4. Making butter

Team Croatia

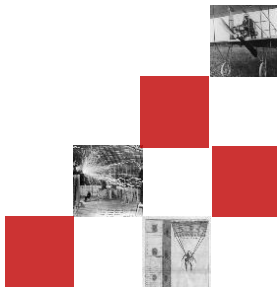
Reporter: Dominik Čondić Bijader

4. Making butter

Investigate the methods to produce homemade **butter** from **milk** or **cream.**
Investigate how **properties** of the butter depend on **relevant parameters.**

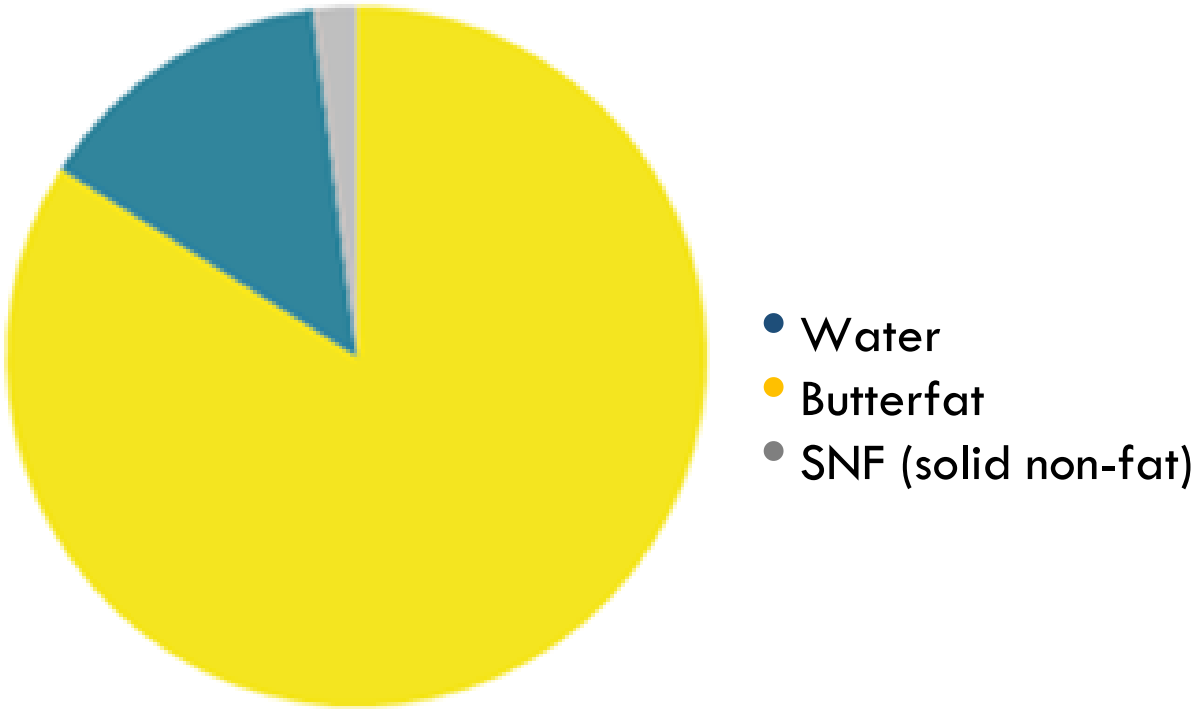
- Percentage of milk fat in the material
- Time of the cream mixing

➔ percentage of butterfat and total mass of the butter



Butter

Butter composition - a dairy product with 84% milk fat, 14% water and 2% lactose, protein and minerals



