

Milk Is a Natural

Observations and Results

Data Table 1. Protein and Carbohydrate Content of Skim Milk

Volume of skim milk used (mL)	
Mass of skim milk used (assume density = 1.0 g/mL)	
Mass of empty watch glass (Part A) (g)	
Mass of watch glass + casein (g)	
Mass of dry casein (g)	
Mass of filter paper (Part B) (g)	
Mass of filter paper + lactalbumin and lactoglobulin (g)	
Mass of lactalbumin and lactoglobulin (g)	
Combined mass of total proteins from 20 mL of milk (g)	
Mass of empty watch glass (Part C) (g)	
Mass of watch glass + lactose (g)	
Mass of lactose from 1 mL of milk (g)	

Data Table 2. Qualitative Tests for Protein and Carbohydrate

Test Tube	Biuret Test			Benedict's Test		
	Solution	Color	(+/-)	Solution	Color	(+/-)
1	Distilled water (Control)			Distilled water (Control)		
2	Skim milk			Skim milk		
3	Casein solution			Casein solution		
4	Lactalbumin solution			Lactalbumin solution		
5	Filtrate (Lactose solution)			Filtrate (Lactose solution)		
6	Reference (Protein)			Reference (Carbohydrate)		

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Post-Lab Calculations and Analysis

1. Based on the combined mass of protein isolated from 20 mL of skim milk, calculate the percent composition of total protein in skim milk. What percent of the total protein content is due to the casein fraction? (Assume the density of milk is equal to 1 g/mL.)
2. Using your experimental value for the percent protein in milk, calculate the mass of protein in grams that would be present in 1 serving size (1 cup, 240 mL) of skim milk. Compare this result with the information provided on the nutritional label for the protein content in 1 serving of skim milk.
3. Based on the amount of lactose isolated from 1 mL of skim milk (filtrate), calculate the percent composition of lactose in skim milk.
4. Using your experimental value for the percent lactose in milk, calculate the mass of lactose in grams that would be present in 1 serving size (1 cup, 240 mL) of skim milk. Compare this result with the information provided on the nutritional label for the carbohydrate (sugar) content in 1 serving of skim milk.
5. Based on the results of the Biuret and Benedict's tests, comment on the effectiveness of the experimental procedures for the separation of the protein and carbohydrate fractions of skim milk.