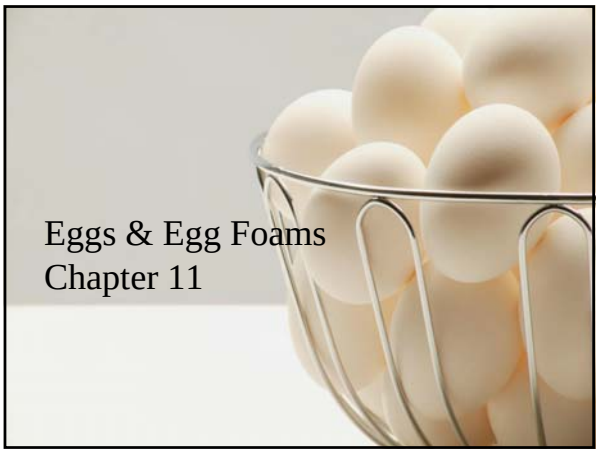


Eggs & Egg Foams
Chapter 11

F.Y.I.

- A hen requires 24-26 hours to produce an egg. Thirty minutes later she starts all over again.
- If an egg is accidentally dropped on the floor, sprinkle it heavily with salt for easy clean up.
- Egg yolks are one of the few foods that naturally contain vitamin D.
- Yolk color depends on the diet of the hen. Natural yellow-orange substances such as marigold petals may be added to light-colored feeds to enhance colors.

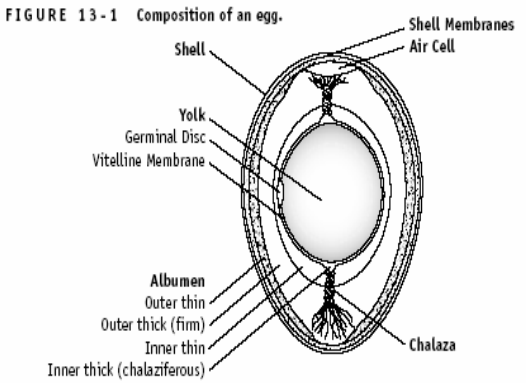
American Egg Board: www.aeb.org

Egg Functions

1. Flavor, color, nutrition
2. Emulsifying agent
3. Aids in thickening/structure
4. Binding/coating agent
5. Leavening agent
6. Interfering substance

Composition & Nutritional Value

1. One medium egg contains between 4-5 grams of fat
2. High cholesterol
   - ~200 mg/egg
3. High in Complete Protein
4. Little to no CHO
5. High in vitamins & minerals
   - Vitamins ADEK, some B vitamins, selenium, iodine, zinc, iron, copper



Composition of Eggs

- **Chalaza (pl. chalazae):** The ropy, twisted strands of albumen that anchor the yolk to the center of the thick egg white.
- **Vitelline membrane:** The membrane surrounding the egg yolk and attached to the chalazae.
- **Cuticle (bloom):** A waxy coating on an eggshell that seals the pores from bacterial contamination and moisture loss.

Inspection

- The Egg Products Inspection Act of 1970 requires that egg processing plants be inspected and that their eggs and egg products be:
  - Wholesome
  - Unadulterated
  - Truthfully labeled
- This law is enforced by the USDA Poultry Division and applies to all eggs, whether imported or shipped intra- or interstate.

Purchasing Eggs

Grading

- The best-quality eggs are graded USDA Grade AA, followed by USDA Grade A.
  - The grades sold at supermarkets.
- USDA Grade B, the lowest grade.
  - Available to food service establishments and not sold directly to consumers.

Characteristics of Fresh/High Quality Eggs

- Yolk is high & firm above the white
- Small yolk diameter
- Yolk is centered in white
- High ratio of thick to thin white
- High standing thick white

Candling

FIGURE 13-2 Candling: Eggs are automatically rolled against a light background during mass scanning, allowing checkers to remove those that have defects or that are cracked, soiled, or damaged.

