

Potential Impacts of New Processing Technologies on Milk Marketing



David Barbano - Cornell University

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David Barbano


Department of Food Science

Cornell University

Processing Technologies

- **On-farm Modification of Milk Composition**
- **Milk Protein Fractionation**
- **Modified Atmosphere Processing with Carbon Dioxide**

Types of Membrane Filtration

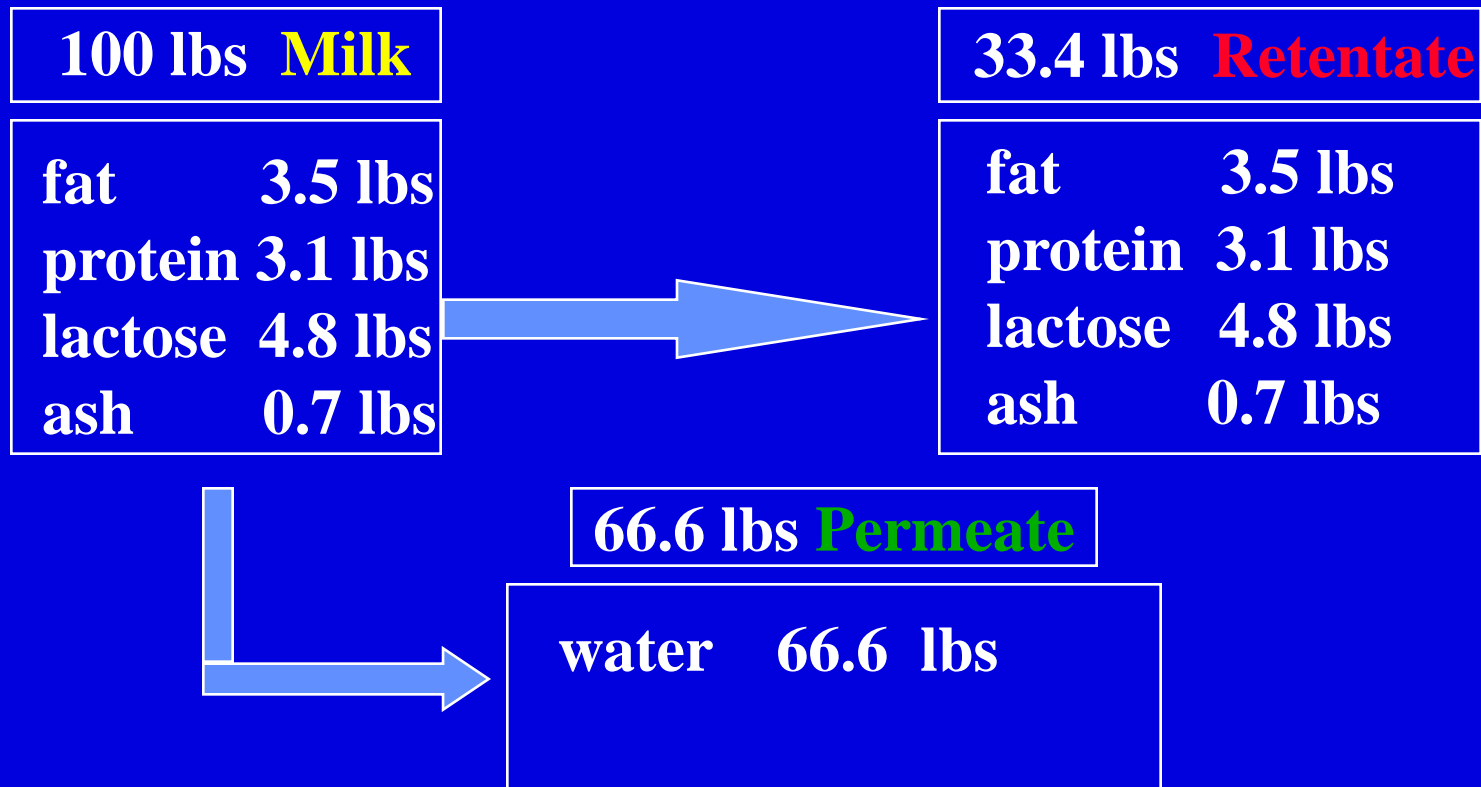
- **Reverse Osmosis** - smallest pore size
 - **Nanofiltration**
 - **Ultrafiltration**
 - **Microfiltration** - largest pore size
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Types of Membrane Filtration

- **Concentration Processes**
 - Reverse Osmosis
- **Fractionation Processes**
 - Nanofiltration
 - Ultrafiltration
 - Microfiltration