Cream to butter transition

Oil in water

Mechanical processing

Water in oil

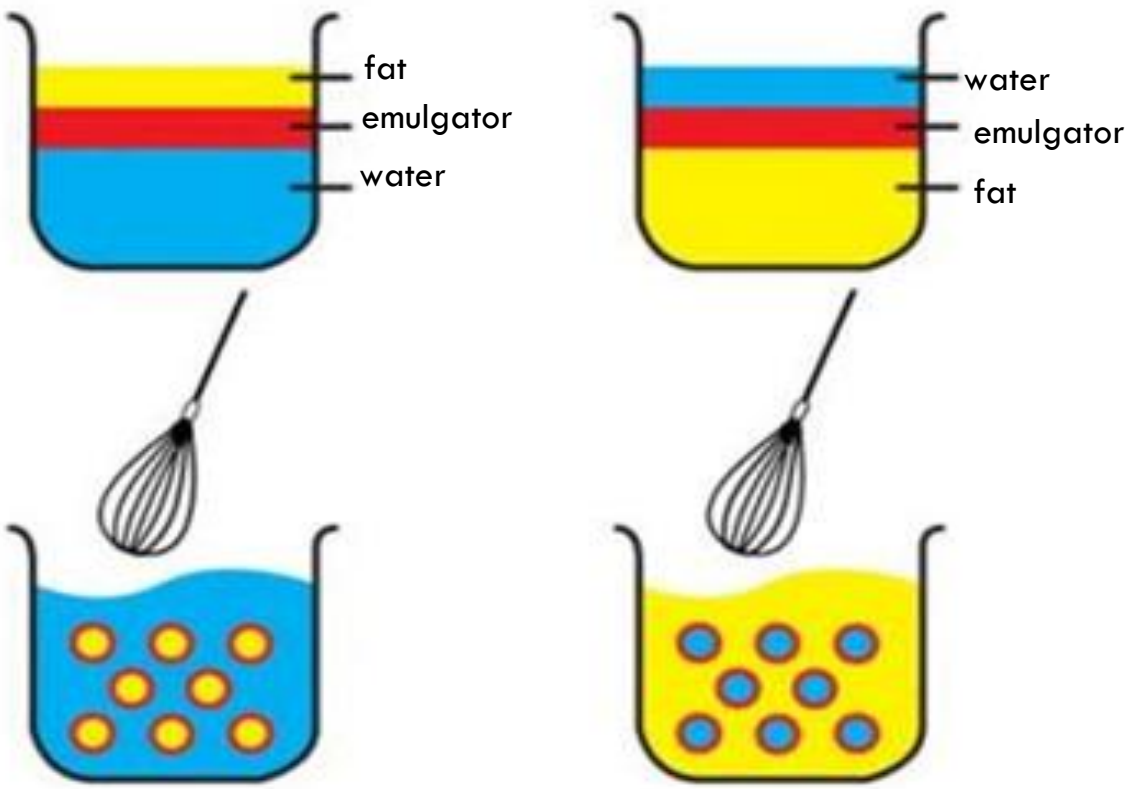
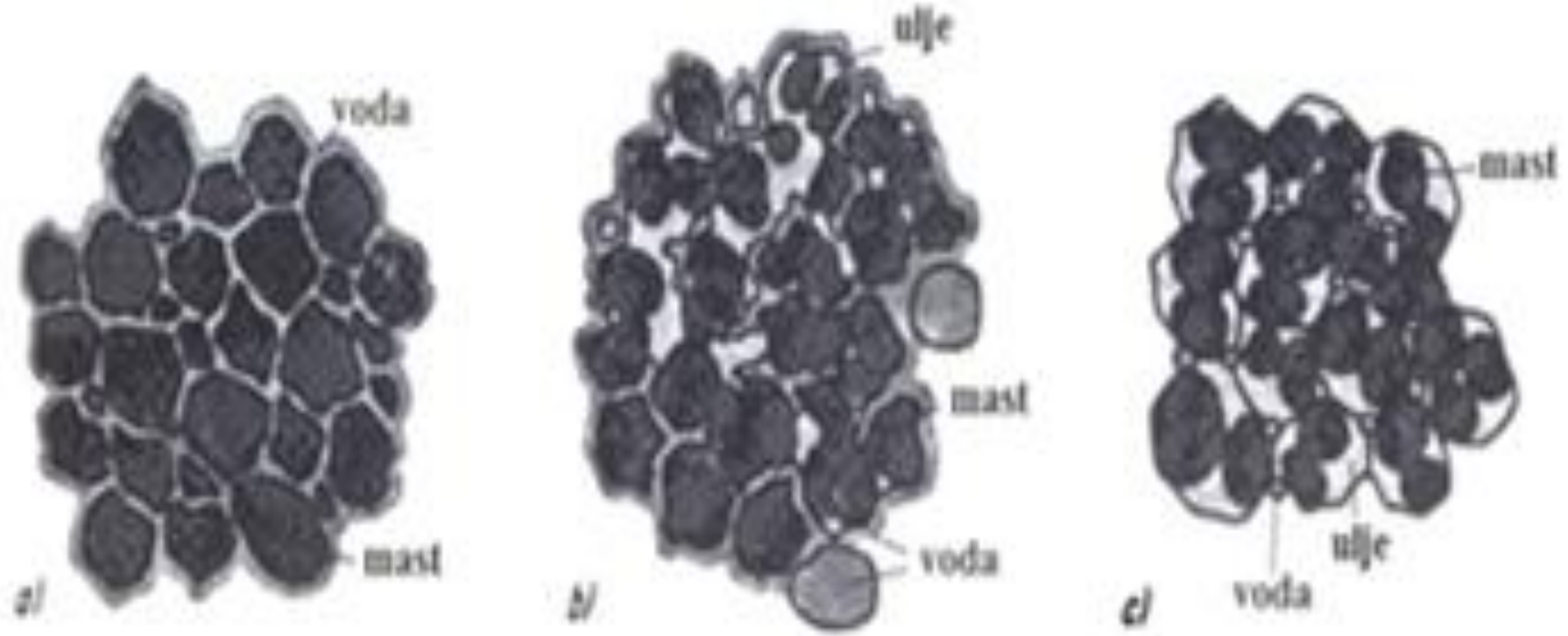