Purchasing Eggs

Haugh Units

- The freshness of an egg can be detected by cracking it open onto a flat surface and looking at the height of its thick albumen.
- Fresh egg whites sit up tall and firm, while older ones tend to spread out.

FIGURE 13-3 Measuring Haugh units to determine egg quality.

Which is the highest quality egg?

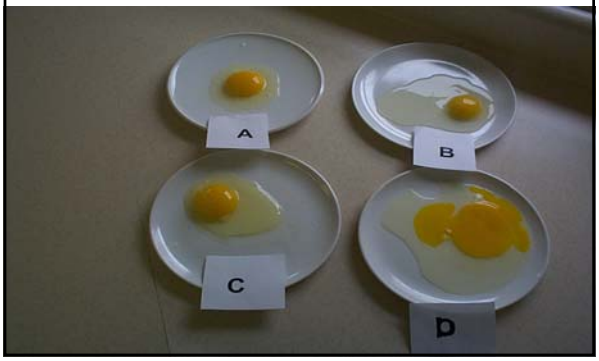
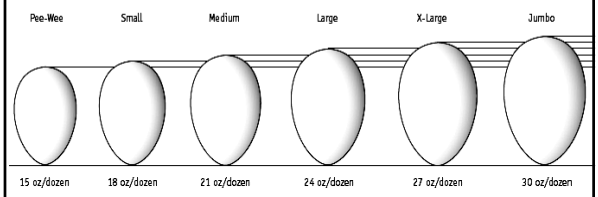


FIGURE 13-5 Egg sizes determined by minimum weight (including shells) per dozen.



- Sizing is not related to grading in any way.
- Eggs are sold in cartons by various sizes determined by a minimum weight for a dozen eggs in their shell.

Changes in Prepared Eggs

- The key to cooking eggs is to keep the temperature low and/or the cooking time short.
- Egg whites and yolks coagulate at different temperatures.
- Adding other ingredients to eggs changes their coagulation temperature.
- Undesirable color changes may occur during egg preparation.

Preparation of Eggs

- Dry Heat
  - Fried
  - Scrambled
  - omelets
- Moist heat
  - "Boiled" eggs
  - Coddled eggs prepared in a cup
  - Poached eggs
  - A variety of custards
  - Eggs that are prepared using the microwave

Custards

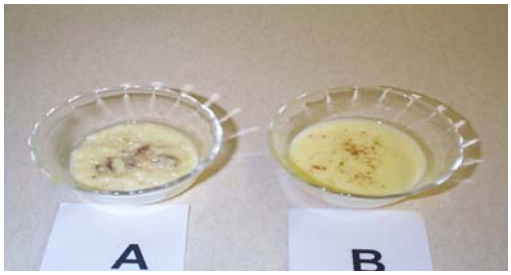
- Custards are mixtures of milk and/or cream, sweeteners (sugar, honey), flavorings (vanilla, nutmeg, etc.), and eggs or egg yolks.
- Custards
  - Sweet or savory
  - Stirred or Baked
    - Stirred Custard ingredients are stirred while being heated.
    - Baked custard mixes are poured into ungreased custard cups that are placed in the oven.

Preparation of Custards

1. **Baked Custards**
   - **coagulated by heat without stirring which produces a gel**
   - **usually cooked in a water bath**
   - **doneness**
   - **Excessive heat treatment results in curdling, syneresis and toughening of the protein**
2. **Stirred Custards**
   - **creamy consistency due to stirring**
   - **stirring prevents gel formation**
   - **use double boiler:click to the next slide to see a double boiler**
   - **doneness**

Double Boiler: Water placed inside the bottom pan prevents direct heat and avoids scorching

