THE CHEMISTRY OF FROZEN DESSERTS

During summer, you can turn to a dizzying array of frozen desserts for refreshment. Here’s a handy guide to help you tell your ice cream from your gelato.

### COMPOSITION & STRUCTURE
A mix of air, ice crystals, liquid syrup, and fat droplets make up most frozen desserts. These ingredients form a solution in which the droplets of fat are suspended. Milk proteins stop fat droplets from coalescing, while emulsifiers help multiple fat droplets trap air.

### A SINGLE FAT DROPLET
- Liquid Fat
- Emulsifier Molecules
- Milk Proteins
- Frozen Fat Crystals

The fat droplets make frozen desserts creamy and also help stabilize the air bubbles formed during beating and aeration. Ice crystals help determine the texture: the smaller the crystals, the smoother the dessert.

### ICE CREAM vs. GELATO vs. SOFT SERVE vs. FROZEN YOGURT

**ICE CREAM**
- **FAT CONTENT BY WEIGHT:** 10–20%
- **OVERRUN:** 20–100%

**GELATO**
- **FAT CONTENT BY WEIGHT:** 3–8%
- **OVERRUN:** 20–30%

**SOFT SERVE**
- **FAT CONTENT BY WEIGHT:** 3–10%
- **OVERRUN:** 30–60%

**FROZEN YOGURT**
- **FAT CONTENT BY WEIGHT:** 0.5–3%
- **OVERRUN:** 50–60%

*See below; premium brands have a lower overrun than economy brands do.*

### AIR & OVERRUN
- **AIR BUBBLES:** 50%
- **ICE CRYSTALS:** 30%
- **LIQUID SYRUP:** 15%
- **FAT DROPLETS:** 5%

% by volume for typical composition of ice cream

Overrun refers to the amount of air added to frozen desserts. It is the increase in volume of a frozen treat as air gets incorporated during manufacture, expressed as a percentage.

### SHERBET & SORBET
- **SHERBET**
  - **FAT CONTENT BY WEIGHT:** 0%
  - **OVERRUN:** 100%

- **SORBET**
  - **FAT CONTENT BY WEIGHT:** 1%

Sherbet and sorbet both contain less dairy than ice cream does. Sorbet contains none at all and is just fruit and sugar, while sherbet contains a little milk or cream, giving it a smoother feel.