Photo no. 3, oil in water and water in oil emulsion

Butter structure



a)cream b) churning c)butter

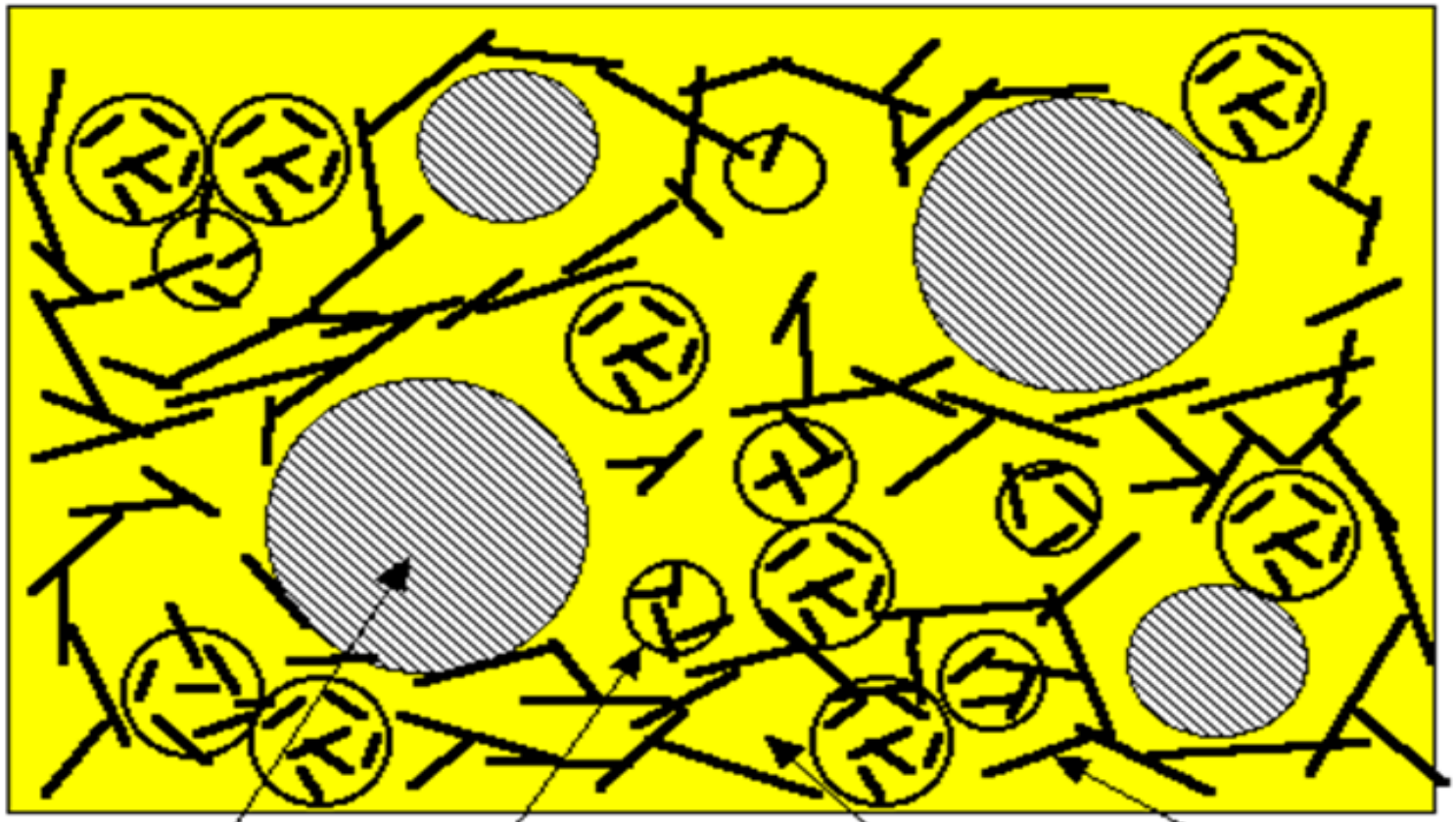
Photo no. 4, cream to milk transition

Butter grading

Photo no. 5, official butter grading stamp

Grade	butterfat %
AA	**> 92**
A	85 - 92
B	80 - 85
Isn't considered butter	< 80

Butter structure



Experimental setting

equipment:

- mixer "Bosch" 450W
- Silicon ladle
- 1000 ml measure
- 2000 ml plastic mixing bowl
- Metal cupcake mold
- Oven - 60°C
- Freezer - 4°C

Materials:

- 33% cream
- 20% cream

Modified Mojonnier method

1. mixing 100 ml of cream into butter
2. straining, wheighing, packaging butter
3. Dehidration of butter over 8h on 60°C
4. Butter hardening during 1h in a 4°C freezer
5. Wheighing butter for the second time
6. Statistic processing of the data using the formula:

$$\frac{m(butter\ after\ dehidration)}{m(butter\ before\ dehidration)} \times 100 = \%\ butterfat$$

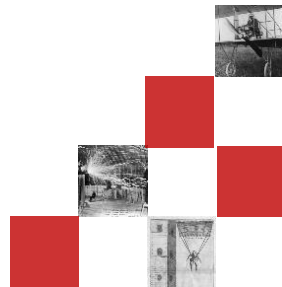
Hypotheses

H1: the longest mixing period and the highest fat perentage cream will yield the most butter.