Custard A was overcooked and has curdled



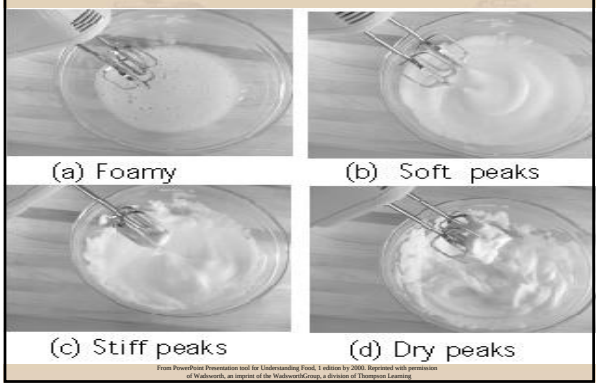
Egg Safety Tips

1. **Inspect before buying and discard any broken eggs**
2. **Refrigerate immediately at or below 40 F**
3. **Keep in cartons**
4. **Cook until the whites are coagulated & yolks begin to thicken to kill the salmonella bacteria**
5. **Egg dishes should not be kept out >1 hour**

Egg Foams: What is a foam?

1. Air trapped in a liquid
2. In egg foam, air trapped by protein.
3. Denatured and then coagulates
4. Heat expands protein/air

Stages of Foam Formation



Volume & Stability Factors

- Sugar
  - increases stability
  - delays foam formation
  - added at foamy or soft peak stage
- Acid
  - increases stability
  - doesn't delay foam formation
- Temperature
  - room temperature
- Fat
  - decreases foam formation

Foam Products

- Meringues
  - Hard or soft
- Soufflés
- Meringue/foam cakes
  - Angle food
  - Sponge

www.oregon-berries.com/cx2/mk02b2.htm

Soft Meringues

- Preparation procedure
  - Beat egg whites almost to soft peak stage.
  - Add sugar gradually, otherwise extensive beating is necessary to produce foam as sugar interferes with coagulation of egg proteins.
  - Continue beating to stiff peak stage.
- High quality characteristics
  - slightly moist, tender, fluffy, lightly browned, easy to cut

Possible Preparation Problems

- Beading
  - droplets of amber syrup appear on the surface due to the over-coagulation of the protein.
- Weeping (Synerisis)
  - Leakage of the liquid where the meringue & filling meet due to the under-coagulation of protein
- Can be minimized by:
  - spreading meringue on hot filling.
  - baking in oven (425 F) ~ 5 min.
  - Adding a tsp of cornstarch to sugar before beating it into the egg whites

Hard Meringues

http://www.canadaegg.ca/english/recipes/festmeringues.html

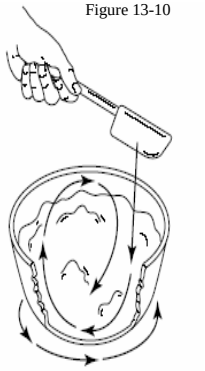
- Prep procedures

1. Egg whites beaten to soft peak stage
2. Sugar added gradually (4T/egg white) and beaten to stiff peak
3. Place swirls of foam on baking sheet.
4. Baked @ 275 F for 1.5 hrs
5. Leave in oven after baked with door closed for another hour to increase the drying out of the meringue.

Souffles

- The main ingredients of a soufflé are a thick base generally made from a **white sauce** or pastry cream, an egg white foam, and flavoring ingredients
  - **White sauce:** A mixture of flour, milk, and usually fat.
- Stiffly beaten egg whites are **folded** into the thick egg yolk mixture.

Figure 13-10



Do you know the ingredient's functions?

- *Eggs*: Provides foam for leavening and structure
- *Flour:* Contributes to structure
- *Sugar*: Tenderizes, gives flavor, browns, & stabilizes foam
- *Acid*: Stabilizes foam and whitens cake

Meringue/Foam Cakes

- Preparation procedures

1. Make egg white foam
2. Flour-sugar mixture sifted over top of foam & folded in
3. Bake 375 in ungreased tube pan for 1 hour
4. Cool upside down

Milk/Cream Foams

Whipping cream

- High in fat & therefore whips well
- Air bubbles encased in layer of protein & clumps of fat
- Cold temperatures
- Sugar delays incorporation of air leading to low volume
- Used for filling and decorating pastries

Whipping milk

- Lower in fat
- Lower in cost
- Decreased whipping ability
- Lacks flavor