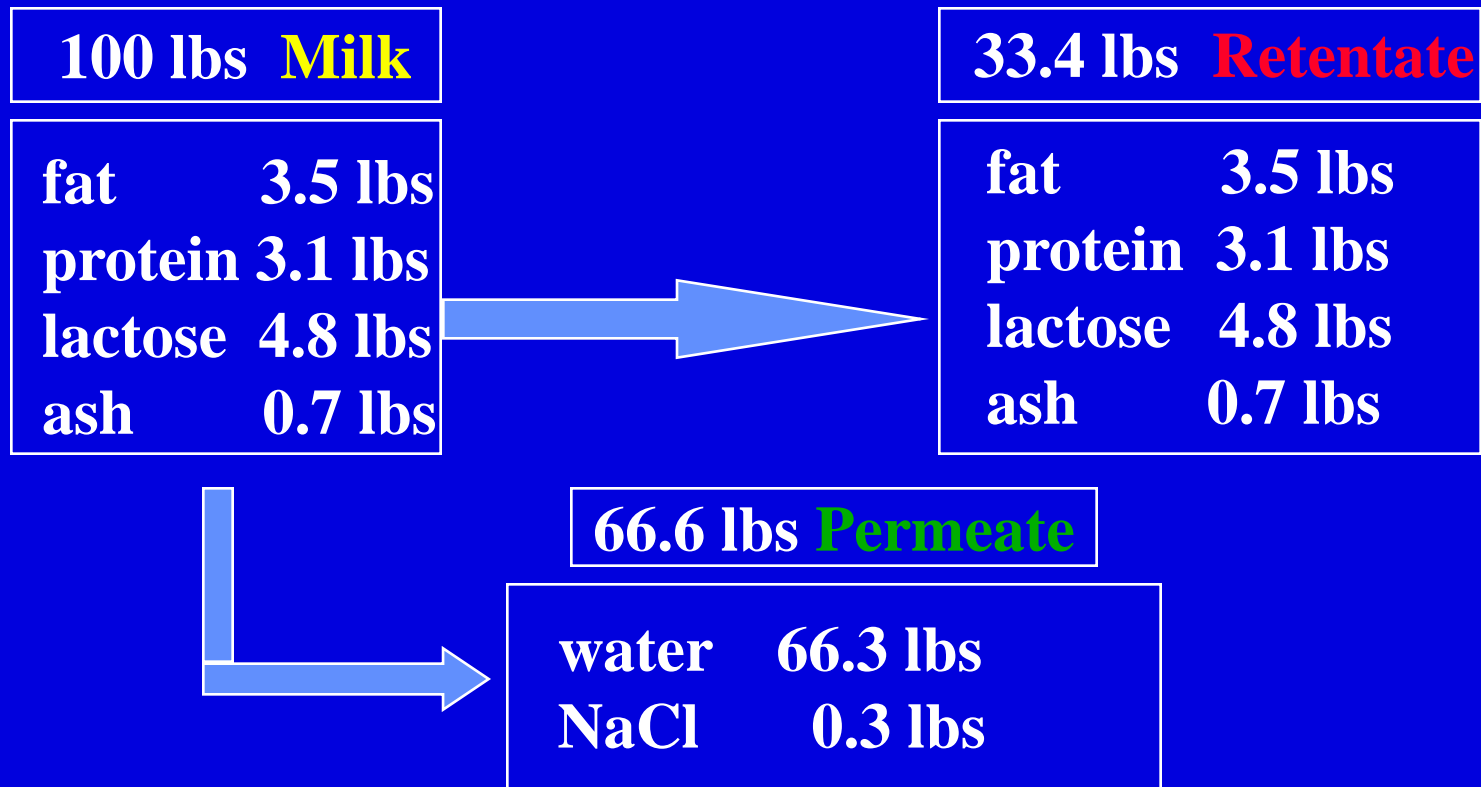
Basics of Separation Processes

3X Reverse Osmosis



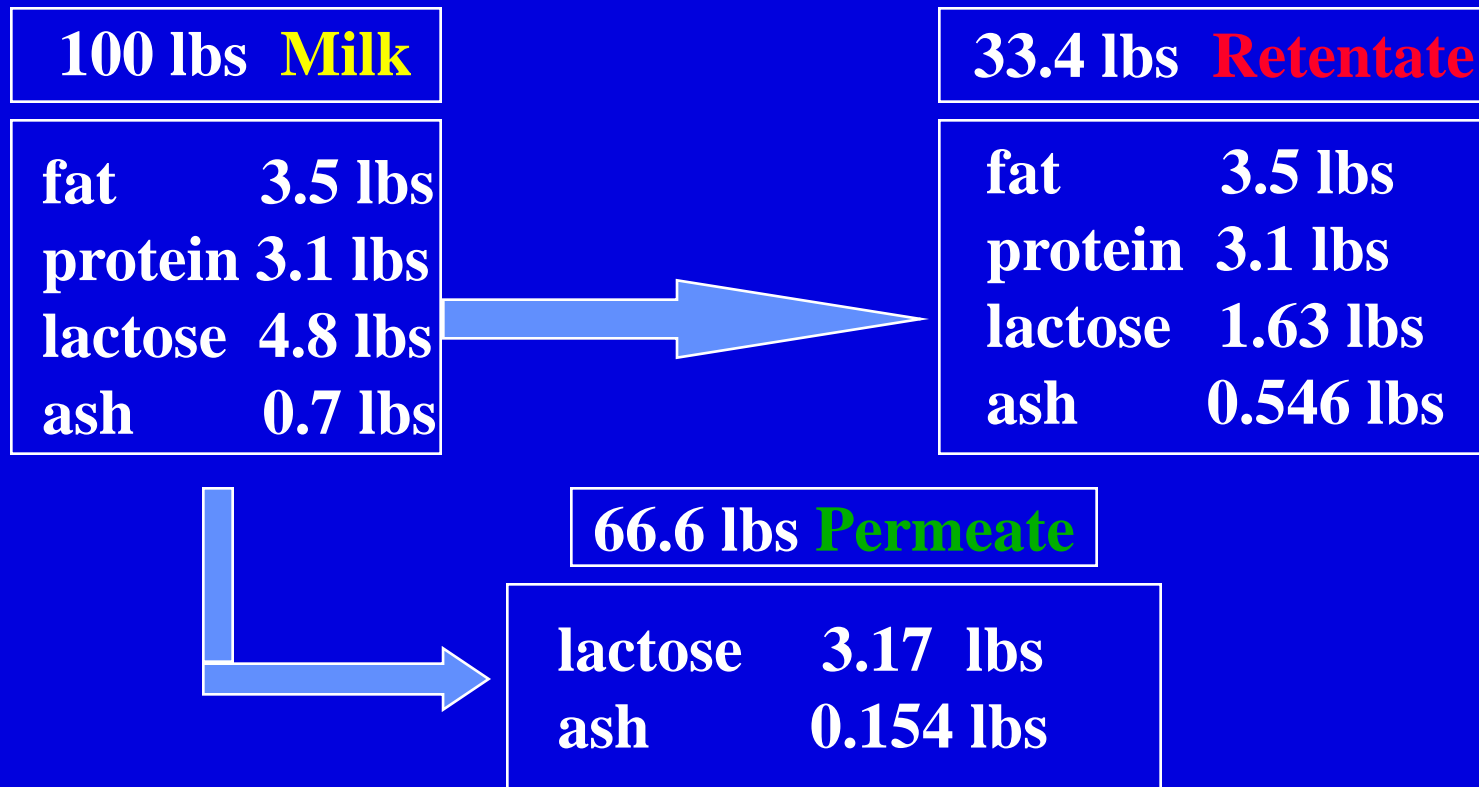
Basics of Separation Processes

3X Nanofiltration



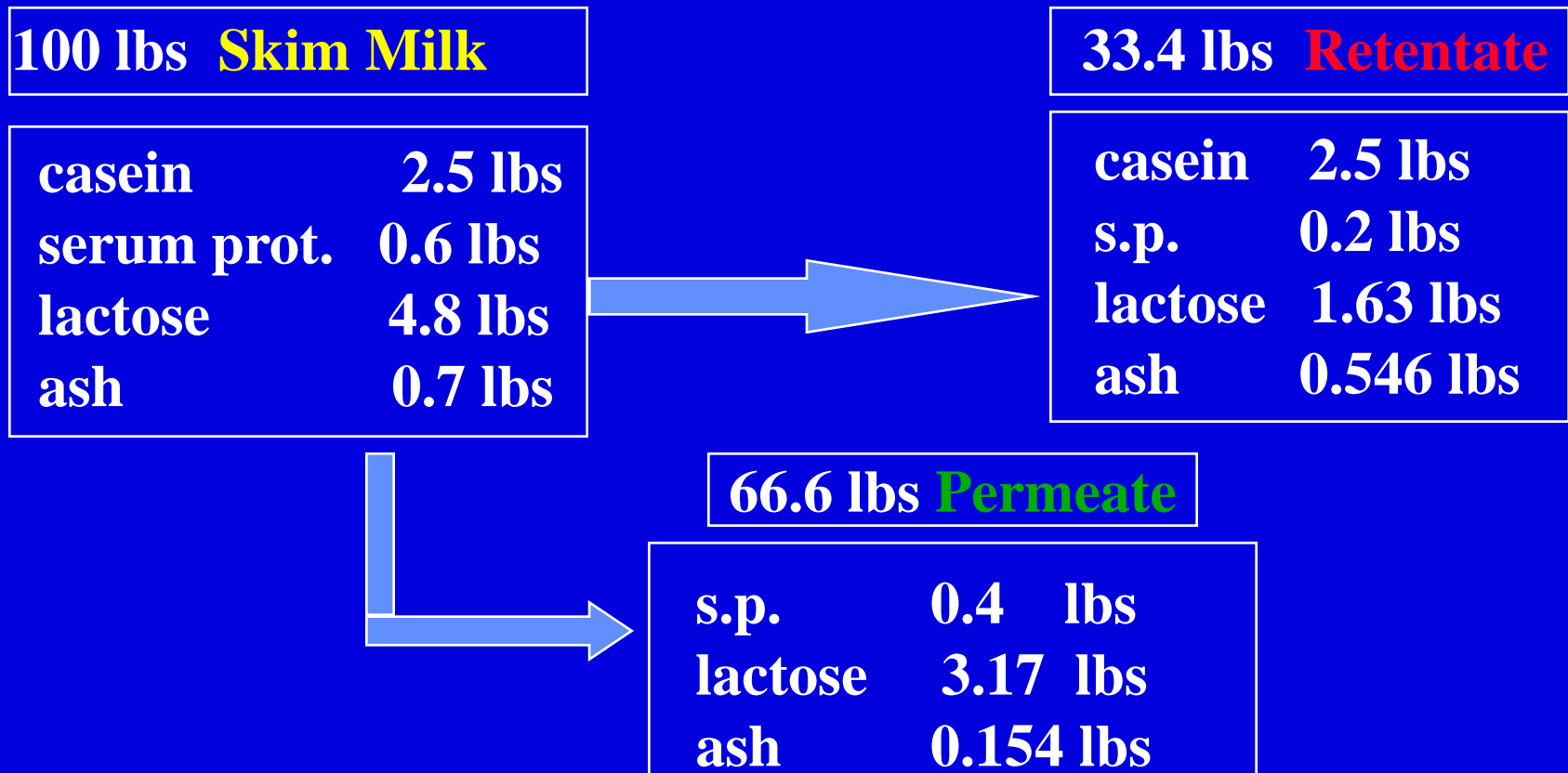
Basics of Separation Processes

3X Ultrafiltration



Basics of Separation Processes

3X Small Pore **Microfiltration**



Processing Technologies

- **On-farm Modification of Milk Composition**

On-farm Modification of Milk Composition

- **Ultrafiltration and Reverse Osmosis**
 - **3x concentrate with about 12% fat and 9% protein reduces the cost of shipping.**
 - **Improved cheese making efficiency.**
 - **Protein fortification of products without increased lactose and calories.**
 - **Shipping longer distances**