H2: the shortest mixing period of the lowest fat percentage cream will yield the least butter

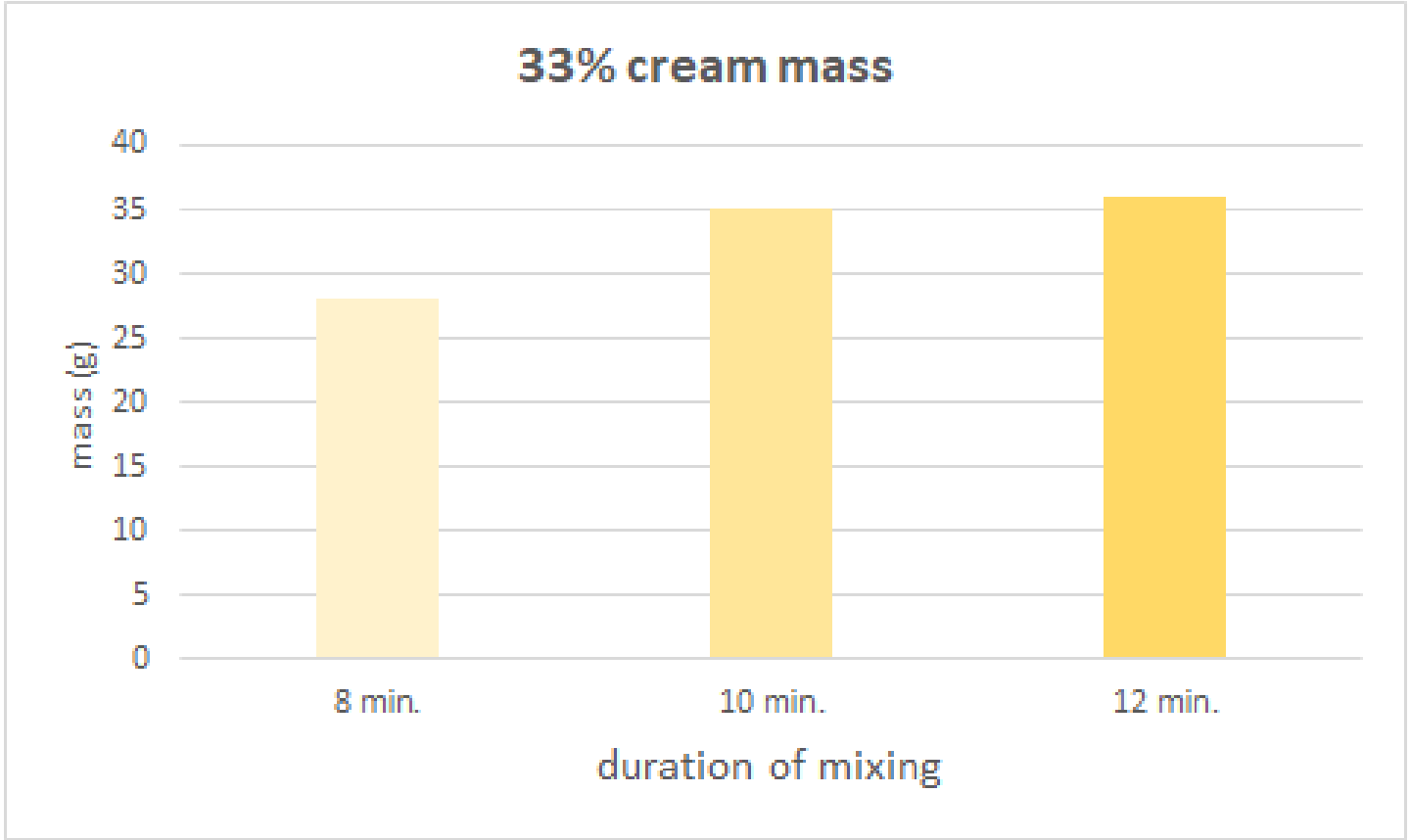
H3: the longest mixing period and the highest fat percentage cream will yield the butter with the most fat percentage

H4: the shortest mixing period of the lowest fat percentage cream will yield the butter with the lowest fat percentage



