The problem № 4
Making quark

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Quark, cottage cheese, and similar varieties of white acid-set cheese can be produced from milk. Investigate this process experimentally and study the properties of the resulting product.
Experimental setup:

- Milk
- Acid
Result

Milk

- Quark
- Whey
Cottage cheese from 200 ml of milk

From home milk
51.29g
About 26% more

From shop milk
37.91g
Milk consist of:

- Calcium
- Protein
- Carbohydrates
- Other substance
Reactions with $HNO_3$

Proteins

- Denature
  - Settling

Carbohydrates

Will be oxidized to acids
Carbohydrates + $HNO_3$

\[
\begin{align*}
\text{CHO} & \quad \text{COOH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{HO} - \text{C} - \text{H} & \quad \text{HO} - \text{C} - \text{H} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{CH}_2\text{OH} & \quad \text{COOH} \\
\end{align*}
\]

$\xrightarrow{t}$

\[
\begin{align*}
\text{HO} - \text{C} - \text{H} & \quad \text{HO} - \text{C} - \text{H} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{COOH} & \quad \text{COONa} \\
\end{align*}
\]

$\xrightarrow{\text{NaOH}}$

\[
\begin{align*}
\text{HO} - \text{C} - \text{H} & \quad \text{HO} - \text{C} - \text{H} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{H} - \text{C} - \text{OH} & \quad \text{H} - \text{C} - \text{OH} \\
\text{COOH} & \quad \text{COONa} \\
\end{align*}
\]
Titration

Whey  →  Milk
Electrophorese

* H-homemade
S-shop one
W-whey
M-milk
Shop milk VS Home milk

Milk
Proteins

Whey
Carbohydrates
Calcium

Whey

Milk
Calcium (mg) in 100 ml

- Homemade Whey
- Home Milk
- Shop whey
- Shop milk

The graph shows the calcium content in 100 ml of each product.
Lactobacteriase

* H-homemade
S-shop one
W-whey
M-milk

HW  HM

SW  SM
Lactobacteriase

H-homemade
S-shop one
W-whey
M-milk
Conclusion

Home milk is better to making cottage cheese:

- More protein
- More calcium
- Doesn’t have amyllum
- More lactobacterias
- No antibiotics

Differences:

- Bacillus sp in shop milk
- Different amount of bacterias
Thank you for your attention