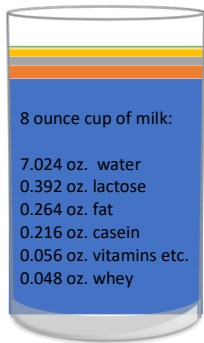




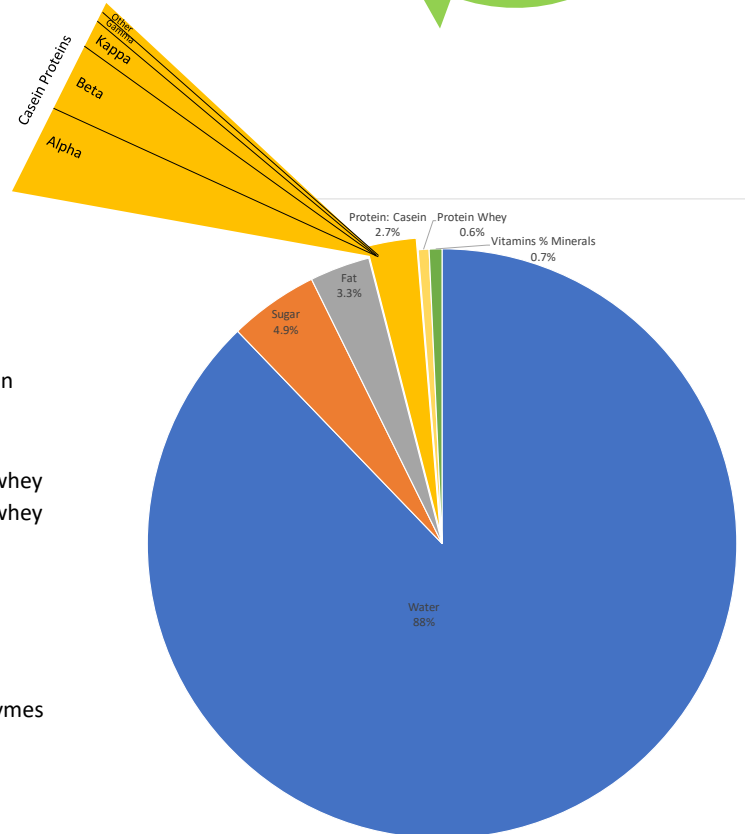
### 5 Components in bovine milk:

1. Water: 87.8%
2. Sugar (carbohydrate lactose): 4.9%
3. Protein: 3.3% (82% is casein and 18% is whey)



- 82% of total protein is Casein
  - ◊ Alpha Casein: 44% of total casein
  - ◊ Beta Casein: 33% of total casein
  - ◊ Kappa Casein: 11% of total casein
  - ◊ Gamma Caseins: 6% of total casein
  - ◊ Other: 6% of total casein
- 18% of total protein is Whey
  - ◊ Beta Lactoglobulin: 50% of total whey
  - ◊ Alpha Lactalbumin: 20% of total whey
  - ◊ Other: 30% of total whey
    - \* Blood Serum
    - \* Lactoferrin
    - \* Immunoglobulins
    - \* Transferrin
    - \* Minor proteins and enzymes

4. Fat: 3.3%
5. Vitamins and Minerals 0.7%



### Genetic Tests For Milk Genes

There are three milk gene tests available.

1. Beta Casein Gene (UCD and TAMU)  
The alleles tested for: **A1, A2, A3, B, C, F, G, H1, H2, I, K, L** (TAMU only tests for A1 and A2)
2. Kappa Casein Gene (UCD)  
The alleles tested for: **A, B**  
The A allele is associated with higher milk production.  
The B allele is associated with increased protein and casein content with better cheese yield.
3. Beta lactoglobulin Gene (UCD)  
The alleles tested for: **A, B**  
The A allele is associated with increased milk yield and whey protein.  
The B allele is associated with increased casein and better cheese yield.

<http://ansci.illinois.edu/static/ansc438/Milkcompsynth/milkcompsynthresources.html>  
<http://www.milkfacts.info/Milk%20Composition/Milk%20Composition%20Page.htm>  
[http://ansci.illinois.edu/static/ansc438/Milkcompsynth/milksynth\\_proteinbiochem.html](http://ansci.illinois.edu/static/ansc438/Milkcompsynth/milksynth_proteinbiochem.html)  
<https://www.beckmancoulter.com/wsrportal/bibliography?docname=IB-18070.pdf>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5327394/> <http://www.cheesesociety.org/wp-content/uploads/2011/02/2011-Milk-Composition-Hill.pdf>  
<https://www.ncbi.nlm.nih.gov/pubmed/15867940?report=abstract>  
<https://www.viva.org.uk/composition-cows-milk>  
<https://www.vgl.ucdavis.edu/services/MilkProtein.php>  
<http://cdrf.org/2017/02/09/a2-milk-facts/>  
<https://www.sciencedaily.com/releases/2017/04/170428102103.htm>  
<https://theconversation.com/science-or-snake-oil-is-a2-milk-better-for-you-than-regular-cows-milk-62486>