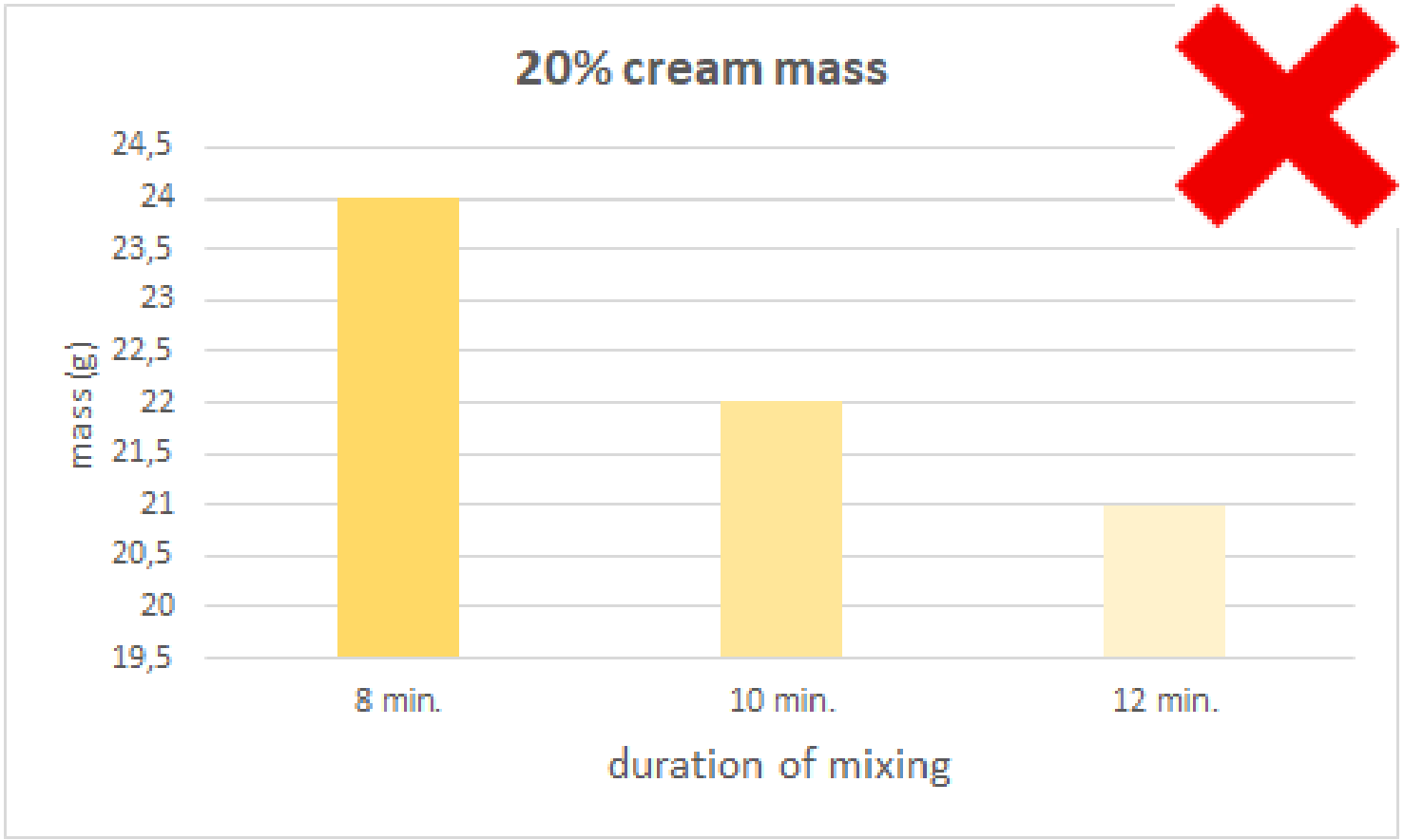
H1: the longest mixing period in a water bath and the highest fat percentage cream will yield the most butter.

