugar is the principal ingredient
- and Those which are based on chocolate.
- Sugar based confections include: nougats, fondants, caramels, taffees and jellies.
- Chocolate based confections: chocolate-covered confections, chocolate-panned confections, chocolate bars, chocolate-covered fruits, nuts and cremes.
- Many other ingredients including milk products, egg white, food acids, gums, starches, fats, emulsifiers, flavors, nuts, fruits, are used in candy-making.



Ingredients

- Sucrose: Sugar from sugar cane or beet.
- Invert sugar: Sucrose can be hydrolyzed by acids or enzymes into two monosaccharides glucose and fructose. The hydrolyzed mixture of fructose (levulose) and glucose (dextrose) is called "invert sugar". Its use can prevent or help control the degree of sucrose crystallization.
- Corn syrups: Viscous liquids containing dextrose, maltose, higher sugars and dextrans that are produced by the hydrolysis of corn starch using acid or acid-enzyme treatment. Example: HFCS(high-fructose corn syrup)



Ingredients

Sugar substitutes: The ability of sucrose to cause dental cavities and its caloric content have led to the use of sugar substitutes in some confections.

Bulk sweeteners (alcohol derivatives of sugars are not fermentable by bacteria in the mouth, do not contribute to cavities, but do have caloric values as sucrose, e.x. Sorbitol, xylitol, mannitol)

High-intensity sweeteners (caloric and non-caloric) - saccharin, sucralose, thaumatin, aspartame, Acesulfam K, do not have bulking or mouthfeel of sugar.

COCOA & CHOCOLATE PRODUCTION

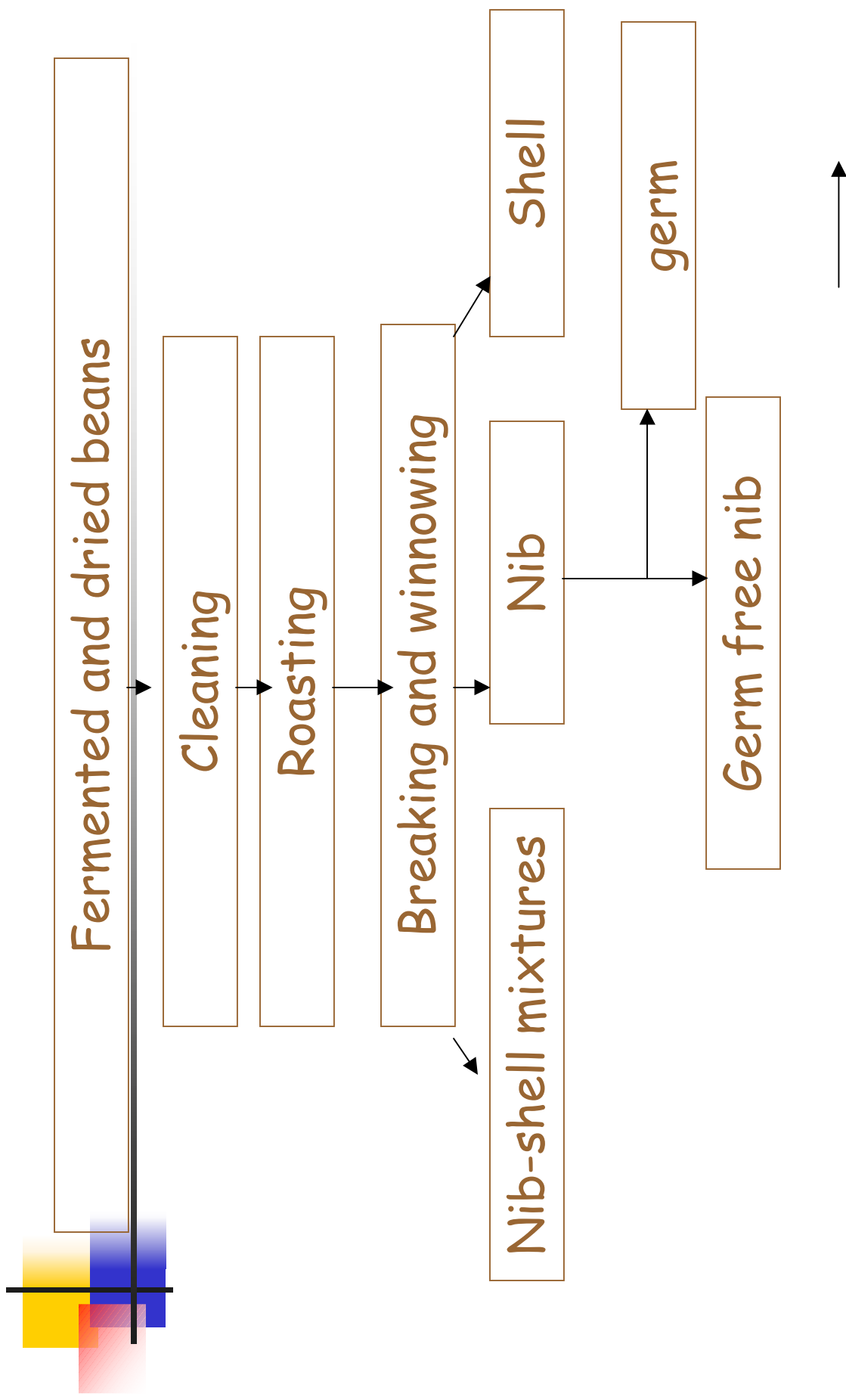


Fig. 20.1 in Potter)