Processing Technologies

- **On-farm Modification of Milk Composition**
- **Milk Protein Fractionation**

Small Pore Microfiltration

- **New Milk Protein Fractions (new value added ingredients for dairy and nondairy foods)**
 - **Native Casein Concentrates**
 - **Pure Milk Serum Proteins**
 - **Individual Milk Protein Isolates**

Processing Technologies

- **On-farm Modification of Milk Composition**
- **Milk Fractionation**
- **Modified Atmosphere Processing with Carbon Dioxide**

Modified Atmosphere Processing Using Carbon Dioxide

- **Cultured Products**
- **Raw Milk Concentrates and Fractions**
- **Pasteurized Milk and Whey Concentrates and Fractions**
- **Raw and Pasteurized Cream**

Impacts on Marketing

- **Reduced bulk and ability to minimize microbial growth will allow shipment of concentrates and fractions over longer times and distances.**
- **Liquid concentrates with carbon dioxide may allow international marketing and shipping of value added ingredients.**

Impacts on Marketing

- **Fractionation of the solids components of skim milk and the ability to ship liquid concentrate fractions longer distances will present challenges to classified pricing within the Federal Milk Market system.**

Impacts on Marketing

- **Fractionation of the solids components of skim milk will provide an opportunity to develop a wide range of new value added dairy based beverages (e.g., modified protein levels, modified casein to serum protein ratio, modified protein to other solids ratio).**