- 33% cream during 12 minutes in a water bath – **highest butter yield**



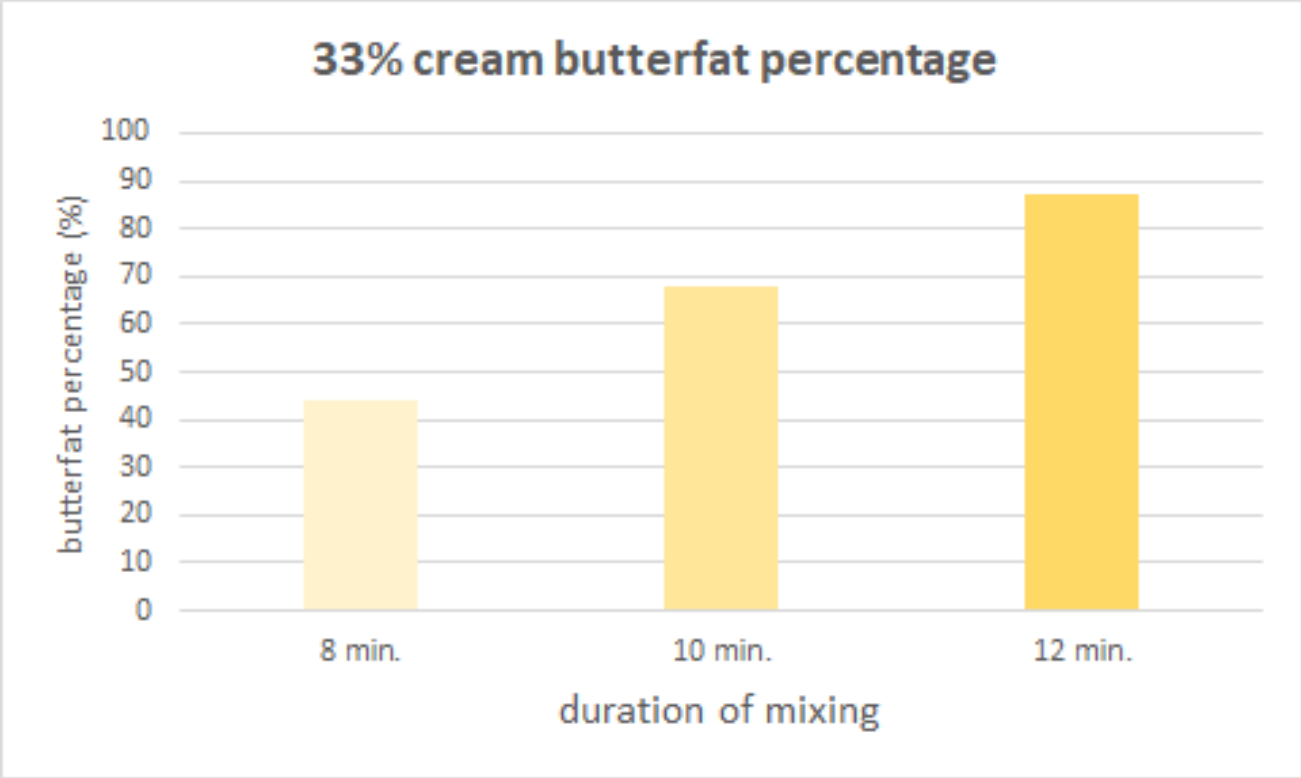
H2: the shortest mixing period of the lowest fat percentage cream without a water bath will yield the least butter

33% cream mixed for 12 min – **lowest butter yield**



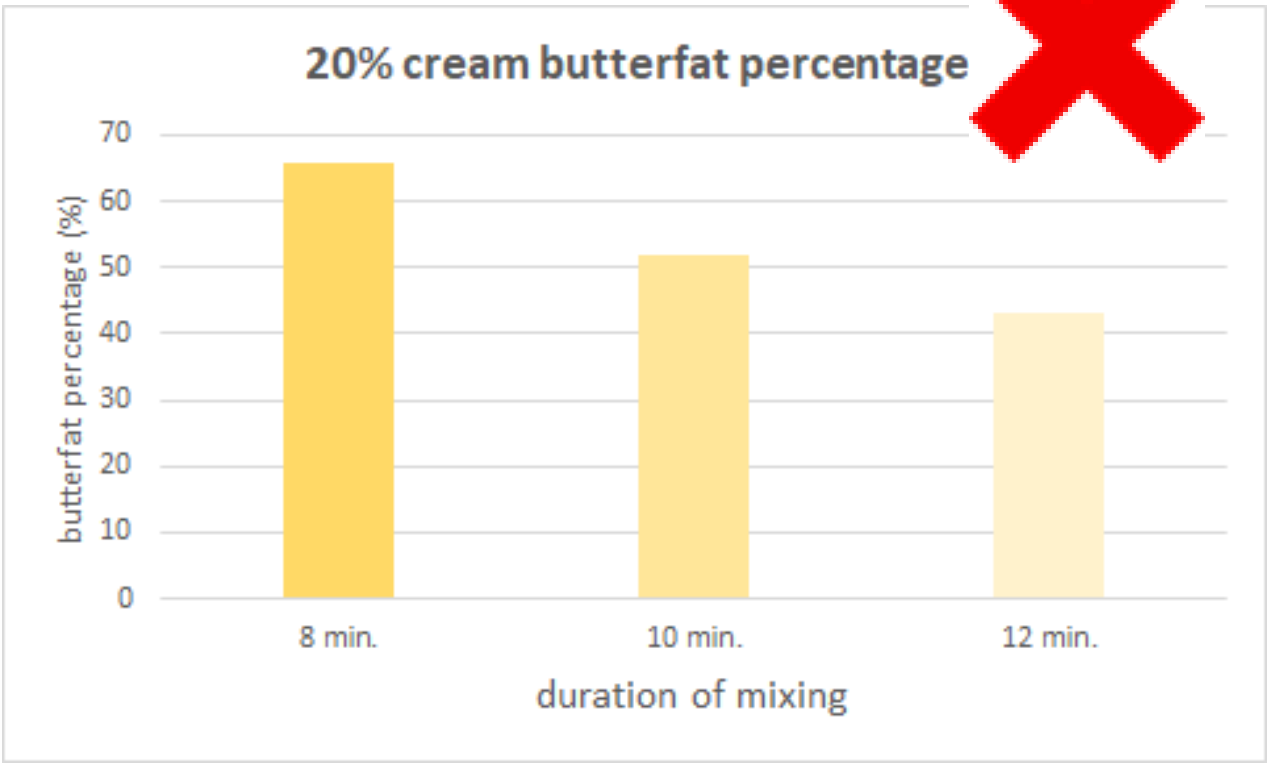
H3: the longest mixing period in a waterbath and the highest fat percentage cream will yield the butter with the most fat percentage

33% cream mixed for 12 minutes in a water bath yielded the butter with **the most fat percentage (lowest quality)**



H4: the shortest mixing period of the lowest fat percentage cream without a water bath will yield the butter with the lowest fat percentage

33% cream mixed for 12 minutes without the waterbath yielded the **butter with the least butterfat percentage**



Conclusions

- Higher percentage cream mixed for the longest amount of time yields the most butter
- Lower percentage cream mixed for the longest amount of time yields the least butter
- Higher percentage cream mixed for the longest amount of time yields the butter with the highest butterfat percentage
- Lower percentage cream mixed for the longest amount of time yields the butter with the lower butterfat percentage (lower quality)
- Longer period of mixing can lead to the destabilization of the emulsion and butter with lower butterfat percentage, thereby less quality of butter.
- Temperature is an important factor in butter quantity, but not quality

Thank you!

Team Croatia

Reporter: Dominik Čondić Bijader